

THE
ENTOMOLOGIST'S RECORD
AND
JOURNAL OF VARIATION

EDITED BY

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Editorial Secretary

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This magazine was established essentially as a Journal of Variation as its subtitle purports. Throughout the year we have again kept this object in view and largely dealt with phases of variation. The two main contributions on variation dealt with the *Noctuidae* and the *Melitaea*, the former marshalling the facts relative to our local island species, the latter, not only marshalling the facts, but going farther and suggesting what may, or may not be, the evolutionary lines of the present distributions and relationships of the species of this particular genus.

Besides the above there have been the article recounting experimental breeding of *Pieris brassicae* and summarising the forms hitherto recorded with additional forms; two articles in the *Coccinellidae* (Col.), and many individual records of variation.

The articles on Africa by our colleague Dr. Burr have been concluded. A correspondent wrote us the other day, "I thoroughly enjoyed reading Dr. Burr's account of his African travels and envied his many captures."

Faunistic work has been well recorded. We have "The Ants of Windsor Forest" for which our colleague Mr. H. Donisthorpe has had special local facilities afforded him; and "The Hemiptera-Heteroptera of Hants" has been concluded. Collecting experiences have been recorded by our correspondents from Calvalaire and S. France, Central Europe to Montenegro, and Belgium, the West of Ireland, Cornwall, Gloucester, Kent, Cambridge, etc.

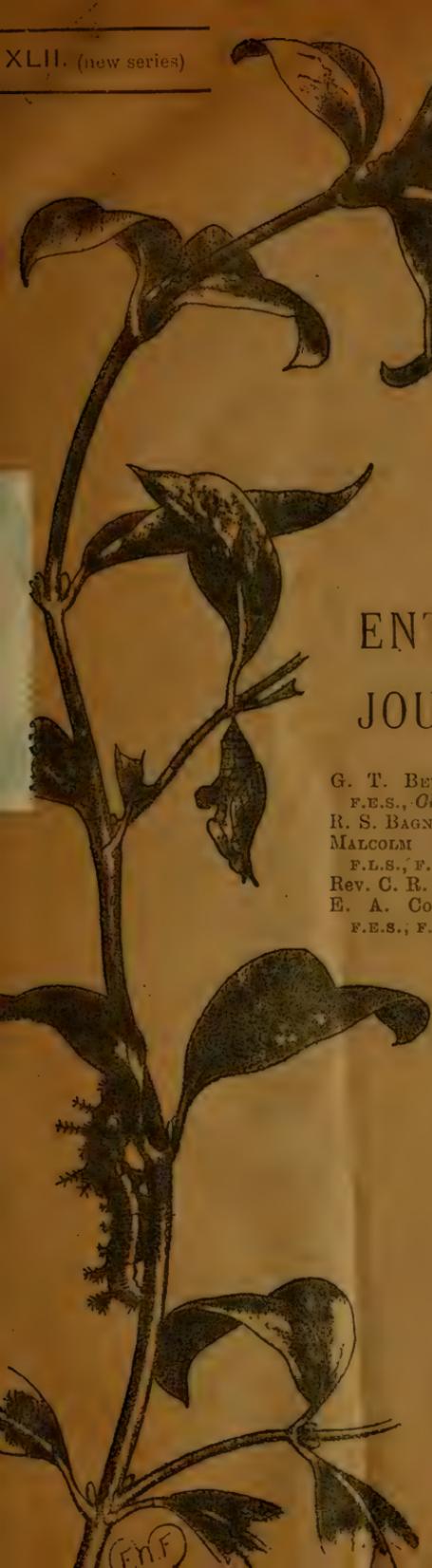
Reviews and short notices have been given to keep our readers informed of the advance of our study, with items of local and social matters of general interest.

Academic questions such as Nomenclature, Spelling of Names, etc., have been dealt with, but not, we trust, unduly.

May we ask in the coming year that our subscribers send us paragraphs on matters of interest, for insertion either in "Current Notes" or in "Scientific Notes."

We regret that the ranks of our supporters have been so thinned by the decease of many well-known entomologists and trust that our subscribers will help to obtain others to fill their place. With a good increase of subscribers we could then increase the number of pages.

We greet our readers with all seasonable wishes and ask them one and all to send us notes on entomological subjects and news of general interest during the coming year.—Hy. J. T.



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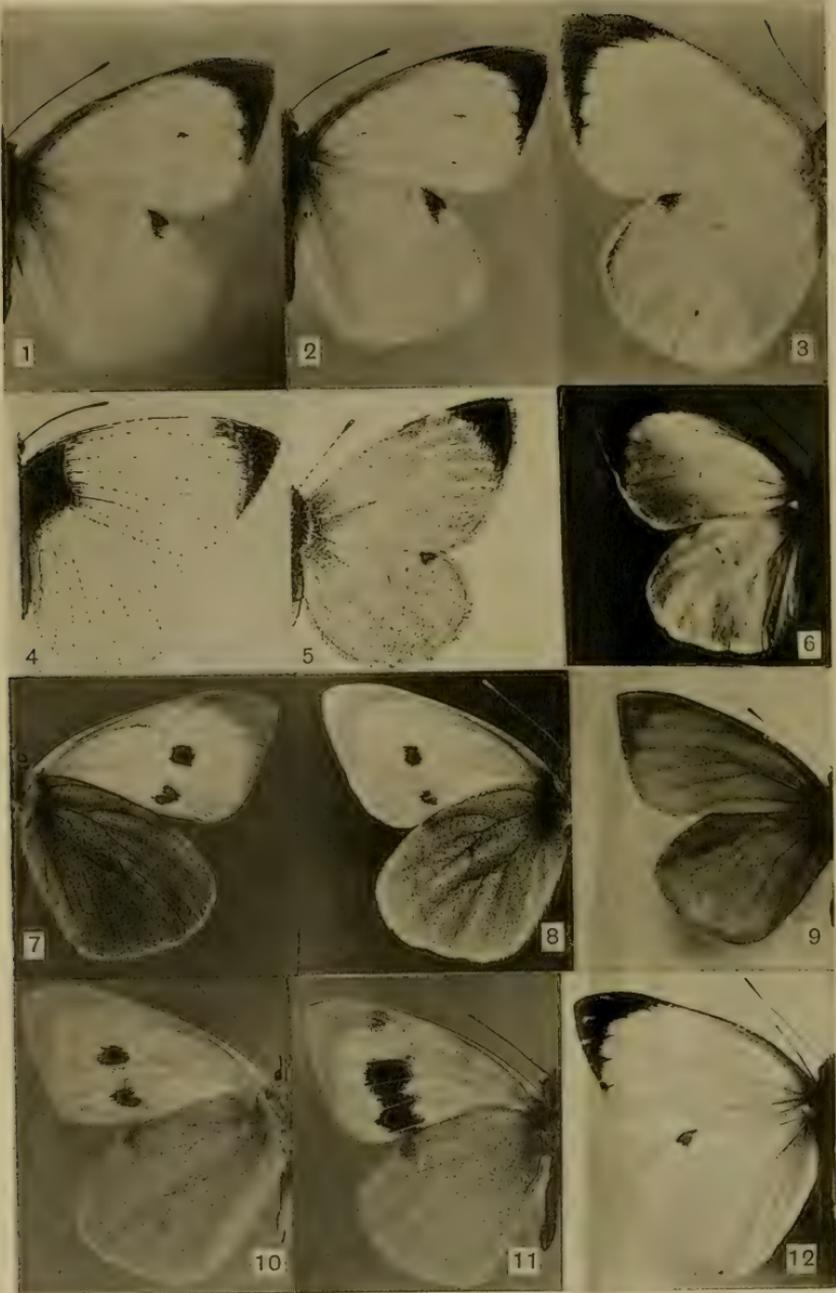
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The Entomologist's Record.

Photo. G. S. G.-S.

ABERRATION IN *PIERIS BRASSICAE*. (Male)

PLATE I.

PIERIS BRASSICAE, L. ABERRATIONS IN THE MALE.

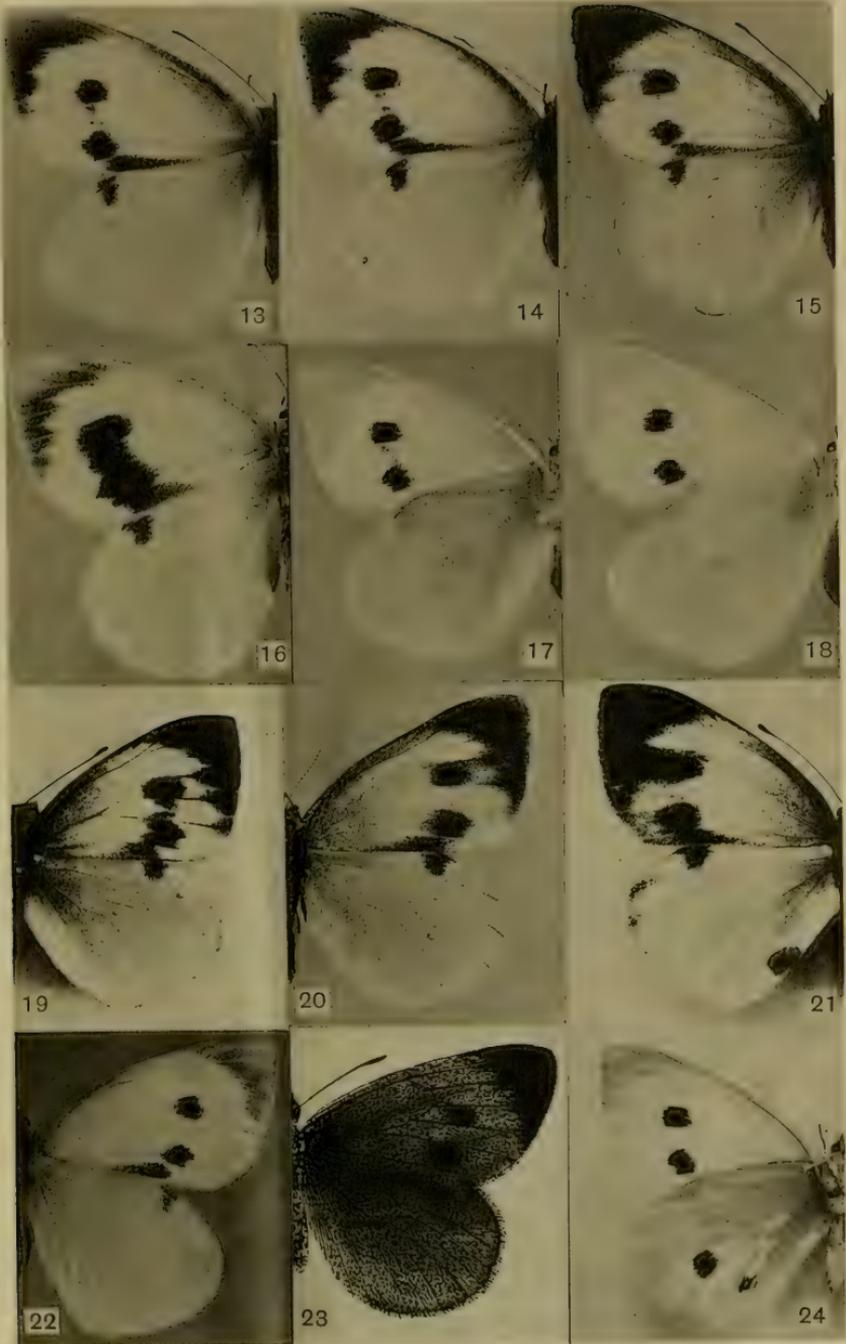
1. Ab. *nigronotata* (A.S.)
2. Ab. *binigronotata*, showing traces of ab. *marginata* (A.S.).
3. Ab. *marginata*, with faint traces of ab. *nigronotata* (race *nepalensis*, C.C.).
4. Ab. *basi-nigrescens* (from a drawing by Mosley of the illustration of Plant's specimen).
5. Ab. *semi-nigrescens* (from a drawing by Mosley of Cook's specimen).
6. Ab. *semi-nigrescens* (A.S.).
7. Ab. *anthrax* (A.S.).
8. Ab. *venata* (underside of fig. 6, A.S.).
9. Ab. *nigrescens* (T.C.).
10. Ab. *infra-fasciata* (A.S.).
11. Very marked development of ab. *infra-fasciata* (race *cheiranthi*, C.C.).
12. Ab. *nammei* (B.M.)

A.S. = Aberdeen Series; B.M. = British Museum; C.C. = Cambridge Collection; T.C. = Tring Collection.

PLATE II.

PIERIS BRASSICAE, L. ABERRATIONS IN THE FEMALE.

13. *Ab. fasciata* (A.S.).
14. *Ab. fasciata*, together with *ab. biligata* (A.S.).
15. *Ab. postero-maculata*, together with *ab. biligata* and slight traces of *ab. fasciata* (A.S.).
16. Very marked development of *ab. fasciata* (race *cheiranthi*, C.C.).
17. *Ab. infra-fasciata* (A.S.).
18. *Ab. pallida* (A.S.).
19. *Abs. fasciata* and *biligata* well developed (race *wollastoni*, B.M.).
20. *Abs. biligata* and *postero-maculata* (A.S.).
21. *Abs. biligata* and *punctigera* very well developed (race *nepalensis*, B.M.).
22. Near *ab. vasquezii* (A.S.).
23. *Ab. nigrescens* (from a drawing by Mosley of Bramwell's specimen).
24. A portion of the pattern of the upperwing, including the discal spots, reproduced on the underside of the hindwing (T.C.).



ABERRATION IN PIERIS BRASSICAE. (Female)

The Entomologist's Record

AND

JOURNAL OF VARIATION.

VOL. XLII. No. 1.

JANUARY 15TH, 1930.

Pieris brassicae, L., with special reference to aberrations from Aberdeenshire.

By G. S. GRAHAM-SMITH, M.D., F.R.S., F.E.S., and W. GRAHAM-SMITH.

(Continued from p. 180.)

nigrescens, Cockerell (1889).

Synonym: *obscurata*, Oberthür (1896).

The parts usually white are dark, greenish grey on both upper and undersides, while the usual dark markings are distinct. (Plt. I. 9: plt. II. 23).

Cockerell gave the name to a female captured two miles from Perth in 1868, and thus described by Bramwell (1869). It "is of a uniform dusky brown colour, both on the upper and undersides; the black spots on the wings are quite distinct, being of a much more intense and shining black than the ground colour."

Boisduval (1836, p. 521, var. β) mentions a female specimen from the neighbourhood of Paris, Oberthür (1896, p. 6, pl. I. fig. 5) describes and figures another female from Paris, and Bang-Haas (1915) describes two males, one from Begerburg in the Staudinger collection and another, which he figures (Pl. X. fig. 5), caught at Goldap in East Prussia in 1903, and now in the Tring collection.

This last specimen has a very "shaggy" upperside, the scales being more or less raised except at the margins and on the abdominal area of the hindwing. On the underside the scales in and below the cell of the hindwing are curled up, but on the underside of the forewing they are almost normal, though they show a slight tendency to curling. Possibly the coloration is largely due to malformation and displacement of the scales.

semi-nigrescens (ab. nov.).

Mosley (1889, 1896) mentioned that T. Cook had a male with "all wings suffused with sooty between the nervures." Plt. I. fig. 5, is from a coloured drawing of this specimen by Mosley, kindly lent by Mr. H. J. Turner. The specimen is now in the Free Public Museum, Liverpool, and the Director, Dr. J. J. Simpson, has kindly had it examined for us. The upper surface might be described as 'mealy'

in appearance, the scales being 'upturned at their edges.' The "underside of the upperwing on comparison seems normal, but the underside of the lower wing is certainly darker than usual, but *not* very much darker, and the scales are smooth."

In this series two male examples, one better marked than the other, of this aberration occurred, both exhibiting other anomalies (*venata* and *anthrax*) on their undersides.

In both, the upperside has a rough shaggy appearance due to the scales being raised, especially in the regions which are dotted in plt. I, fig. 5. The colour of the best marked example (plt. I., 6) varies with the conditions under which it is viewed, but generally exhibits a mottled, greyish-green tinge in the affected areas.

There can be little doubt that this condition is intermediate between the normal and ab. *nigrescens*, and presumably occurs in both sexes.

basi-nigrescens (ab. nov.).

Plant (1843) captured at Leicester in 1842 a male with the basal portions of all four wings black (plt. I. fig. 4). This specimen is figured in the *Zoologist* (I. p. 471) and by Morris (1857) in his *British Butterflies* (Pl. 7). Grosvenor (1908) exhibited a specimen from Aberdeen "with the forewings heavily speckled with black at the base, and underside of the hindwings similarly powdered."

anthrax (ab. nov.) [*ἀνθραξ* = charcoal.]

In a male of this series the undersides of the hindwings are so densely suffused with black scales that they have a very dark appearance (plt. I. fig. 7).

Perhaps a specimen exhibited by Leeds (1909) "with undersides of the hindwings a very distinct blue," and another from Bradford exhibited by Carter (1913) "having the underside thickly irrorated with black scales" are examples of this aberration.

No examples of this aberration were noted in the B.M. collection, and only two males approaching it, captured in April, 1893, and April, 1909, in the Tring collection.

Doubtless transitional forms occur. It is probable that a similar development of black scales occurs in the female, but we have not seen an example.

venata, Verity (1908).

Synonym: *plasschaerti*, Dufrane (1912).

The nervures of the underside of the male and of both sides of the female are made prominent by a dusting of violet-grey scales.

Verity described and figured (Pl. XXXV. 24, 25) three specimens from Morocco. In the Tring collection there are two male (Wexford, bred, 18.X.1924) and one female British examples, but none were noted in the B.M. series from various countries.

In this series there was one well-marked male example (plt. I. fig. 8).

aurea, Mosley (1896).

Synonyms: *flava*, Krulikovski (1902).

lutea, Röber (1907).

flava, Fischer (1925).

Mosley named this aberration from a male with the "ground colour golden yellow," offered for sale at Bradford. He had previously stated that he had seen a male, presumably the same specimen, with the ground colour "sulphur yellow" in "a very old collection."

Another British male, labelled "Brown Collection" is in the Tring Museum.

Bang-Haas (1915, Pl. X. f. 7) figured a female taken in Silesia and named by Röber, and took another female at Hanau. There is a bright yellow female from Prussia in the Tring Collection, and two decidedly yellow females from Morocco in the F. B. Newnham Collection at Cambridge.

Fischer (1925) occasionally produced similar forms, both male and female, in experiments conducted on pupae between 1918 and 1924. It may be desirable to retain his name, *flava*, for such experimentally produced aberrations.

Kruikovski (1902) applied the name *flava* to a male from Samara with the upper surface of a delicate yellow colour.

It is evident that all variations from light to deep yellow occur, but it seems inadvisable to attempt to differentiate by name between aberrations of different tints.

carnea (ab. nov.).

Newman (1916) exhibited "two pairs (a part of a series) of *Pieris brassicae* bred from wild Aberdeenshire larvae, the ♂♂ especially showing a decided pink coloration all over the wings."

pallida (ab. nov.).

The undersides of the hindwing and of the apical areas of the forewings are pale, lacking to a great extent the yellow colour normally present. In most cases in the spring generation the black pigmentation commonly present on the hindwing is slightly developed (plt. II. fig. 18).

A very marked example from Monk's Wood, Hunts, is figured by Frohawk (1914, Pl. 3, fig. 20). Amongst the 39 underside British spring males in the Tring Collection there are three good examples, and four amongst the 28 females. In this series there were two well-marked examples (0.2 per cent.), both females.

sublutea, Turati (1924)

The black dusting at the bases of the upper sides of both fore and hind wings is absent. The specimens occurred in the race *cyniphia* (p. 27).

rammei, Knop (1922)

Knop describes a female captured near Bremen, July, 1915, in which the nervures are traceable on each side as four yellow-brown streaks (1mm. × 10mm.) passing through the apical blotch of the forewing.

Adkin (1918) states that he saw an example of this aberration on August 5th, 1917, at Eastbourne.

In the British series in the B.M. there are three examples, one, a male from Paignton, Devon, captured in July, 1901 (plt. I. fig. 12), one a female, from Edelstone, Warwick, also captured in July, and a female

from Carnarvon. The British collection at Tring contains two male examples, one, well-marked on both wings, captured at Southend on June 7th, 1900, and the other slightly marked on the left side only. In all these cases the nervures appear as pale yellow lines passing through the apical blotch.

Very occasionally recently emerged specimens rub the tips of their wings against the walls of the breeding cage in such a manner that the scales covering the prominences due to the nervures are alone removed, thus simulating the aberration *rammei*.

minor, Ksienschopolsky (1911)

Small examples, measuring 40-50mm., to which the name *minor* has been given by Ksienschopolsky, are to be seen in most museums.

elongata, Gelin (1914)

Described from a single small specimen (50mm.) with marked narrowing of all four wings.

GYNANDROMORPHS seem to be very rare.

Occasionally curious aberrations occur. There is for example at Tring a female bred from a larva collected at Brighton in August, 1898, in which a portion of the pattern of the anterior wing, including the discal spots, is present on the underside of the right hindwing (plt II. fig. 24).

Green blotches or streaks along the nervures are due to injury during or shortly after emergence.

RACES.

Hubner (1806) described the very distinct and remarkable form, *cheiranthi*, from the Canaries, and Gray (1846) presumably recognised that *P. brassicae* from the Himalayas differs from that of Europe, when he figured it under the name of var. *nepalensis*. Later Butler (1886) described the form, *wollastoni*, from Madeira as a distinct species. It is not surprising that in these localities, distant from Europe and little likely to be influenced by migration, distinct races occur, though "it is worthy of remark that the typical *Pieris brassicae* occurs in the Azores" (Kirby, 1894).

In spite of its marked tendency to migrate, sometimes in great numbers, the recent work of Verity and others has shown that various geographical races, more or less recognisable and each with different seasonal forms, denoting the several generations, occur in Europe and the Mediterranean region. Those races and their seasonal forms have received names, but unfortunately there is much confusion in regard to them, and further work is required before their geographical limits, their differentiating characters and the influence of altitude, local climatic conditions, food, migration and other factors upon them are definitely established.

The term "race" is here used in the sense of Rothschild and Jordan's (1903) "*Geographical Variety or Subspecies*," but while some of the races described, such as *cheiranthi* and *wollastoni*, may be regarded as subspecies, since almost all the individuals are peculiar, in others the percentage of peculiar forms is much smaller, and in

some the claim for special distinction has yet to be established. Rothschild and Jordan consider that a race should be "designated by its name added to that of the species without any abbreviation before the subspecific name." The "generatory" or seasonal variety they designate as f.t. = *forma tempestatis*.

The following is a brief summary of the races hitherto described.

EUROPEAN RACES.

According to Verity and Querci (1923) there are in Europe two distinct races: (I.) race *brassicæ*, L., extending northwards from Central Italy "to the whole of central and Northern Europe," including England, and (II.) race *verna*, Zeller, occurring throughout the Mediterranean area and Asia Minor. In both races two, and sometimes three, generations occur, displaying special characters and possessing distinctive names.

I. Race *brassicæ*, L. (1758).

In this race there are always two, and sometimes three, generations to which the names *chariclea*, *brassicæ* and *tertia* are applied by Verity and Querci (1923).

1st generation, f.t. *chariclea*, Stephens (1828).

In England the imagines appear at the end of April and in May from pupae which have survived the winter. The characters of the commonest form (ab. *chariclea*) have been described (*ante* XLI. p. 177), but at this season specimens with all the characters of the second generation (*brassicæ*) are sometimes observed. It is possible that these may be derived from pupae belonging to the second generation of the previous year, which overwintered instead of emerging in July. On this point no evidence seems to be available.

2nd generation, f.t. *brassicæ*, L.

The imagines, derived from eggs laid by the first generation in May appear in England in July and August, and differ from those of the first generation in having the apical blotches very dark, their extreme tips only being slightly irrorated with white, and indented internally along the nervures. The hindwings beneath are pale yellow and only slightly dusted with black scales.

It is difficult at present to state the range of variation in this generation in England, for it is poorly represented in the collections we have seen. This is due partly to neglect of this common and apparently uninteresting species during the height of the season, and partly to the fact that the larvae are not found in abundance in gardens, as they are late in the season. The autumn larvae on the other hand are often very abundant in gardens and can be collected easily in large numbers. Consequently the first generation and its aberrations are better represented.

To the second generation in Central Europe the name *lepidii* was given by Röber. Verity and Querci (1923) suggest that "as Stephens by creating his name *chariclea*, restricted the specific name to the summer form, there is no use for Röber's *lepidii*," but Stauder (1921, A) thinks that the central European summer form is sufficiently distinct from its large size, and light coloration with absence of black

scaling on the underside of the hindwing to justify a distinctive name.

3rd generation, f.t. *tertia*, Verity (1919).

In favourable seasons a third generation with the same characters as the second may be produced.

Verity (1908, p. 164) stated that in the extreme north and above 1200 m., only one generation occurs, but judging from his later paper (1923) and a recent letter to us (Feb. 1929) he seems to have modified this opinion.

We have given reasons for thinking that in normal years in the north of Scotland only a single brood, with the characteristics of *chariclea* occurs. If this surmise is found to be correct by those who have the opportunity of working out the problem locally, a form exists in the north which has some claim to being regarded as a race.

II. Race *verna*, Zeller (1847).

In this race there are usually three, and sometimes four generations, called respectively *verna*, *aestiva*, *tertia* and *autumnalis* by Verity and Querci (1923).

1st generation, f.t. *verna*, Zeller (1847).

This generation was usually spoken of as *chariclea* until Verity and Querci (1923) pointed out the differences from the northern *chariclea*, and proposed the name *verna*, applied by Zeller to forms from Messina in Sicily. They state "it differs from *chariclea*, Steph., in the lowlands, chiefly by consisting of individual forms transitional to *vasquezi*, Obth., and by producing well characterised ones of the latter quite frequently."

2nd generation, f.t. *aestiva*, Zeller (1847).

The specimens are larger and have more extensive black apical blotches than *brassicae*, and show very scanty black scaling on the very pale yellow undersides of the hindwings. In the female the indentations on the inner side of the apical blotch are sharper—(Verity, 1908, pl. XXXV. 12, 13; and Seitz, 1907, I, pl. 19e).

To the second generation from Taurus and Syria the name *catolenua* was given by Röber (1896, 1897), but Verity and Querci (1923) consider these specimens to be identical with those of the same generation from Italy, Spain, etc., and assert that "Röber's *catolenua* is not an oriental race, but is the second generation of the whole of Southern Europe." Graves (1925) agrees with this view. Verity and Querci (1923) propose, on the ground of priority to substitute the name *aestiva*, applied by Zeller to forms from Syracuse, for *catolenua*.

3rd generation, f.t. *tertia*, Verity (1919).

Verity in 1919 thought that the third brood had "intermediate characters between the first and second," but later (1923) made the following statement: "As to the third generation in southern Europe I have called *tertia*, I am not fully convinced that it is not perfectly identical with the second of northern Europe (which is also the most usual in central Europe), and consequently nothing but nymotypical *brassicae*, L."

4th generation, f.t. *autumnalis*, Rocci (1919).

This occasional generation seems to have the same characters as the third.

Stauder (1921, A) working in the Illyrian-Adriatic region says that in the Julian Alps there are two generations only, but elsewhere at least three and sometimes four. Not infrequently in sheltered situations near Trieste and in Dalmatia he found larvae feeding or about to pupate in December, January and February, and states that in the south the species can hibernate as a larva.

He terms the first generation, with heavy white scaling on the apical blotch and dark undersides on the hindwings; *chariclea*. The second generation, characterised by its larger size, wholly black apical blotches and light undersides without black scaling of the hindwings, he terms *lepidii*. The third generation resembles the second but is larger, often has dark dusting over the white upperside, and in the female the club-shaped mark and the costal spot of the hindwings are strongly developed. This south Illyrian-Dalmatian-Italian third generation he thinks deserves a special name and calls f. *pseudocatoleuca*. The fourth generation is similar to the first.

III. Race *italorum*, Stauder (1921, B).

Stauder names this race from specimens taken during June and July in the middle and higher region (400-1600m.) of the Calabrian Apennines, describing it as a mixed form between "*chariclea*, *catoleuca* and *lutea*, Röber."

The apical blotch is grey and the underside of the hindwing heavily dusted with black scales. In some of the females strong "teeth" along the veins join the apical blotch to the upper costal spot (ab. *biligata*), and in most examples the discal spots are united by a bridge of small dots (ab. *fasciata*). In the female the whole of the upper surface is yellow or greenish yellow.

(To be continued.)

Field Notes from Angola.

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

XV. CONCLUSION.

(Continued from Vol. XLI, p. 143.)

My last letter was written from the camp at the source of the Quangu at the end of October, 1927. Now, two years later, I take the advantage of increased experience to contribute a few final observations and to correct some of the more egregious blunders, which cropped up inevitably in the circumstances under which the letters were written.

I was storm-bound up the Quangu for some days and then had to hurry back to the camp on the Lungue Bungu as food supplies were running out. Here I picked up Pavel Stepanovich and we started to trek back to the railway on our way to Villa Luso. The rains were in full swing and we were having violent thunderstorms at least once a day, but this marked the beginning of the best season for Entomology, for a whole series of fresh and unfamiliar Orthoptera appeared in considerable quantities. One of the most noticeable was the creature

I have referred to previously as *Chrotogonus*. I now have learnt from Mr. Uvarov that this is a remarkable new genus related to *Chrotogonus*, from which it differs in its notably dilated, broad, flat, toad-like body and complete winglessness. The female is about double the size of the male. It occurs exclusively on the pale sand, which it matches in colour. Since July I had been picking up occasional specimens but now it suddenly appears to be abundant on sandy patches up the river valley, especially along the Mu-Simoi.

I found the scrub around Villa Luso very altered. When we were there in the dry season it was poor and most of the Orthoptera found in it were immature. Now it abounds in life. The most striking is a great tawny cricket with a big head, a *Brachytypes*, a creature as big as a man's thumb. I had been finding the larvae and was glad now to get plenty of the adult. I had expected that so fine an insect would have a very penetrating voice, and I have a recollection of having read in years gone by that Krauss, writing of the Sicilian species, states that its stridulation can be heard a mile away. As a matter of fact the whole bush resounded with the short, sharp, loud note of this great cricket. It sounded much like the cheep of a bird, and a fair sized bird, too. I was puzzled at first, as it resounded on every side, especially in the late afternoons and before and after rain. I thought the bushes must be full of birds, yet could find none. Then we ran it down to this cricket. It is not a prolonged song, like our familiar European crickets, but a sharp, piercing, short chirp. When held in the fingers, the creature opens its formidable jaws and chirps in anger.

Sweeping in the scrub, instead of producing, after great effort, only a few immature *Pyrgomorphae* or such common things now turned out new and unfamiliar fellows in considerable quantity and variety. Of a curious black creature with antennae tipped with white, unfortunately, I got only one specimen, but the long black fellow with orange wings referred to previously, in Letter XIV from the Quangu, *Glyphoclonus*, probably *miripennis*, Karsch, was fairly numerous. Those from the Quangu had brilliant orange wings, but these had bright crimson. It is a striking creature in its intense blackness with gorgeous wings in startling contrast.

On November 9th, 1927, Nazaroff and I left Villa Lusa with two British-made lorries, two-and-a-half tons of baggage, and motored through the forest into the Belgian Congo, arriving six days later, after sundry adventures, at Elisabethville, the attractive little town that is the capital of the Katanga, the great mining district of Central Africa.

The material collected has all been sent to the British Museum and is being determined by Mr. Uvarov. The amount is very considerable and as the collections made afterwards in the Congo and in Northern Rhodesia are included, some time must yet elapse before the work is complete. Meanwhile we may take the opportunity of correcting some of the errors in the earlier letters.

Letter No. I. (*Ent. Rec.* XXXIX., No. 10, p. 136). The stridulation recalling that of *Locusta* was probably produced by a *Conocephalus*, which is the most persistent and penetrating songster among Central African Locustids. The single, metallic note referred to in Loanda was probably produced by a bird.

No. II. (*l.c.* XXXIX., p. 152). The big Hetrodid from near

Amboim is referred to the genus *Acanthoplus*; it is very likely *A. longipes*, Charp.

No. IV. (*l.c.* XL., p. 3). The slender little Locustid referred to at the bottom of p. 3, as resembling in figure a minute *Saga* is a Conocephalid, referable to the genus *Megalotheca*.

No. VI. (*l.c.* XL., p. 26). The mysterious and peculiar stridulation referred to here was afterwards traced to *Conocephalus*, a very persistent and penetrating vocalist. Species are numerous.

No. VII. (*l.c.* XL., p. 50). The small Heterodid referred to at the bottom of page 50 is *Cloathella clypeata*, Bol.

The top paragraph on p. 51, about the "dwarf Sagid," should be deleted. On p. 109, in the middle, the "small, grey Pamphagid" referred to is not referable to the *Pamphagidae*; the genus is *E. rochoederus*, Bol., of the *Aceridiidae*. The little butterflies referred to at the bottom of p. 110, are, of course *Acræa*. The "diminutive *Saga*" at the bottom of p. 112, is, of course, the same *Megalotheca* referred to above.

No. IX. (*l.c.* XL., 1928). P. 129, the fat, shiny brown creature referred to is *Maxentius*, a Stenopelmatid.

No. XI. (*l.c.* XL., Dec., 1928). The two species of *Acrida* referred to on p. 172 are respectively *A. crocea*, Bol., with crimson wings, and *A. liberata*, Burr., with yellow wings banded with black. The *Saga* referred to on the same page belongs to the genus *Clonia*.

In *l.c.* XLI., in the letter from Cobemba, at the bottom of p. 15, I was mistaken in writing of polymorphism. This does occur, of course, to a marked extent in the Orthoptera and wing-coloration is an unstable feature, but in the case referred to here there were certainly at least two genera involved.

No. XIII. (*l.c.* XLI., p. 58). The leaf-like Mantid here is *Phyllocrania*.

No. XIV. (*l.c.* XLI., p. 122). The black Truxalid with orange wings in the first paragraph belongs to the genus *Glyphoclonus*, probably *miripennis*, Karsch. Among the "burnt grasshoppers," referred to a little lower, the one with the posterior extremities singed, so to speak, is *Parga*.

Cavalaire and the New Riviera. May, 1929.

By LIEUT. E. B. ASHBY, F.E.S., F.Z.S.

Leaving London on May 7th at 8.20 p.m., I arrived at Cavalaire, Var, via Newhaven, Dieppe, Paris, Marseilles and St. Raphael on May 9th at 10.30 a.m. It was necessary to spend the night at Marseilles en route. The journey along the coast from St. Raphael by the Sud de France Railway is very pretty. On arrival I sampled the pine forest zone to the north of Cavalaire in the sunless afternoon and I was only able to put up a bag of 1 freshly emerged *Arctia villica*, 4 males and 1 female in good condition of *Polyommatus hispana*, H.S.; the wasps *Polistes gallica* and *Vespa germanica*; the Coleoptera *Trichius fasciatus*, L.; *Oxythorea stictica*, L.; *Stenopterus rufus*, L.; *Exosoma lusitanica*, L.; *Melasoma populi*, L.; *Oedemera lurida*, Marsh.; *Oedemera flavipes*, Fab.; the Diptera *Machaerocera grandis*, Rond.; *Bombilius venosus*, Mik.; the Hymenopteron *Chrysotoxum arcuatum*, L.;

and the Rhynchota *Harpactor (Rhynocoris) erythropus*, L.; the Burnet Moth *Zygaena stoeccadis* was just out.

May 10th.—This morning I resumed my collecting of *P. hispana* to the north of Cavalaire station, taking also the moth *Diacrisia mendica*; also one specimen of the very beautiful *Thalpocharis purpurina*, and the beetle *Oedemera flavipes*, Fab. Afterwards taking the 10.19 a.m. train to Bormes, I collected in the direction of La Londe, with fine hot sun all day tempered with a strong wind. I took fresh *Limenitis rivularis (camilla)*, *Aporia crataegi*; the subsp. *ausonia* of *A. crameri* the "skipper" *Erynnis alceae*, *P. hispana*, *Anthocharis crameri (belia)* and the Hymenoptera *Odynerus (L.) dubius*, *Anthidium sticticum*, *Messor barbarus*, L., *Macrophya rustica*, L. (males), *Panurgus ursinus*, *Halictus perezi*, and the beetle *Psilothrix cyanea*, Oliv.

May 11th.—This morning I ascended the valley of Malatras, the direction of which is indicated by the notice board a short distance North behind the railway station. It is an hour's walk. I ascended also to the top of the mountain behind the valley, another hour's hard pull, but I shall not repeat it. On the summit on masses of spurge in full flower I took a quantity of Hymenoptera amongst them being, *Strongygaster singulatus*, *Allantus dahliei*, Klug., *Amblyteles armatorius*, 3 males, and *Coelichneumon lineator*, Fab., 1 ♀, and the Coleoptera *Trichius fasciatus*, L., *Cebro lepturoides*, F., *Chrysomela sanguinolenta*, L. On the way back I took a fresh *Zerynthia (Thais) polyxena (hypermnestra)* subsp. *cassandra*, a female of *Heodes dorilis*, a female of *Glaucopsyche cyllarus*, *L. rivularis*, *Pontia daplidice* form *bellidice*, *A. crameri* subsp. *ausonia*, a nice series, and *P. hispana* both sexes; the Rhynchotid *H. erythropus*. I omitted to mention that while still on the summit I saw distinctly a quite fresh *Thestor ballus*, which I failed to secure, an occurrence significant of the unusually late spring.

May 12th.—I took to-day the first *Melanargia syllius* in perfect condition, they are not common at present, and not easy to net on the sloping grounds behind Cavalaire. On a day when the sun has been obscured, I got little except a number of *P. hispana* ♂s together with some *P. daplidice* subsp. *bellidice*, the pretty beetles *Oedemera flavipes*, F., and the Dipteron *Rhagio (Leptis) conspiciuus*.

May 13th.—To Cogolin by train, changing at La Foux. I collected along a stream running south of the station, and at right angles to the main road, which (and the railway) crosses the stream. I heard last year at Hyères that Cogolin was a good collecting ground and I should surmise that there is a good deal of workable ground in the district. The day produced about 10 *cassandra*; males of *Melitaea didyma*; *L. rivularis*; and I saw a specimen of the Footman Moth *Deloipea pulchella*, but failed to secure it. Of the bees *Andrena hessae*, Panz.; *A. morio*, *Anthidium sticticum*, and *Lionotus dubius*; the Dipteron *Xanthogramma ornatus*, Meig.; and the Coleopteron *Telephorus fuscus*, were taken.

May 14th.—To-day at Bon Porto, the next cove west of Cavalaire I found the beetle *Chaleophora mariana*, L., amongst mussel beds left by the retreating tide, and on the hills above the cove the following Hymenoptera settled on spurge, viz.:—*Vespa germanica*, *Eumenes pomiformis*, *Anthophora tarsata*, Spin., *Allantus dahliei*, Klug., *Macrophya rustica*, L. males, *Odynerus callosus*, Thoms., *Nomada nobilis*, and *Mutilla coeca*, Rad., 1 ♂; the spring generation of *Pararge aegeria*

are mostly worn at to-day's date. The Dipteron *Dasygogon tentonus* was taken.

May 15th.—To-day at Cogolin, *Plebeius aegon*, males, were emerging and the Burnet moth *Z. stoecadis*, Bork., getting quite plentiful. I found a large batch of *Vanessa io* larvae all feeding on wild hop. Nettle seems a scarce plant in the district. Quite fresh specimens of the moth *Hemaris fuciformis*, L., were not uncommon. A very large form of *Sphrecodes gibbus* was not rare on spurge. I also took the Rhynchotid *Syromastes marginatus*, and a beautifully fresh specimen of *Bombus hortorum*, L.

May 19th.—The first quite fresh specimens of *Melitaea pseudathalia* at Cavalaire, and the ants *Messor barbarus*, L., and *Camponotus cruentatus*, Latr., were met with.

May 20th and 21st.—During these two days I worked the ground along the railway line between Cavalaire and La Croix. The Burnet moth *Z. stoecadis* was generally common, usually with 6 spots, but sometimes with only 5 spots on the forewings. Between Cavalaire and Pardigon I found the beetle *Pimelia bipunctata*, Fabr., in some numbers, and between Pardigon and La Croix in two grassy patches on the left hand side of the railway line I found *M. syllius* in such numbers that I was able to take a nice series of quite fresh males; I also took males of *Emydia cibrum*, a specimen of *Rhodostrphia cabraria*, Scop., and a *Boarmia punctinalis*, specimens of the bees *Polistes gallica*, *Eumenes pomiformis*, *Andrena hessae*, *Proanthidium laterale*=*4 lobum*, Oer., the Rhynchota *Eurygaster austriacus*, Schr., and *Coranus niger*, Rmb., the beetles *Mylabris variabilis*, Pallas., and *Chrysomela hyperici*., the Dipteron *Tabanus ater*, Fabr., and a larva of the Orthopteron *Bacillus granulatus*, Brullé., were taken.

May 22nd.—To-day ascending from Bormes Station about mid-day I mounted up through the small town into the beautiful Forêt du Dom, an open Forest and extremely hot. *Epinephele pasiphæe* was commencing to emerge and I secured a couple of males; also a nice series of males of *Lionotus dubius*, Sauss. I saw a perfectly fresh male of *Dryas pandora* settled, but was unable to secure it. Some fine large forms of *Epinephele jurtina* subsp. *hispulla* were in prime condition. The beetle *Protactia morio*, Fab., which was active on the wing seemed particularly interested in me, as it flew round and round me on several occasions in the Forest; also the Dipteron *Machaerocera grandis*, Rond. I saw nothing of *Hesperia sidae*, but secured one specimen of the Rhynchotid *Verlusia rhombea* var. *quadrata*, Fab.

(To be continued.)

Coccinella hieroglyphica—New Aberrations.

By G. CURTIS LEMAN, F.E.S.

A. At the request of my friend Herr Leopold Mader, of Vienna, I have named the following further aberrations of this species, which are new to me:—

1. ab. **mul santi**, mihi, nov. ab. Formula: $\frac{1}{2}$, 1, 2, 3.
2. ab. **gradli**, mihi, nov. ab. Formula: $\frac{1}{2}$, 1, 4, 5.
3. ab. **ryei**, mihi, nov. ab. Formula: $\frac{1}{2}$, 2+1+3, 4.
4. ab. **beffai**, mihi, nov. ab. Formula: $\frac{1}{2}$, 1+2, 3, 4, 5.
5. ab. **caprai**, mihi, nov. ab. Formula: $\frac{1}{2}$, 1+3+5+4.

6. ab. **biconfluenta**, mihi, nov. ab. Formula: $\frac{1}{2}$, 2+1+3, 4+5.

7. ab. **incompleta**, mihi, nov. ab. Formula: (2+1+3+ $\frac{1}{2}$)(3+5), 4.

The types of Nos. 3 to 7, both inclusive, are in Herr Leopold Mader's collection.

B. Herr Leopold Mader has pointed out to me that ab. *kirkai*, Lem., is a synonym of ab. *brachiata*, Gratl. (Formula: $\frac{1}{2}$, 1+3, 4, 5) and must therefore sink.

He suggests, however, that this name should stand for a specimen in his collection under formula: $\frac{1}{2}$, 1+3, 4+5 and this I propose to adopt and therefore the correct formula for ab. *kirkai*, Lem., should read: $\frac{1}{2}$, 1+3, 4+5.

C. Weise (*B.T.* 1879 and 1885) gives two formulae for his ab. *curva*.

I propose to restrict ab. *curva*, Ws., to the formula: $\frac{1}{2}$, 1+3 and to give the other formula the new name of

ab. **bicurva**, mihi, nov. nom: $\frac{1}{2}$, 1+3+2.

D. Herr Leopold Mader agrees with me that ab. *schneideri*, Gratl., is a synonym of ab. *flexuosa*, F., and that ab. *trilineata*, Herbst., is another synonym, consequently we have:—

ab. *flexuosa*, F. (syn.: *trilineata*, Herbst.=*schneideri*, Gratl.)—
2+1+3+ $\frac{1}{2}$, 4+5.

E. Edwards' ab. *flexuosa* [*Ent. Mo. Mag.* L. 139] is not ab. *flexuosa*, F., and therefore requires a new name and this I propose to give it as under:

ab. **herbsti**, mihi, nov. nom. [=ab. *flexuosa*, Edwards]—
Formula: 1+3+ $\frac{1}{2}$, 5.

F. With regard to the black pigmented varieties Herr Leopold Mader has evolved a formula of letters in place of numbers for the 5 light coloured markings given by Edwards (*l.c.*) to prevent confusion. I propose to adopt this system here, and I add for comparison Mader's and Edwards' respective formulae:

Mader—b (=macula basalis).	Edwards spot 2.
„ h (=m: humeralis).	„ 1.
„ m (=m: marginalis).	„ 3.
„ a (=m: apicalis).	„ 5.
„ s (=m: suturalis).	„ 4.

I propose to name the following new aberrations:—

1. ab. **4-maculata**, n. ab. Formula: b, h, m, a.

2. ab. **biverrucata**, n. ab. Formula: h, m.

3. ab. **panzeri**, n. ab. Formula: b (coll. Reineck).

The spot b in No. 3 is nearer the scutellum than the normal position of this spot and more circular than oblong.

Description of the Larva of *Sibine fusca*, Stoll. A Limacodid from the Argentine.

By K. J. HAYWARD, F.E.S., F.R.G.S.

On my last visit to Villa Guillermina before leaving the Chaco for Buenos Aires I once more proved the entomological value of the beautiful garden attached to the visitors' house there. This garden has given me many insect rarities, and during a few minutes stroll after tea the evening of my arrival I noticed a *Citrus* (lemon) that had

been eaten, and without much trouble found the curious sluglike form of caterpillar here described. Returning to the tree on the second day I found after a very long search the second specimen of this larva. I regret that with my cameras packed and in the busy state I found myself on my return to Villa Ana, I was unable to get either sketch or photograph of the larvae.

In general appearance they resemble slugs, but unlike the slug are flat dorsally and with flat sides, the section being more or less that of the bottom arch of a capital "A." Beneath they are sluglike with rudimentary forelegs. In length they are about 20mm. Colour above the margin light yellowish green, beneath pale whitish green. Head pale greenish with brown face. Thoracic segments plum colour dorsally, colour slightly deeper at the edges. There is a frontal ridge with four small tubercles of the ground colour with short reddish bristly hairs. At the edge of the dorsal colouring on the second thoracic segment is a slightly larger similar tubercle, and a similar pair on the third thoracic, still slightly larger. On the eleventh segment of the larva, dorsally, at the edge of the flattened part, a pair of prominent tubercles, brown with bluish base which is yellow ringed, and with bristly reddish hairs. There is a yellow marginal stripe that bends back on the first thoracic and edges the darker thoracic dorsal marking, forming a perfect "bracket" sign across the third thoracic, point towards tail. Around the margin a series of small tubercles of light greenish colour with reddish brown bristles. Above these tubercles on the eleventh segment, as also on the last segment, a velvet-like process of burnt-sienna hairs, joined to the tubercles above. The tubercles on the penultimate segment slightly higher than the line of the others, and whereas the remainder are brown tipped, these two are black tipped but with the same reddish bristles. The general shape of the larva has been explained above, but it remains to add that the surface of the insect is not completely smooth, but "crinkly" with pairs of slight circular depressions along the dorsal area, and corresponding depressions along the flattish sides. These depressions rather bluish green. The yellow marginal line is scalloped.

Described from two larvae found on *Citrus* (lemon) at Villa Guillermina, Prov. of Santa Fé, on January 9th and 10th, 1929.

One specimen pupated January 11th the other 13th in an ovoid cocoon. In pupal state 33 days.

Imagines sent to B.M. Nat. History, under No. 7025. Empty pupa cases under No. 7026.

One of the imagines was badly damaged through emerging in a small pill box whilst I was away.

New Forms of Lepidoptera.

In Volume XV. of the *Mitt. Münchner Ent. Gesell.* the following are newly described by Leo Sheljuzhko:—

Anthocharis cardamines ab. *divisa*, Shelj., was described and named, p. 97, from Kijew. "The discal spot of the forewing is divided into two spots."

Aporia crataegi subsp. *shugnana*, Shelj., comes from Chörög (province Shugnan), Pamirs. "The females are thickly scaled. The

black scaling on the veins is finer than in subsp. *naryna*. The black marginal markings are distinctly narrower, but much more sharply defined. The spot at the end of the cell of the forewing is very striking; it is fairly wide, but very sharply defined, while its contour in *naryna* females is almost always more or less ill-defined. The vein closing the cell of the hindwing is powdered with black in almost all the examples, but in the females the powdering is nearly twice as thick as in the males. On the underside the black scaling along the veins is much less than in *naryna* and *centralasiae*, and the underside is much less scaled with black. In the females the underside is yellowish."

Gonepteryx cleopatra ab. ♀ *citrina*, Shelj., from Attica and N. Morea. "Citron-yellow, especially the hindwings, about as in the males. The forewings the same, but somewhat lighter in the basal half."

Anthocharis grüneri ab. *decolor*, Shelj., of the Armenian race *armeniaca* from Pontus. "An albinistic form, on the upperside of which the usual black markings (apex, discal spot, and margin of orange patch) are white-grey. The green markings below are of a dusky yellow-green."

A. grüneri ab. *thatshukovi*, Shelj., of the same race "has the ground colour of all the wings pure white, without any greenish suffusion as in typical *armeniaca*. The orange-red of the apical blotch of the forewing is much less fiery, more yellow than orange, and is bestrewn slightly with black scales. It has a more restricted extent and only reaches the upper part of the discal spot. The apical blotch does not extend so far down to the anal angle but there is an area below it of an indefinite admixture of yellow and black scales. The discal spot is much enlarged and showed no trace of a pale centre, which is usually very clearly defined. The dark apex is purer black, the lighter suffusion being wanting. The usual white spots on the margin of the wing are wholly absent.—The green on the underside is strongly reduced."

Anthocharis damone ab. ♀ *flavopicta*, Shelj. "The apical part of the forewing is powdered with fine yellow scales mostly along the veins. The pale spots on the margin are deep ochre-yellow. The underside of the forewings is much deeper yellow especially at the apex and towards the base." Greece.

Cabera exanthemata ab. *suprapunctata*, Wehrli. "Characterised from the usual form by the presence of very prominent large black central spots on all four wings above and below and rather thick powdering on the wings." Tessin.

In vol. XVI. of the *Mitt. Münchner*, H. Burgeff describes and names a large number of aberrations, local forms, races and subspecies of the European Zygaenids including the British occurring species *esularis*, *achilleae*, *filipendulae*, *loniceræ* and *meliloti*.

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at Caracas, Ditton Hill, Surbiton, on November 27th, 1929, Mr. W. J. Kaye in the Chair. Members present in addition to the Chairman:—Mr. Robert Adkin, Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis, Dr. H. Eltringham. Visitors present:—Dr. K. Jordan, Mr. W. Rait-Smith, Mr. H. E.

Andrews, Mr. E. Step, Mr. W. H. T. Tams, Capt. A. F. Hemming, Capt. N. D. Riley. The guests arrived in the early evening and were received by Mr. and Mrs. Kaye and light refreshments were served in the Drawing Room. Mr. Kaye's collections of Lepidoptera were on view and he specially exhibited a number of hybrid *Sphingidae* bred in captivity in Germany together with specimens of the male and female parents. The former included *Celerio galliphorbiae* obtained from a pairing of ♂ *C. gallii* and ♀ *C. euphorbiae*. The result was a hybrid almost indistinguishable from the male parent. Several similar pairings between species of the same genus *Celerio* gave results, which seemed to lean to one or the other parent and not a complete fusion of the characters of both. Even when *Celerio euphorbiae* was paired with *Celerio respertilio* the latter was hardly in evidence in the result *epilobii*. Very different were the results in the crossings of the two genera *Pergesa* and *Celerio*. Both *euphorbiella* obtained from pairing *Pergesa porcellus* ♂ with *Celerio euphorbiae* ♀ and *harmuthi* obtained from pairing *Celerio euphorbiae* ♂ with *Pergesa elpenor* ♀ were most striking in that the colours and patterns were completely mixed up. Again with the two species of the one genus *Pergesa*, *elpenor* ♂ and *porcellus* ♀ the hybrid produced and named *luciani* leans much more towards *porcellus* tending to show that within the same genus the fusion of colour is not nearly so marked as when two species mated are of different genera. Supper was served at 8 o'clock and the members and guests departed at a late hour after a most entertaining and enjoyable evening.—H.W.-E.

The Third Annual Dinner of the Department of Entomology, British Museum (Natural History) was held at Maison Lyons, Shaftesbury Avenue, on Wednesday, December 11th, and proved to be a very pleasant and successful affair. The toasts were as follows:—

"The King."

"The Entomological Department." Proposed by Dr. C. Tate Regan, F.R.S. Reply by Major E. E. Austen, D.S.O.

"The Guests." Proposed by Mr. C. J. Arrow. Reply by Dr. Carl Jordan.

The evening was brought to a close with dancing, music, etc. Major and Miss Austen gave some good recitations, and several of the Museum staff helped to entertain the company with songs and music.—H.D.

In vol. III. of the *Bull. Soc. ent. Bulg.* is an article with a plate, on the wing-mosaic of the intersexual males of *Lymantria dispar*, the subjects of the paper being, not the products of either cold or heat, but captured specimens in nature. The comparisons made are very interesting.

In the *Int. Ent. Zt.* Vol. XXIII. p. 375, two aberrations of the venation of *Parnassius apollo* are described and named (!!!) and reference is given to five other named aberrations of venation of the same species. Surely there should be some limit to this naming of such freak pathological forms which hardly seem worthy of notice at all. If such naming were useful from a genealogical point of view there might be some reason for a very limited nomenclature of such, but to label them *latreili*, *verityi*, *seitzi*, etc., seems the height of absurdity and must hold entomology up to ridicule by all thinking naturalists.

The same number (31) of the above magazine concludes a very

useful and interesting article on the northern boundary of the area of distribution of *Papilio podalirius* in Europe. A map is attached to the communication marking some 70 "furthest north" places of occurrence.

REVIEWS AND NOTICES OF BOOKS.

It may be remembered that in 1926 we reviewed in these pages an admirable book written by Dr. Martin Hering, *Der Oekologie der Blattminierenden Insektenlarven*. The author is now issuing in parts through the firm of Messrs. Oswald Weigel of Leipzig a *Minen-Herbarium*, consisting of very carefully pressed and mounted leaves showing the mines made by the larvae of the leaf-miners which have been described and in many cases figured in the above work. In the first part which is priced at M4.50 the mines of 20 species are given, 11 being of lepidopterous larvae all Tinea, the remainder mines of dipterous larvae. Each example is mounted in a folded sheet the outside of which is labelled with the name and order of the plant and the name and order of the maker of the mine and the locality with date of collecting. In addition there is a separate list of the contents for reference. The folded sheets are contained in a cardboard case properly secured and labelled for reference. The whole when finished will make an excellent supplement to the book or be equally useful as a separate work. We can highly recommend this new departure in practical publishing.—Hv.J.T.

The same firm are publishing another small portfolio on similar lines arranged and edited by Chr. Bollow, Berlin-Steglitz. This also contains 20 subjects. Messrs. Weigel specialise in Herbarium construction of all kinds and one can be assured the work is well carried out.

We have recently received one of those splendid volumes of entomological reference which are so necessary to all students of the science, "A list of the Generic Names used for Microlepidoptera." The author's name, T. Bainbrigge-Fletcher, is a guarantee of the correctness and completeness which is a *sine qua non* in such work. The word List is misleading for it is a synonymic list in the widest sense of the word and much more than that. Each generic name is accompanied by references to (1) the family to which it belongs, (2) its author, date of valid publication, synonyms and homonyms, (3) a reference to the original description, (4) the type species of each generic name with its locality, and (5) a list of the synonyms. The compiler has followed rather rigidly the nomenclature rules of the zoologist exclusive of the modification suggested by many British entomologists, still as all the references are included it is easy for those, who do not follow a priority modified by the exclusion of certain publications and other limitations, to get their references and full correct information on facts from this excellent work. Such errors as *Gracilaria*, Zell. (1839) for *Gracillaria*, Haw. (1828) are corrected, but we do not like to see ultra familiar names such as *Gracillaria*, *Coleophora*, *Nepticula*, *Ornia*, *Laverna*, *Dichrorampha*, supplanted for reasons to us somewhat insufficiently grounded. This is a work to which every student of microlepidoptera must have access and the best gratitude of micro-workers, is due to Prof. Fletcher for his task of more than 20 years duration.—Hv.J.T.

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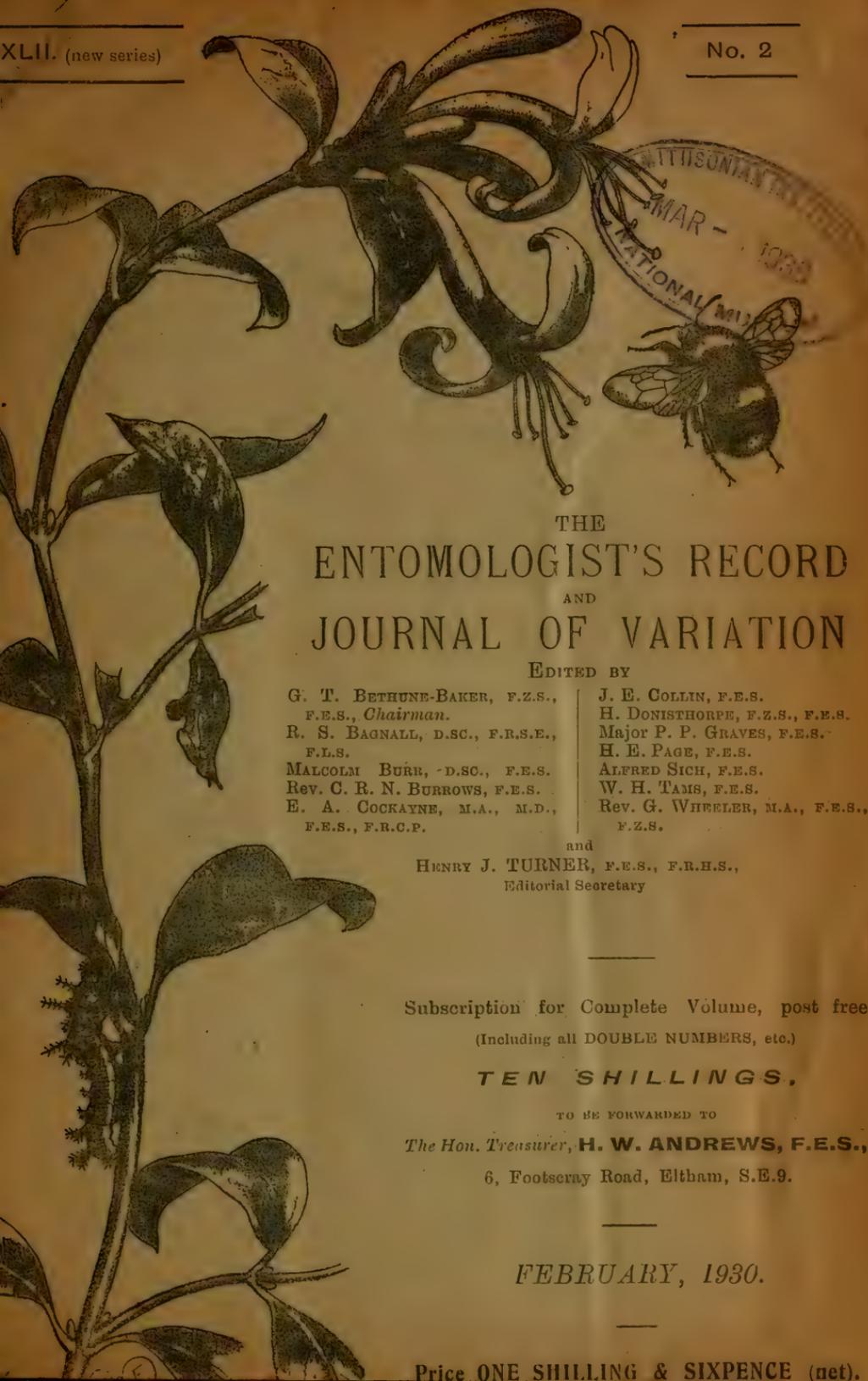
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**Pieris brassicae, L., with special reference to aberrations
from Aberdeenshire.**

By G. S. GRAHAM-SMITH, M.D., F.R.S., F.E.S., and W. GRAHAM-SMITH.

(Concluded from p. 7.)

MEDITERRANEAN RACES.

Race *cypria*, Verity (1908, pl. XXXV. 14, 15).

This is a dwarf race (about 45mm.) from Cyprus agreeing in its characters with the south European race. Specimens of normal dimensions are, however, obtained from parts of the island (Turner, 1920), and further evidence seems to be required before the limits of this race can be defined.

Race *cyniphia*, Turati (1924, A).

This race occurs in Cyrenaica.

The specimens are small with minute discal spots, the club-shaped mark almost obsolete, the apical blotches small and lightly dusted with white, and the bases of the wings with few dark scales. The upper-side of the hindwing in greenish-white and the under-side greenish-yellow with a few black scales near the base.

In some males the black scales usually present at the bases of the wings are absent (ab. *sublutea*, Turati, 1924, B), and in others the underside of the hindwing is whitish-green (ab. *vernalis*, Turati, 1924, C).

Race *subtaeniata*, Turati (1929).

In August, 1926, Ghigi collected 10 examples of *P. brassicae* on the Italian Islands in the Aegean. Turati (1929, p. 178), who studied these specimens, considered that two, a male and a female from Cos, were examples of *catolauca*, Rüb., and that one, from Nisyros, was an example of *lepidii*, Rüb. The others, 1 ♂ and 4 ♀ from Rhodes and two from Mount San Stefano, all showed the characteristics of *infrafasciata* (Ante, XLI., 1929, p. 179). These Turati describes under the name of "*Mancipium brassicae subtaeniata, f.n.*"

ATLANTIC ISLAND RACES.

Race *wollastoni*, Butler (1886).

Butler (1886) picked 10 specimens out of the Zeller and Wollaston collections from Madeira, the males being examples of ab. *nigronotata*, and the females of ab. *fasciata*, and thought they belonged to a new species, which he named *Ganoris wollastoni*.

Baker (1891), dealing with Wollaston's collection, regarded the form as a variety, and "an interesting instance of insular deviation from the original type." He says that "the upperside of the ♂ is practically indistinguishable from *P. brassicae*, but on the underside the two black spots are larger and often connected by black scaling, making them appear to be one large patch." The undersides of the hindwings and of the apical patch are described as "greenish-gray," and all the females as "much darker than the parent species." He notes that the spots on the forewings are very large, "each being

extended over two veins and joined together in the centre by black dusting". . . . "On the under surface the spots are always decidedly larger than in *brassicae*, but never joined . . . whilst the colour of the apical area and secondaries is always greener and greyer than in the common species. . . . It is clear from the foregoing that we have here a distinct transitional form from *brassicae* to *cheiranthi*."

In the B.M. series all the 9 males show the aberration *nigronotata*, and 7 of them *intra-fasciata*. All the 20 females show the aberration *fasciata*, to a greater or less extent, on both upper and undersides, and several the aberration *biligata*, (plt. II. fig. 19).

Illustrations of *wollastoni* are unfortunately uncommon. Holt-White (1894) figures the upper-side of a female with the apical blotch suffused externally with white scaling and well-marked black dusting between the discal spots, in fact a marked example of ab. *fasciata*. Seitz (1907, Pl. 19, e), gives coloured illustrations of the upper-side of a male and the under-side of a female. In the latter judging from the B.M. series the dark markings are abnormally developed, the apical blotch almost coalescing with the upper discal spot and strong "teeth" passing to the lower spot. Verity (1908, Pl. XXIX., 20) reproduces the same specimen. The single female in the Tring collection is, however, very like the above example.

Röber (1907) says *wollastoni* occurs in Smyrna in March and April, meaning presumably that examples of ab. *fasciata* are found.

Race *cheiranthi*, Hübner (1806).

This very distinct and handsome race was first described by Hübner (1806) and later by Boisduval (1836) from the Canary Islands, where the latter says it replaces *brassicae*.

In the males of the B.M. and Tring series the aberrations *nigronotata* and *intra-fasciata* are constant, the black scaling joining the discal spots being very broad and continuous (plt. I. fig. 11). In the female the aberration *fasciata* is similarly marked on both upper- and undersides, and the majority of them show the aberration *biligata* to a marked extent (plt. II. fig. 16).

It is remarkable that the aberrations *marginata* and *postero-maculata* do not seem to occur.

Judging from the B.M. and Tring series the different females illustrated by Seitz (1907, pl. 19, e.) and Verity (1908, pl. XXXV. fig. 27) are both abnormal, showing excessive development of the black scaling on the upperwings.

The race seems to be "peculiar to the Canary Islands" (Holt-White, 1894).

Race *azorensis*, Rebel (1917).

Kirby (1894) says that "typical *Pieris brassicae* occurs in the Azores," but Rebel points out that according to Staudinger and Rebel (1901) the local form resembles *chariclea*, Steph., and Warren accepts this view.

EASTERN RACES.

Race *nepalensis*, Gray (1846).

Doubleday (1844) gave the name *nepalensis*, without any description, to specimens sent by Hardwicke from Nepal, and Gray (1846) figured the uppersides of both sexes, without describing them. The figures represent specimens with the characters of *chariclea*, the outer edges of the marginal blotches being pale and the inner edges dark. In the female 'teeth' projecting inwards along nervures 3 and 4 nearly reach the discal spot. The tips are bordered by yellowish-white cilia.

Lang (1864), Moore (1882), Butler (1886), Moore (1905), Bingham (1907) and Lefroy (1909) all state that this butterfly is common in N.W. Himalayas and neighbouring parts, but do not suggest that it differs from the European form.

On the other hand Butler (1886) mentions that in the female the second and third branches of the median vein are blackened. Röber (1907) says "it is a large form; the black markings are wider and the hindwing beneath is yellowish and dusted with black." Verity (1908, pl. XXXV., 16, 17, 18), who figures a male, in which the inner margin of the apical blotch is irregular, and a female in which the 'teeth' are prolonged to join the upper discal spot, states that the upper discal spot is usually joined to the external border by two indistinct lines.

In the B.M. series 22 out of 47 males show the aberration *nigronotata*, and 14 the aberration *marginata*, while 37 out of the 39 females are examples of ab. *biligata* and 18 also show the aberration *fasciata*. Of the 37 males from Thibet in the Tring collection 20 show the aberration *nigronotata* and 2 *marginata*. All 13 females are examples of ab. *biligata*, but only 3 show the aberration *supra-fasciata*. Of the 27 males from other parts of the Himalayan region 6 show the aberration *nigronotata*, and 8 *marginata*; and of the 21 females 11 show the aberration *biligata*, but none the aberration *supra-fasciata*.

Though specimens from different localities vary, the chief characteristics of the race seem to be the very common occurrence of the aberrations *marginata* and *biligata*, and the considerable frequency of the aberrations *nigronotata* and *fasciata*. The noticeable dusting of black scales over the upper surfaces of the wings gives the race a characteristic facies (plt. II. fig. 21).

There are in some parts "two or three broods in the year" (Moore, 1882), but these have not received names.

The spellings *nipalensis* (Lang, 1864), and *nepalense* (Moore, 1882) have been used.

Race *ottonis*, Röber (1907).

This name is given by Röber to "the Central-Asiatic spring form; the underside of the hindwing is strongly darkened and dusted with greenish black." Verity (1908, pl. XXXV. 22, 23), illustrates specimens from Turkestan which do not seem to show special features, and Verity says he sees "no reason to distinguish them particularly."

Of the 9 males in the B.M. collection from Yunnan 2 show the aberration *nigronotata* and 3 traces of the aberration *marginata*. The 2 females are poorly marked examples of the aberration *biligata*.

P. brassicoides, Guérin (1849), from Abyssinia, first described as a subspecies, is regarded by both Verity (1911, p. 337, Pl. LXVII., f. 26, 27) and by Aurivillius (1925, p. 49, Pl. 12) as a distinct species. The former says it "combines characters of *brassicæ* and *mesentina* or *dubernardi-darvidis*," and the latter that it is the only known species of the *brassicæ* group occurring in the Ethiopian Region.

Ab. *alligata*, Cabeau.

Derenne (1930) points out that we were in error in making ab. *alligata*, Cabeau a synonym of *fasciata*, Kiefer (XLI. p. 179), since Van Schepdael's specimen, which is described by Cabeau, shows the characteristics of ab. *fasciata* and to a lesser degree those of ab. *biligata*, Cabeau. For such aberrations Verity (1908, p. 166) suggested the name *conjuncta* (XLI., p. 176). Since Verity did not apply his name to any type specimen Cabeau's name ab. *alligata* has priority, if it is considered desirable to distinguish by special names examples in which the characters of two or more distinct and named aberrations occur.

We are much indebted to Mr. N. D. Riley for access to the British Museum Collections and for photographs of three interesting specimens (figs. 12, 19, 21), to Dr. K. Jordan for his kindness in showing us the Tring Collections and for photographs of two rare specimens (figs. 9, 24), to Dr. J. J. Simpson for information relating to a specimen of ab. *nigrescens* mentioned by Mosley, to Mr. H. J. Turner for much assistance, especially in obtaining for us much of the foreign literature and for the loan of Mosley's drawings (figs. 4, 5, 23), and to Mr. H. P. Hudson, of the Pathological Department, Cambridge, for the care and skill with which he photographed most of the specimens illustrated.

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CORRECTIONS.—On pl. I., "nammei" should be "rammei."
 p. 7, l. 15, "white" should read "whole."

Memorandum to the Forest Entomologists and other Entomologists who are interested in the Study of Bark-beetles.

By Dr. P. SPESSIVTSEFF (Experimentalfältet, Sweden).

At the session of the Forest-entomological Section of the International Congress of Forest Experiment Stations held at Stockholm in July, 1929, I proposed the forming of an International Society of Ipidologists with the following words:

"During the last 10-20 years the interest in the systematical and biological study of the bark-beetles has greatly increased. Such regions as for instance Sibirien, Kaukasus, the Balkan States and the Mediterranean region, whose fauna of bark-beetles was previously not sufficiently known, begin to attract the attention of entomologists.

"Those investigators who pursue their studies in the field in far away countries are, however, confronted with the following difficulties:

"1. The absence of keys for the identification of the bark-beetles (the *Bestimmungstabelle* of Reitter of 1913 are antiquated and Eggers contributions in the *Entomologische Blätter* do not cover the whole field.

"2. The descriptions of new species are often published in such journals with no wide distribution, where they are not easily accessible.

"3. These descriptions are often purely morphological and are not accompanied by figures or keys comprising other closely related species.

"4. The new species are often formed on single or a few specimens which remain in the collection of the author and are as a consequence inaccessible to other investigators.

"It would therefore be a great advantage to science if the work of the ipidologists in the different countries could be made easier. As

most of the entomologists who pursue systematic and biological studies on the bark-beetles are attached to the forest-service I suggest that this section take the initiative of organising an International Society of Ipidologists. I further propose that a commission be formed to which the work of forming a detailed programme is entrusted. A number of distinguished forest-entomologists unfortunately not here present ought to be asked to join the work of the commission. In the meantime we may confine our activities along the following lines:

"1. To enlist the co-operation of as many investigators as possible who are working on the bark-beetles."

"2. To publish the names and addresses of the members of the association in suitable journals."

"3. To issue detailed keys for the identification of the palearctic and possibly also of the nearctic bark-beetles."

"4. In view of the difficulties connected with this work it would be necessary to issue the keys in series and entrust the different groups to specialists."

The proposal was unanimously adopted by the section and the following were chosen as members of the organizing commission:

DR. V. VON BUTOVITSCH, Forstliche Hochschule, Eberswalde, Germany.

DR. N. A. KEMNER, Lund University, Sweden.

DR. P. SPESSIVTSEFF, } Entomological Department, Swedish Forest
 PROF. DR. I. TRÄGÄRDH, }

Experiment Station, Experimentalfältet, Sweden.

On behalf of this commission I take the liberty of asking you, who are interested in the study of the bark-beetles to join our new society and send your name and address as well as details as to what part of the group you are interested in to Professor DR. I. TRÄGÄRDH, Experimentalfältet, Sweden.

Lists of the members will be published regularly in the *Entomologische Blätter*, Stettin, and in other journals.

When in this way a society has been formed it will be advisable that the members in the different countries nominate between them a commission of 1-3 members for the purpose of co-operating with the central commission.

Centhorrhynchidius palustre, n.sp., a British Species of Rhyncophora (Coleoptera) new to Science.

By T. H. EDMONDS, F.E.S.

When collecting near Bovey Tracey in August, 1928, I took, on patches of *Nasturtium palustre*, growing by the side of the river, a few specimens of a *Centhorrhynchidius* of the *floralis* group, which seemed to be different.

When I was there with Mr. Donisthorpe in July last, we tried at the same spot and took several *Centhorrhynchidii*. He informs me that most of these were *floralis* and *melanarius*, but that one is evidently new and that there is a similar specimen in the Power Collection labelled "? *minutus*" but it is not that species. A few weeks

later I tried again at the same place and took several more specimens of the new form. On the advice of Mr. Donisthorpe I am describing it and my thanks are due to him for his assistance in the matter.

Ceuthorrhynchidius palustre, sp.n.

Black with rather scanty white scales.

Antennae reddish, scape usually lighter, club darker.

Thorax rather closely punctured, scantily clothed with narrow white scales, constricted at apex, with a small tubercle at each side, anterior margin raised and usually narrowly and obscurely brownish, base strongly bisinuate.

Elytra with a double row of narrow white scales on the interstices, without band at the suture, at the most with some broader white scales near the scutellum.

Underside rather scantily clothed with white scales.

Long. $1\frac{1}{4}$ to $1\frac{1}{2}$ mm.

Allied to *C. floralis*, but narrower and on the average smaller. The thorax is rather longer, less strongly constricted towards the apex and the apical margin is not so much raised. The clothing both of the upper and underside is much scantier and there is no sutural band present.

Several specimens at Bovey Tracey, Devon, on *Nasturtium palustre*.

Synharmonia conglobata, L.—New aberrations.

By G. CURTIS LEMAN, F.E.S.

My friend, Herr Leopold Mader, of Vienna, has sent me diagrams of the following aberrations, which we agree are unnamed and he has asked me to name them for him. I do so in compliance with his request, though with some diffidence having regard to the length of the list and to the probability that these cannot pretend to exhaust all the possible combinations, which may hereafter be found in a species, which boasts eight spots.

I may perhaps add that coloured plates of these aberrations will appear in due course in Herr Leopold Mader's very interesting and exhaustive work, "Evidenz der pal. Coccinelliden" now being issued in parts as a supplement to the *Zeitschrift des Vereines der Naturbeobachter and Sammler*.

ab. *subconjuncta*, n. ab.—1, 2, 3, 4, 5, 6+7+8.

ab. *mülleri*, n. ab.—1, 2, 3, 4, 5+7+6, 8.

ab. *subvariegata*, n. ab.—1+2, 3, 4, 5, 6, 7, 8.

ab. *friederikae*, n. ab.—2+1+4, 3, 5, 6+7, 8.

(I have the honour of naming this after the wife of Herr Leopold Mader.)

ab. *triconjuncta*, n. ab.—1+2, 3, 4+5, 6+7, 8.

ab. *herbsti*, n. ab.—1+2, 3, 4, 5+7+6, 8.

ab. *sicardi*, n. ab.—1+2, 3, 4, 5, 6+7+8.

ab. *kirkae*, n. ab.—1, 2, 3, 4, 5+S, 6+7+8.

ab. *ellisi*, n. ab.—1+2, 3, 4, 5+S, 6+7+8.

ab. *subpineti*, n. ab.—1+2+S, 3+4+5+S, 6+7+5, 8+S.

(The formula ab. *pineti*, Ws. (vera) is 1+2+S, 3+4+5+S, 6+7+5, 8.)

- ab. *hawkesi*, n. ab.— $2+1+4+3$, $5+S$, $6+7+8$.
 ab. *caprai*, n. ab.— $2+1+4+5+S$, 3 , $6+7+8$.
 ab. *bedwelli*, n. ab.— 1 , 2 , 3 , $(4+5+S)$ ($5+7$), 6 , 8 .
 ab. *harwoodi*, n. ab.— $1+2$, 3 , $(4+5+S)$ ($5+7$), 6 , 8 .
 ab. *cineta*, n. ab.— $(2+1+4+3)$ ($4+5+S$) ($6+7+5$) ($8+7$).
 Every spot confluent with the rest.
 ab. *subcineta*, n. ab.— $(1+4+3)$ ($4+5+S$), 2 , $6+7$, 8 .
 ab. *gradli*, n. ab.— $1+2$, 3 , 4 , $6+7+5+S$, 8 .
 ab. *weisei*, n. ab.— $1+2$, 3 , 4 , $(6+7+5+S)$ ($8+7$).
 ab. *heydeni*, n. ab.— $1+2$, 3 , $(4+5+S)$ ($6+7+5$), 8 .
 ab. *lestragei*, n. ab.— $1+2$, $(3+4+5+S)$ ($6+7+5$) ($7+8$).
 ab. *schneideri*, n. ab.— $(2+1+4+3)$ ($4+5+S$), $6+7$, 8 .
 ab. *mulsanti*, n. ab.— 1 , 2 , 3 , $(4+5+S)$ ($6+7+5$), 8 .
 ab. *evertsi*, n. ab.— $1+2$, $(3+4+5+S)$ ($6+7+5$), 8 .
 ab. *walteri*, n. ab.— 1 , 2 , 3 , $(4+5+S)$ ($6+7+5$) ($8+7$).
 ab. *kuhnti*, n. ab.— $1+2$, $3+4$, $6+7+5+S$, 8 .
 ab. *sagoensis*, n. ab.— $1+2$, $3+4$, $(6+7+5+S)$ ($8+7$).
 ab. *reitleri*, n. ab.— $1+2$, 3 , $(4+5+S)$ ($6+7+5$), 8 .
 ab. *linnei*, n. ab.— $2+1+4$, 3 , $(6+7+5+S)$ ($8+7$).
 ab. *ryei*, n. ab.— 1 , 2 , 3 , 4 , $6+7+5+S$, 8 .
 ab. *illigeri*, n. ab.— $1+2$, 3 , $(4+5+S)$ ($6+7+5$) ($8+7$).
 ab. *marshami*, n. ab.— $1+2$, $(3+4+5+S)$ ($7+5$), 6 , 8 .
 ab. *haworthi*, n. ab.— $2+1+4+3$, $(6+7+5+S)$ ($8+7$).
 ab. *goezei*, n. ab.— $2+1+4+3$, $6+7+5+S$, 8 .
 ab. *bivinta*, n. ab.— $(2+1+4+3)$ ($4+5+S$), $6+7+8$.
 ab. *omniconjuncta*, n. ab.— $(2+1+4+3)$ ($4+5+S$) ($6+7+5$) ($7+8+S$). Differs from ab. *cineta*, mihi, in having spot 8 confluent with suture.
 ab. *magnifica*, n. ab.— $(1+2+S)$ ($1+4+3$) ($4+5+S$) ($6+7+5$), $8+S$. A fine heavily marked aberration.
 ab. *crotchi*, n. ab.— $(2+1+4+3)$ ($4+5+S$), $6+7+8+S$.
 ab. *donovani*, n. ab.— $(2+1+4+5+S)$ ($6+7+5$) ($8+7$), 3 .
 ab. *naezeni*, n. ab.— $(1+4+5+S)$ ($6+7+5$), 2 , 3 , 8 .
 ab. *faldermanni*, n. ab.— $1+2+4+3$, $5+S$, $6+7$, 8 .
 ab. *gyllenhali*, n. ab.— $1+2+4$, 3 , $6+7+5+S$, 8 .
 ab. *motschulskyi*, n. ab.— $(2+1+4+3)$ ($4+5+S$), $6+7$, $8+S$.
 ab. *zetterstedti*, n. ab.— $1+2$, $(3+4+5+S)$ ($6+7+5$) ($7+8+S$).
 ab. *panzeri*, n. ab.— $2+1+4+3$, $6+7+5+S$, $8+S$.
 ab. *paykulli*, n. ab.— $1+4$, 2 , 3 , $5+S$, $6+7+8$.
 ab. *latreillei*, n. ab.— 1 , 2 , $(3+4+5+S)$ ($6+7+5$) ($8+7$).
 ab. *stephensi*, n. ab.— $(1+2+S)$ ($1+4+3$), $6+7+5+S$, 8 .
 ab. *laichartingyi*, n. ab.— $1+4$, 2 , 3 , $6+7+5+S$, 8 .
 ab. *thunbergi*, n. ab.— $(1+2+S)$ ($1+4+5+S$) ($6+7+5$), 3 , 8 .
 ab. *olivieri*, n. ab.— 1 , 2 , 3 , 4 , $(6+7+5+S)$ ($8+7$).
 ab. *cederjhelmi*, n. ab.— $2+1+4+3$, $5+S$, $6+7$, 8 .
 ab. *lecontei*, n. ab.— $1+4+5+S$, 2 , 3 , $6+7$, 8 .
 ab. *fairmairei*, n. ab.— 1 , 2 , $3+4$, $5+S$, $6+7+8$.
 ab. *zoubkoffi*, n. ab.— $1+2$, 3 , 4 , $(6+7+5+S)$ ($7+8+S$).

Stray Notes on Erebiid Species.

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

Erebia fletcheri, Elw., *E. dabanensis*, Ersch., and *E. kozhantschikovi*, Sheljuzhko. When looking over the Erebias in the B.M. collection last year, I came on an unmistakable ♂ of *E. fletcheri*. This is, so far as I know, the only known ♂ of this species. Strangely enough the specimen had been dissected by Elwes, who according to his habit had mounted the genitalia on a card, but he apparently never published anything about it or added anything to his first note, which was published at the same time as his figure of the ♀ (*Trans. Ent. Soc.* 1899, pl. 12, fig. 4). The genitalia were so contorted on the card that it was quite impossible to gain any real idea of their formation, but the authorities kindly gave me permission to try and remount them, which although they were a little damaged by their previous rough treatment, I was able to do in a quite successful manner. The resulting mount plainly showed that *fletcheri* was very distinct, with no real affinity to any other known species, and not the slightest similarity to *dabanensis*.

A thing which had always surprised me was why this very distinctly marked insect should have always been placed as an aberration of *dabanensis*. Eiffinger confidently asserts that he is sure that Elwes' figure can only be an aberration of *dabanensis*, and others have said the same. There is, however, no real resemblance between the two. Quite recently two remarkable specimens have come into my possession, which at once threw some light on this point. They are aberrations of *dabanensis* and *kozantschikovi*, but both show considerable resemblance to *fletcheri*, in fact they were sent to me as the latter by Staudinger. A further point of confusion has been the failure to distinguish between *dabanensis* and *kozantschikovi*. It was only in 1925 that Sheljuzhko described the latter, and aberrations of it are even more like *fletcheri* than those of *dabanensis* owing to the very dark, almost unicolorous underside of the hindwing. It was doubtless because Elwes did not fully appreciate the difference between his Wilui specimens (*i.e. kozantschikovi*) and *dabanensis*, that he placed his ♀ of *fletcheri* as an aberration of the latter. I am indebted to Mr. Sheljuzhko for permission to dissect one of his co-types of *kozantschikovi*, and I have also been able to examine the genitalia of one of Elwes' specimens in the British Museum collection and a third specimen in my own collection, and structurally the three agree perfectly, though from widely separated localities, keeping constantly distinct from *dabanensis*, of which I have mounted the genitalia of some half dozen specimens.

It may be noted here that in Dr. Chapman's paper on the genus *Erebia* (*Trans. Ent. Soc. Lond.* 1898) he gave a drawing of the clasps of both *dabanensis* and *kozantschikovi*, but as he did not distinguish between the two he makes a mistake which is rather confusing. He figures the clasp of *tundra* (he had the type to examine from the Staudinger collection) on plate XV., f. 51*a and 51*b, which is typical of *dabanensis*, for *tundra* is an aberration of that species; then he gives two clasps of "*dabanensis*" figs. 51b and 51c, which are really *kozantschikovi*.

Although I do not consider that as a rule the naming of aberrations

is of any particular value, in the present case it seems useful to name these *fletcheri*-like aberrations, as it may help to keep similar specimens from being confused with *fletcheri* in the future.

E. dabanensis, ab. **confusa**, nov.

In this aberration the yellowish-brown rings which normally surround the four small black spots on the upperside of the forewing, are extended so as to form a broad, continuous, transverse band, with perfectly even inner and outer edges, on both upper and underside of the forewings. Otherwise the specimen is normally marked. In *dabanensis* this band is usually outlined on the underside of the forewings, but is always suffused to a greater or less extent by the dark ground colour. It is therefore on the upperside that this aberration is most abnormal.

Type, a ♀ in my collection from Mondy, Saján Mountains.

E. kozhantschikovi ab. **rubescens**, nov.

In this aberration all those markings which are usually a deep ochre in the type are of a dark mahogany colour. On the upperside of the forewings only three of the usual five black spots remain, and these are reduced to the merest points. There are five mahogany-coloured spots more or less forming a band, but intersected by the nervures, with an even outer edge but shading off irregularly on the inner edge. On the hindwings, there are three very small mahogany-coloured dots without black spots. On the underside, the forewings are crossed by a very broad and continuous mahogany-coloured band (quite as broad as the normal band in *fletcheri* and at least twice as wide as that of *kozantschikovi*) in which are four very small black points near the outer edge. The hindwings are almost unicolorous black, with just a faint indication of the usual dark grey antimarginal band. The whole ground-colour, both on the upper and underside, is much blacker than usual. The underside of this specimen is quite suggestive of *fletcheri*, but of course the markings of the upperside are much less pronounced. Type, a ♂ in my collection from the Saján Mountains.

E. pawloskii, Men.

This species is a most variable one; a short study of it will convince most people of the fact. But in spite of this I own I felt reluctant to accept the large and very strikingly-coloured *theano* as a subspecies of it.

Still, all morphological data pointed to this being the case, and Dr. Chapman came to the same conclusion many years ago. There is, it is true, a constant difference in the genitalia, of *theano*, shown by the development of the shoulder of the clasp, and superficially *theano* is very constant too, but a long study of the Erebian genitalia has demonstrated that the particular form of variation exhibited by the clasp of *theano*, is not a reliable character, but one which can only be accepted as of specific value when accompanied by some second structural difference. It is also a fact that in numerous cases, highly specialised subspecies of *Erebia* species often develop some structural difference from the type form, which difference is most frequently connected with the dorsal ridge of the clasp. Finally, in *E. ceto*, a

species quite distinct from *theano*, a certain race which superficially differs but little from the type, produces as its normal form, a form of the termination of the clasp almost identical with that of *theano*, and differing from typical *ceto* in just the same manner as *theano* does from *pawloskii*. So altogether there seemed no real doubt about the matter, but I felt it would be by no means easy to convince the general collector of the fact. Under these circumstances I was doubly pleased to get two very remarkable specimens from Staudinger, which effectually did away with the apparent gulf between *pawloskii* and *theano*. Bang-Haas referred them to *haberhaueri*, but personally I placed them as small *theano*. On mounting the genitalia the very interesting fact was disclosed that they were true *pawloskii*. This discovery at once links up the somewhat scattered units of this species. It must be recalled that the N. American *ethela* (= *sofia*, Str.) is also a form of *pawloskii*, but the colour in the cell on the upperside of the forewing, and the yellow spot at the base of the hindwing on the underside, were features unknown in *pawloskii*, and more suggestive of relationship with *maurisius* (and *haberhaueri*), though there too the yellow basal spot of the hindwings on the underside did not agree. Elwes noted that he had never seen an Asiatic specimen with this spot. Of course it is present, very strongly, in *theano*, but Elwes regarded the latter as a distinct species quite unconnected with *ethela*. The two specimens of my newly discovered form of *pawloskii* naturally show this characteristic spot of *ethela* quite strongly, for they are small replicas of *theano*, having in fact developed the facies of the latter while retaining the size and structure of *pawloskii*. So on the one hand while they bridge the gulf between *pawloskii* and *theano*, on the other they, almost certainly, represent the form from which the slightly darker *ethela* must have sprung, though very probably at the time when they penetrated to the north of America their facies may have been even closer to *ethela* than they now are.

This extremely interesting subspecies may be described as follows :

E. pawloskii, ssp. **connexa**, nov. (= *haberhauri*, ssp. *tunkuna*, Bang-Haas, *il.*)

Size as *pawloskii*. Upperside : forewings dark brown with a band of six very broad brownish-orange spots, just separated by the dark nervures. The first three spots (those next the costa) and the last (next the inner margin) project towards the base of the wing further than the other intermediate ones, just as in *theano*, while the outer edge of the band is perfectly regular. The distal half of the discoidal cell is filled with the same colour as the spots of the band, while there are traces of a further spot between the cell and the inner margin. The hindwings are dark brown with a single row of six broad spots, the same colour as those of the forewings, but they are more widely separated than the latter, by the dark ground colour running along the nervures. As in *theano*, the first three spots project nearly twice as far towards the base of the wing as the following ones ; there is, however, no basal spot on the upperside. Underside ; The markings are exactly the same as those of the upperside, only the basal area of the forewings is suffused with a rusty red, from the inner edge of the band to the base, and on the hindwings there is a large yellow basal spot, which corresponds to the central one of the basal row, to be seen

in *theco*. It is the same spot that is so characteristic a feature of *ethela*, but all the markings are much stronger than in that race. All the spots of the underside are a very pale yellow, much lighter than on the upperside. Type, a ♂ in my collection from Schawyr, in the eastern Tannuola Mountains.

The name employed *i.l.* by Bang-Haas was very inappropriate, the Tunkun Mountains being some two or three hundred miles north of the Tannuola Range.

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

The discovery made by Suschkin (1913) and by Reverdin (1920-1927) of marked variations in the genitalia of the *Melitaea* has opened out an interesting field to investigation and to deductions. Hitherto it seemed a hopeless puzzle to explain their existence, their connections and their origins, but the knowledge we have lately acquired from other groups of Lepidoptera has shed considerable light also on this problem, which apparently fits in perfectly with the general laws we have made out. There are only a few particular points which need to be looked into more thoroughly to complete the general picture. A serious hindrance is unfortunately created by the extremely vague and fragmentary data concerning the Asiatic races of the *athalia* group and the indefinite way in which their few names have been applied.

Let us begin by a rapid general survey of the evolution of the tribe. In my paper on *didyma*, Esp., I have pointed out that the *Melitaea* have originated from the tropical *Phyciodes* as the result of adaptation to the temperate climate, which began to appear on the face of the earth in the Polar regions. Amongst the *Phyciodes* which still live at the present day in the temperate climate of North America there are species, like *ismeria*, Boisd., of Colorado, which are extremely similar in shape and pattern of both surfaces to *Melitaea harrisii*, Scudd., the American representative of *dictynna* and *protomedia*, which only differ from it by some slight specific features, and there are species like *Phyciodes barnesi*, Skinner, which very much resemble the small summer forms of the Palaearctic *M. phoebe*, Schiff., with a mixture of *arduinna*, Esp. features by their shape and general appearance and by the fundamental lines of the underside pattern. This obviously shows that these two types of structure and pattern are the most primitive ones in the genus *Melitaea*, and the American species confirm it clearly by affording cases of transition and different mixtures of features, which one is accustomed in the Old World to associate with perfectly distinct groups of species. Thus *whitneyi*, Behr., on the upperside might be mistaken for a *phoebe*, whereas on the underside it is intermediate between *phoebe* and *dictynna* and it resembles the latter more than the former; that this is no case of superficial likeness, but a really intermediate species, similar to the common ancestor, from which those two groups may have sprung, possibly when still at the *Phyciodes* stage, can be considered more or less proved by the rather unexpected discovery of the last few years that the genitalia of *dictynna* resemble much more those of *minerva*,

and in consequence those of *arduinna* and *phoebe*, than they do the genitalia of the *athalia* group, in which it had always been placed owing to its general resemblance to it produced by parallel variation. In America we will presently see there also are species, such as *ancia*, Doubl., and *editha*, Boisd., whose very different looking races recall the aspect of the *minerva-arduinna-phoebe* group in some cases and of the *aurinia-materna* one in others.

It is noteworthy that *baicalensis*, Brem., p. 13 = *arcesia*, Brem., p. 15, and *sindura*, Moore, on the underside combine an *athalia*-, or still better a *dejone*- or a *parthenic*- like pattern, with a fulvous marginal band, between the two capillary streaks, exactly like that which characterises *maturna* and *iduna* on the one hand and *dictynna* on the other: this goes towards showing that *baicalensis* connects the *athalia* group to the others and is more primitive than the latter.

In a general way it seems perfectly clear that the *minerva* and *baicalensis* groups and more precisely their American representatives of the *minuta*, Edw. and *palla*, Boisd. groups along one line of descent and the *dictynna* and *harrisii* one along another have been the most primitive *Melitaea*, which have derived from the *Phyciodes*, as the result of adaptation to a temperate climate. When the climate became still colder a further push was made and the culminating stage of what might be called **frigoripetal** evolution and variation was reached.

In America it has developed to an enormous extent and innumerable variations have been produced both individually and racially, so that it was thought quite a number of species existed there, although the various authors did not agree on their number and in the way of separating the races. Fortunately Gunder has at last succeeded in classifying them by means of the genitalia, which he has examined in each race, mostly from the actual "types" (*The Pan-Pacific Entomologist*, VI. (1929), p. 1). He has thus established that there are in reality only five, or even four known species, if *phaeton*, Dru., and *chalcedona*, Dbl., are considered exerges of a single species, as they probably should be. The three others are *ancia*, Dbl. and Hew., *editha*, Bdv., and *gillettii*, Barnes. Judging by his figures, my impression is that *ancia* is the less highly characterised of the group, both by its genitalia and its general aspect, and that, from it, one branch has turned into *chalcedona* and another in the two successive grades *editha* and *gillettii*. The latter is clearly the transition to the Palaearctic species, as very rightly stated by Gunder, and I should add more particularly to *aurinia*, but, instead of being their American offshoot, as believed by him, it is the closest representative of their ancestors. Suschkin, as well as Reverdin, had made a distinct group of these species, standing opposite all the rest of the *Melitaea*, on the strength of their sharply different genitalia, but Scudder had done still better in separating them as a distinct genus under the name of *Euphydryas* and it is time one should take it up in connection with *aurinia* and the *maturna* group, as they, apparently, differ much more from the true *Melitaea* than the latter differ from the *Phyciodes*.

The *Euphydryas* can be regarded as the extreme result of frigoripetal evolution; the latter must have reached a point which the *Melitaea* centre of organic balance could not surpass, so that the increasing stress from the surroundings obliged these organisms to shift it in such a way that their elasticity could stretch further from

the new centre in the frigidipetal direction. The consequence of specialisation to cold and damp conditions has been that the most extreme *Euphydryas* have lost the power to stand the opposite ones. Genera of this sort might be called **psychrotropic** satellite genera. In my paper on *M. didyma*, Esp., I have pointed out that, after the cold period had reached its climax and all the inhabitants of the Polar Continent had been driven southward to different latitudes, according to their constitutions, producing the great migration, in Asia and in America, of the late Cretaceous and of the early Eocene, I have described in my previous papers, the *Melitaea*, which had passed from their land of origin into Asia, presumably at that time, spread very broadly and responded to the return and gradual increase of heat, which followed, by bursting out into a very active evolution, one might in this case call **caloripetal**; this again culminated in Asia in a satellite genus, the subtropical *Timelaea*, to which the name of **thermotropic** would be suitable. These organisms have in fact taken a turn (*tropos*) respectively towards cold (*psychros*) or towards heat (*therme*).

I cannot enter here into a detailed description of the numerous features which contribute to give the genitalia of *Euphydryas* an entirely different look from those of the *Melitaea*; I must mention, however, the forked piece, as Reverdin puts it, which I should designate as the "saddle-shaped" lateral process of the clasps and which is homologous to Reverdin's lateral apophysis of the true *Melitaea*, though its shape is quite different. It is this process Gunder has illustrated and on which he has based the specific grouping of the American races, but I must say I had some trouble in finding out what part of the genitalia he was dealing with, by examining his sketches; he leads one entirely wrong by calling it "projections of the uncus," and he very improperly calls the upper branch "left projection." My reasons for regarding *anicia* as the less highly characterised species of *Euphydryas*, standing nearer than the others to the *palla* group of the true *Melitaea*, is that some of its extremely different looking races somewhat resemble the latter and that, in conjunction with this, both the branches of the saddle-shaped process are long, slender and curved in a way which suggests analogy and probably also perfect homology with the lateral apophysis of the *Melitaea*, shaped like a cow's horn. In *editha* the branches are shorter and thicker and the upper one is barbed at its end and in the still more extreme *gillettii* they are, as in the Palaearctic species, reduced to a bristled wart and to a stumpy branch; *aurinia*, *matura* and finally its exerge *cynthia* exhibit three successive degrees of reduction. I might mention that in the *Euphydryas* also the terminal apophysis has shrunk into a round mass, covered with spines, and the whole clasp from a globular shape into a triangular one.

(To be continued.)

CURRENT NOTES AND SHORT NOTICES.

The following Fellows have been elected as Officers and Council of the Entomological Society of London for the ensuing year:—*President*: K. Jordan, Ph.D. *Treasurer*: Captain A. F. Hemming, C.B.E., F.Z.S. *Secretary*: S. A. Neave, M.A., D.Sc., F.Z.S. *Other Members of Council*:—H. W. Andrews, Capt. E. Bagwell-Purefoy, F.Z.S., E. C. Bedwell, F. W. Edwards, H. Willoughby-Ellis, F.Z.S.,

H. Eltringham, M.A., D.Sc., F.Z.S., A. D. Imms, M.A., D.Sc., F.R.S., R. W. Lloyd, R. Stewart MacDougall, M.A., D.Sc., F.R.S.E., G. A. K. Marshall, C.M.G., D.Sc., F.R.S., F. Muir, W. Rait-Smith, N. D. Riley, F.Z.S., H. J. Turner. Dr. Imms, F. Muir and Hy. J. Turner have been chosen as *Vice-Presidents* for the year.

The following item only quite recently came to our knowledge. We heartily congratulate our colleague. At the Convocation at the University of Durham in June last Dr. J. W. Harrison presented Professor Richard Siddoway Bagnall, a distinguished scientist, of Edinburgh, for the honorary degree of D.Sc. He said the two northern counties had always been famous for their enthusiastic and learned amateur naturalists, and among them none had been more distinguished than the entomologists. Professor Bagnall was one of the world's authorities on the Thrips.

In the *Int. Ent. Zeit.* for November 22nd is an account of the collecting in the wonderful Val del Fain (Heutal) behind the Bernina-haus station in the Engadine. The botanical treasures of the valley are equally remarkable. The only drawback to collecting in this valley is the almost incessant bad weather. Most of the species to be found there are in considerable number and many are racial.

The *Ent. News* for November has a most interesting account of the U.S. National Museum at Washington, one of the series on N. American Institutions Featuring Lepidoptera contributed by J. Gunder. The article is illustrated by a portrait group of the well known entomologists working in the Museum in January, 1929. Dr. Dyar, Dr. Schaus, Dr. Howard, C. Heinrich, A. Busek and F. H. Noyes. In the same number there is a list of all who have been Honorary (foreign) Fellows of the Entomological Society of London since its foundation in 1833, 57 in Number, with their nationality.

In the *Ent. Zeit.* for November 22nd there is a list of the *Pterophoridae* occurring in the Austria-Hungarian area with the localities in which they are found. Of the 77 species listed, 13 are Oriental, 7 Siberian, 5 (probably) Mediterranean and 4 Alpine in origin.

In the November number of *Lambillionia* M. Thomas discusses the problem—le Retour au Nid, at considerable length. Also Dr. Eubrik Strand writes a critical review of the Memoir on the Ascari (mites) published with the *Tijds. voor Ent.* as a supplement in 1926.

The *Revue Russe d'Ent.* vol. XXIII. nos. 1-2 recently published contains a large amount of original work. N. J. Kusneyov, contributes the article "Malacodea and Operophtera. A study in Micropterism," with 4 plates and several figures. The author concludes "that the loss of the organs of flight must be considered and examined on the physiological basis only, as a result of nutritional, metabolic balance disturbed by the unfavourable conditions of life. Six of the articles deal with Lepidoptera, five with Hymenoptera, three with Coleoptera. There are six further articles included.

In the *Bull. Soc. ent. France*, no. 15, Dr. Verity communicates a note on the races and forms of *Argynnis niobe* occurring in the European area.

The *Soc. Ent.* for December contains three plates devoted to illustrate forms of Macrolepidoptera described as occurring in Pomerania, by K. F. Marquarat.

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalia aurulenta* (Col.), *Tentredinidae* and *Aculeates*.

Desiderata.—Species of *Dolerine* and *Nematine* sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of *Noctuae* and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), *gothicina* forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (Friv) type, *eroides*, *anteros*, *Melitaea trivialis*, *Melanargia larissa*, *Coenonympha oedipus*, *leander*.

Desiderata.—*Euchloë grüneri*, *damone*, *Melanargia arge*, *pherusa*, and other European butterflies not found in France or Switzerland.—*A. Simmons, 12, Loughborough Road, West Bridgford, Notts.*

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytoecidia by Sagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: *Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 5th, 19th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. February 27th. March 13th.—*Hon. Secretary Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—*Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.*

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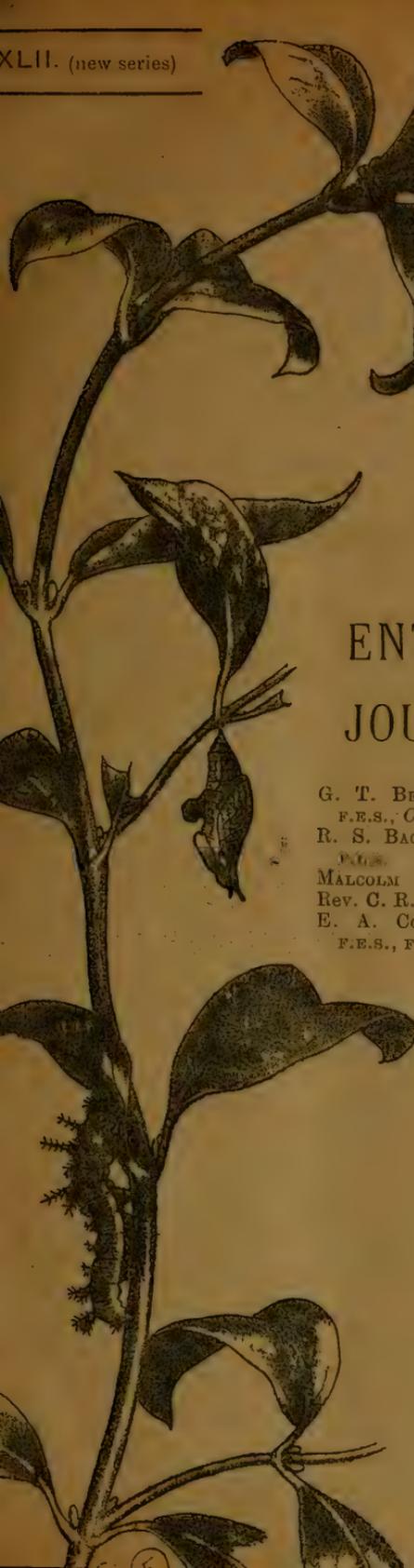
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Prof. Dr. Seitz's 70th birthday, February 24th.

Descendent of one of Germany's noble families, Dr. Seitz has been a collector of butterflies ever since he was six years old. At the age of 27 and after having completed his studies, he departed for Sydney. Together with Mr. William Mac-Leay, Mr. Mastas and Mr. Ollif, he collected butterflies near Adelaide and Melbourne. The first named scientist, took Dr. Seitz for lengthy excursions into the interior of Australia, thus awakening in him the idea of writing a great work, which should enable entomologists to gain a clear survey of the Fauna of the World. This suggestion took root in Prof. Seitz's mind, but he knew that first of all he must get to know thoroughly the butterfly-fauna of the whole World. For this purpose he had to travel and he therefore undertook numerous expeditions to all parts of the World, going at the age of 30 in the year 1890 to the Orient.

Through repeated visits to the Yemen, he gained much knowledge of the Eastern part of the Ethiopian territory, the West of which he had already entered earlier. Then he went to China and collected chiefly in Shanghai. In 1891 he lived in Kaw-Long, opposite the Island of Hong-kong, which he explored for many months. Following upon this, the Doctor stayed in Japan, where again he undertook expeditions far into the interior, starting from Hondo, Yokohama, Fliago and Tokio; he also visited Mianoshida and Nikko. Dr. Seitz remained in these Zones until the year 1892, during which time he studied the Palaearctic southern frontier of Eastern Asia, whose position he fixed by taking many statistical notes. His last South-American journey Dr. Seitz characterises as his 59th voyage to distant countries. Thus one is able to note, that he had plenty of opportunity to explore nearly all the countries of the World for their lepidoptera fauna. After many years of successful work as Director of the Zoological Gardens at Frankfort-on-Main, he retired from this responsible post, in order to be able to devote himself entirely to his chief aim in life—his work "*The Macrolepidoptera of the World.*" The war however, was the cause of delaying the progress of the imposing work, on which the author is still working with the collaboration of some 29 explorers, amongst whom there are several prominent English scientists. Other unforeseen interruptions occurred, through the illness of some of the collaborators whom it was practically impossible to replace; this too caused great trouble and inconvenience. The great exertions of the publishers however, assured the steady progress of the Work.

A Supplement, to the Palaearctic Fauna completed in the year 1920, has become an urgent necessity, and has lately begun to appear, and takes into account all the recent additions made up to date. The whole of the butterfly-volumes appertaining to the Exotic Section are completed, and we hear, that the moth-volumes X and XIV will be finished in the course of this year. We understand that it will probably be about another 3 years this versatile scientist will have to work intensively to finish his work. Prof. Dr. Seitz is at present far away in the interior of Brazil, and we wish him many happy returns of the day on this his 70th birthday.

Field Notes from the Congo.

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

I am afraid I have not much of entomological interest to report from the Congo, although I spent six weeks there. But they were busy weeks and I did not get outside the town of Elisabethville very much.

We crossed the Angola-Congo frontier on Armistice Day, 1927, in two lorries which were, I am glad to say, British made, loaded up with about two tons of kit and baggage. It was a six day drive from Villa Luso, and not without mild adventure, especially when we nearly lost a lorry by the sinking of the pontoon over the river Kayoyo.

After the plateau of Angola, it was rather pleasant to come into an agreeable little town with many of the amenities of civilisation. Elisabethville is barely seventeen years old, but as it is the centre of the immensely wealthy mining district of Katanga, there has been money in circulation. It has many appurtenances of civilisation, including a Cathedral, the smart Cercle Albert and one or two other more modest clubs, a palace for the Governor, and hospital each for whites and blacks. The population is cosmopolitan; apart from the Belgian officials and a few British, it consists mostly of Jews, chiefly of Russian origin, Italians and Greeks. It is well laid out, with shady avenues of handsome jacarandas and other ornamental trees, with rows of detached, pretty little houses standing in attractive gardens; they are built, however, rather to the European model of suburban bungalows and not properly designed for a climate a few degrees south of the equator. There are excellent shops and high prices but hotel accommodation still leaves much to be desired.

I was unlucky in missing the Government Entomologist, who was away in the bush, but glad to make the acquaintance of Monsieur Ramaekar, a keen zoologist and a skilled taxidermist. He is more interested in birds and mammals than in insects but collects beetles and sundries. M. Ramaekar received us very cordially and it was good to have a yarn on African zoology with a man who knows something of the subject.

I did little collecting myself. On the road, when we stopped for lunch or to unload and reload the lorries at one of the numerous pontoons, I picked up a few Orthoptera but nothing very striking; the most noticeable were brilliantly coloured Acridians which flashed as they made short flights in the sunlight among the rough herbage. I was sorry not to come across *Palophus*, the gigantic Phasmid, one of the largest known insects, which appears to be by no means rare in the Congo.

The country we motored through was all forest, but different from that of Angola. There we had rather thin and open woodlands on a poor, sandy soil. We noticed the change a few hours before reaching the frontier. The ground becomes richer and the vegetation much denser and more luxuriant. We saw few of the umbrella-shaped nests of *Calotermes*, which are so characteristic of the country round Villa Luso.

Their place was taken by the lofty pyramidal nests of some species of *Termes*. At one place, where the road ran straight through the forest, it was bordered by countless white pyramids standing ten and

fifteen feet high, very impressive and strange in appearance, like monuments of departed heroes. As we penetrated further, we came upon the red laterite soil so characteristic of vast areas of Africa and the termite nests were red. This colour is repeated in the chestnut flanks of the okapi, which probably wandered through this very spot before it became restricted to its present habitat in the Ituri forest. The strange creature must be very difficult to see in its native haunts, where the red flanks tone with the laterite soil which stains even the trees and the striped legs mingle with the twinkling light of the sun as it penetrates the jungle.

Termites are a benefactor in Angola where their nests provide the only coherent material around Villa Luso; it is used for binding the surface of the sandy roads, for paving camps and for making bricks. In the civilised town of Elisabethville they are a nuisance and do much damage, but they can be kept away by hedges of *Euphorbia*, which they will not approach.

I was struck by the fewness of insects that fly to light; the terraces and restaurants in town were well illuminated but very few insects were attracted by it. Only at one place did I pick up anything worth bottling; that was a place of entertainment which looks out direct upon open grassland; a brilliant illumination attracts considerable quantities to the white walls where they may be picked off with ease. They were most numerous on dark, wet, thundery nights, and we had plenty of these. One night there were swarms of an *Acridium* (or *Tettix*), recalling our common *A. subulatum*, which we hardly regard as a night-flyer at home in Europe. A small grey Mantid was fairly numerous but the most frequent visitor was a rather small green *Conocephalus*, a most persistent musician after dusk until about nine. His song recalls that of *Tettigonia viridissima* but differs in timbre.

In these African forests, so far as I have seen, Locustids and stridulating Orthoptera generally are surprisingly few; *Conocephalus* is the chief musician, the quieter *Heterodidae* coming second. But the main chorus is of the crickets which are varied and numerous. The most noticeable is a big pale fellow, probably *Brachytrype*, a giant among crickets, who appeared in the mature form with the first rains in Angola. He has a sharp loud chirrup like a bird, and towards evening the scrub resounds with his short penetrating note and it was some time before I identified the song with the singer; he also chirrups loudly when held in the hand. He was very insistent around Villa Luso when we left early in November and I heard the same note all through the forests of Katanga.

Through Central Europe to Montenegro.

By P. HAIG-THOMAS, F.E.S.

I had intended this year to spend the summer collecting in Spain, unfortunately owing to one thing and another my departure was delayed till July 11th. I decided therefore to give up Spain and go straight through to Carinthia where I was to meet two entomological friends, Mr. and Mrs. Cox, who were motoring. Unfortunately the season was an early one and we did not find as many species as we had hoped. Leaving London on July 11th, I arrived at the station of

Mösel at the foot of the Sau Alp early on the morning of the 13th and walked up to Stelzing collecting by the way; the day was cold, there was a strong wind, and only occasional glimpses of sun. Very few insects were visible, I observed *Erebia ligea* and *E. euryle*, *Melitaea dictynna* and *M. athalia*, and *Polyommatus anandus*. After depositing my kit at Stelzing at 2 p.m., I walked up the slopes above the tree line on the Geyer Kugel in hopes of finding *E. arete*. No *arete* was seen, but I took *Erebia epiphron* var. *cassiope* and *E. eriphyle* v. *tristis*. Mr. and Mrs. Cox arrived at Stelzing in time for supper.

July 14th.—Was spent on the Geyer Kugel, I took 18 ♂ *E. arete* and 4 ♀ ♀ at 5200 feet on a N.E. slope, a good many *arete* ♂ were worn; a few ♂ *E. eriphyle* v. *tristis* and one fresh ♀ *E. oeme* v. *spodia*, many others were seen but were worn. *E. lappona* higher up was not uncommon but very worn. *E. cassiope* abundant, some of the specimens approaching *nelamus*.

July 15th.—I found *E. arete*, ♂ ♂ only, very common and fresh on the S.E. slope of the Geyer Kugel 5200-5600 feet, *E. eriphyle* v. *tristis* was local and most plentiful on the N.W. slope in damp places where the rhododendron grew rankest. Though some of the ♂ ♂ were worn I took no ♀ ♀. Among common insects at Stelzing I took a few worn *Brenthis thore* very large.

July 16th.—We left Stelzing and motored through Klagenfurt over the Lößl Pass to Laibach and on to Zagreb. Both the Northern and Southern slopes of the Lößl Pass, which cuts through the Karawanken Mountains, are grand collecting ground. We were however too late for the lower slopes and only collected close to the summit of the pass at 4000 feet, where a race of *Erebia nerine* was flying on the rocky scree, ♂ ♂ in grand condition but only 1 ♀ was taken. This race of *nerine* seem intermediate between *stelviana* and *morula* the upperside is almost identical with *stelviana* though the insect is smaller. The underside has the forewings a brighter red than in *stelviana*, the hindwing in distal area has three black spots with white pupils. The ♀ has the band of the forewing on the upperside much wider than in *stelviana*, on the underside the hindwing has the three spots with white pupils well developed. I propose the name **lößli** for it. Among the other insects noticed on the Karawanken Mts. were *E. euryle*, *E. ligea* worn, *M. galatea* v. *procyda*, but much darker than *procyda* from Provence, *Limenitis populi*, *Apatura iris* and *Coenonympha arcania* very worn. There is a good hotel on the south side of the pass in Jugoslavia from which the summit could easily be reached in 1½ hours. We stopped for half an hour on some low wooded hills between Laibach and Zagreb, *L. populi* was in evidence and I took some rather dark *M. athalia*. We arrived at Zagreb about 8 p.m. and stayed at the Royal Hotel which is said to be the best. The country around Laibach looked good for collecting but around Zagreb it was much cultivated and in July dried up.

July 17th.—Was spent in motoring from Zagreb to Jajce over the worst roads imaginable and through a highly cultivated district as far as Banjaluka, between which and Jajce should be good collecting ground; it was already late when we left Banjaluka and we saw no insects.

July 18th.—We motored early up to a lake about 6 kilometres from Jajce but the grass in the marshes had all been cut and we saw no

sign of *Coenonympha tiphon*. Leaving Jajce we took a short cut by a very bad road over a pass to Travnik; the butterflies were rather disappointing. On the low ground a fine large summer form of *Pieris napi*, *Araschnia prorsa* one only, and a few worn *Brenthis hecate* were taken. Satyrids and Lycaenids were conspicuous by their absence. Near the top of the pass at 3500 feet, *Parnassius apollo*, *E. euryale*, *E. ligea* and one very small *E. aethiops* and *Lycaena alcon* worn were taken, while one *Polygonia L-album* was seen but not captured. Much of the open ground, which looked good on the S.E. side of the pass was enclosed, and as the meadows were not cut, and the owners were present we did not attempt to invade them, otherwise our list of insects might have been considerably increased. We motored down to Travnik, which is an exceedingly hot and uninviting looking town and on to Sarajevo.

The country between Travnik and Sarajevo is much cultivated and we saw very few insects.

At Sarajevo we put up at the Hotel Europa, which was both comfortable and moderate in price.

July 19th.—We motored almost to the top of Mt. Trebevic and took many butterflies around 4500 feet. *Papilio machaon*, *Parnassius apollo* r. *bosniensis*, *P. mnemosyne* worn, *P. napi*, *Gonepteryx rhamni*, *Erebia oeme* f. *spodia* ♂ worn some ♀♀ quite fresh (the females of this race were considerably larger than those taken in the Sau Alp). *E. ligea*, *E. euryale*, *E. tyndarus* r. *balcanica* all common. *E. manto* was just coming out. *Melanargia galathea* a fine dark form, *Hipparchia semele*, *Limenitis rivularis* (*camilla*), *Euranesia antiopa*, *Pyrameis cardui*, *Aglais urticae*, *P. atalanta*, *Epinephele jurina*, *Coenonympha arcania*, *C. pamphilus*, *C. iphis*, *Melitaea trivialis* a few around the summit nearly all worn, *M. didyma*, *M. athalia*, *Argynnis aglaia*, *A. niobe* v. *eris*, *Heodes virgaureae*, *H. hippothoe* a large race, and one *H. alciphron* ♀ quite fresh seen. *Plebeius aegon*, *P. medon* (*astrarche*) f. *alpina*, *Scolitantides orion*, *Polyommatus semiargus* and *Lycaena alcon*. Also *Hesperia carthami* and *Angiades sylvanus*. *Colias myrmidone* must have been over as we saw no sign of it.

July 20th.—We again motored to the top of Trebevic and stayed till two o'clock when it clouded over, the only fresh insect seen being *L. argiolus*. Leaving Sarajevo at 4 p.m. we motored to Mostar and stayed at the Hotel Nareton. Most of the country between Sarajevo and Mostar looked good.

July 21st.—We motored to Gadcko and on the way visited Blagaj, where we took about two dozen *Tarucus balcanicus* mostly rather worn. *Polygonia egea* was also common but worn, one *Satyrus statilinus*, a few worn *P. medon* (*astrarche*), and *P. icarus* completed the list. The hotel at Gadcko was not all that one might expect.

July 22nd.—Motored to the Austrian Gendamerie about 16 kilometres along a stony track and then walked two and half hours through forest to the lower slopes of Mt. Vlasulja. One worn *Neptis lucilla* was taken in the forest. The lower slopes of Vlasulja were eaten bare by large flocks of sheep and goats, the only insects being *P. aegon* and *C. tiphon* r. *occupata* (Rev.) both common but the ♂♂ of the latter were almost over; higher up between 5000 and 5500 feet ♂♂ of *Erebia melas* were not uncommon, but difficult to catch on the shale slopes. On this day we took 17 ♂♂ and 3 ♀♀. *E. tyndarus* v. *balcanicus* was also taken, the ♀♀ being larger than those on Mt.

Trebevic. On our way back we ruined two tyres and arrived at Gadcko after dark.

July 23rd.—We motored to Mostar and back to get new tyres and on our way stopped at one or two likely corners for *Tarucus balcanicus* from 500 to 1000 feet above the Blagaj Gorge. The food-plant grew all over the sides of the hills, but *T. balcanicus* seemed to be confined to the gullies facing due South, where it was extremely hot. I took 17 *T. balcanicus*, 2 *Cupido minima*, 7 *Satyrus briseis* and a few *Pieris ergane* ♂ only. There was a good deal of wind and only a few butterflies were seen.

(To be concluded.)

Cavalaire and the New Riviera. May, 1929.

By LIEUT. E. B. ASHBY, F.E.S., F.Z.S.

(Concluded from p. 11.)

May 23rd.—To-day at Beauvallon *Thymelicus acteon* was beginning to emerge, and on the hillsides behind the Golf Hotel I took the moths *Synthymia jica*, Fab., *Napuca ochrearia*, Rossi, which were both flying pretty numerously. I also took two fresh specimens of *Melitaea pseudathalia*, and the following beetles: *Myllabris hieracii*, Graells, which were abundant, *Chrysomela hyperici*, Forst., *Cryptocephalus sexmaculatus*, *Lachnaea pubescens*, Duff., the beautiful *Leptura bipunctata*, F., variety, and *Macrolenes dentipes*, Oliv. The following Hymenoptera were taken, viz., *Anthophora acerrorum*, L., *Andrena limbata*, a slight var., common, *Odynerus laevipes*, Shuck., var., *Andrena labialis* ♂. The view across the sea from Beauvallon halt station to St. Tropez is alone worth seeing.

May 24th.—At La Londe to-day the weather was windy, working up towards a storm. I found but little except the beetle *Cebrio lepturoides*, F., the Hymenoptera *Ammophila sabulosa* and *Xylocopa cyanescens* (wings rather worn), the Dipteron *Mycopla dorsalis*, Fabr., the Burnet moth *Zygaena stocadis*, Bork. I imagine that La Londe is not now a good collecting centre; most of the ground is planted with vines, and I only saw small patches of woodland, but I did not go very far from the station.

May 25th.—At Cogolin today I took a dozen quite fresh specimens of *Brenthis daphne*, as they were feasting on the white blossoms of bramble bushes in the full sun. *Limenitis rivularis (camilla)* was one of the commonest butterflies this spring in the whole district and the females of *Epinephela jurtina* var. *hispidula* repay careful searching for amidst the myriads of the type. Some of these females are very large. Some *Emydia cribrum* were flying and I took one, a male, of *M. pseudathalia*.

May 26th.—The first and only rain of my holiday lasted for about two hours this morning, and the sun this afternoon was hotter than ever. A road leading up into the woods, to the right of the back of the Grand Hotel at Cavalaire developed later into grassy clearings, in the midst of which females of *Melanargia syllius* and *Argynnis lathonia*, and fresh males of *M. pseudathalia* were not uncommon. I took the beetle *Temnochila caerulea*, Oliv., and the Hymenopteron *Allantus zonula*, Kl., var. *bizonula*.

May 27th and 28th.—I continued in the same area as on May 26th, and completed a long series of *M. pseudathalia* including a few females. The females of the beautiful Scoliad, *Discolia flavifrons* were darting about in the hot sun, but so far they have not given me a chance. I took the Diptera *Pangonius micans*, Mg., and *Cerioides vespiformis*, Latr., and two Asilids probably of the sub-genus *Echthistus* one being probably *rujneris*, Wied., ♀, and some females of the moth *Emydia cribrum*; also 2 specimens of the beetle *Lixus iridis*, Oliv., and a single specimen of the moth *Dysauxes punctata*, Fabr.

May 29th.—My last visit to Cogolin this year. Before the station is reached the train passes over a stream bordered each way for some considerable distance by the giant reed. Following up stream by the path which runs parallel with it, a considerable variety of collecting country is met with ending up with woods and wooded hills behind them. There is no let or hindrance if one is careful not to walk over crops, and the locality is a good one in April-May. I imagine the Hotel Cauvet at Cogolin would be satisfactory. Today the moth *Emydia cribrum* was in fine condition and the imagines of *B. daphne* were flying in considerable numbers, and towards the end of a very hot afternoon I found that *Strymon (Thecla) w-album* was well out and I took about a dozen in good condition as they were all feeding upon a white flower beneath their elms. *Lycaenesthes argiolus* was apparently beginning to emerge today. I also took some very fresh males of *Andrena hattorfiana*, Fab. I should like to say that in all probability there is a considerable extent of collecting grounds in the Cogolin-Grimaud district in addition to the ground I have mentioned where I did all my collecting at Cogolin. I was greatly indebted to Mr. Fassnidge's article in January, 1929, of the *Entomologist's Record*, and I found the Hotel de la Plage et des Bains at Cavalaire very convenient as a collecting centre for the neighbourhood. It is very clean, reasonable, 2 minutes only from the station, and is situated right on the beach, where there is excellent bathing, boating, etc., and Monsieur Simon, the proprietor, is deservedly very popular with his clientele.

May 30th.—On the same ground at Cavalaire as on May 26th I saw one or two quite fresh males of *Satyrus circe*, which had probably emerged that morning. On May 31st in the train between Cavalaire and St. Raphael I noticed odd specimens of this butterfly near the railway line in several places. I also noticed this afternoon after my things were packed a number of specimens quite fresh of the beautiful Footman Moth, *Deiopeia pulchella*, flying around the neighbourhood of the Grand Hotel at Cavalaire, and near the railway line, settling frequently on the grass heads. I saw but one mosquito at Cavalaire during my visit. I reached London the evening of June 1st after a particularly enjoyable holiday.

I must express my best thanks to Dr. Perkins, Mr. C. Morley, Mr. C. J. Wainwright, in particular, and to several other naturalists who have helped me to determine many species mentioned in this article.

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

The most extreme species of this genus had become so thoroughly balanced in the psychrotropic state by organic changes that they have never been able, as might have been expected, to face conditions which required changes in the opposite, caloripetal, direction and all they have done in Asia has been to substitute the palaeartic *aurinia* and the *matura* group for their American ancestors by comparatively slight specific transformations. As to *E. desfontainii*, Godt., which differs from most of the species of this little genus and actually inhabits the hottest and driest territories of the region (Morocco and Southern Spain), it is most instructive. In my paper on *aurinia*, in this *Journal* for 1928, I have stated that I had taken it to be a group of *aurinia* which had got locally modified by its new surroundings. Now, the study of the general evolution of the *Melitaeidi*, the knowledge of the genitalia of the American *Euphydryas* and the comparison of this case with the exactly similar one of *M. dejone*, which has accompanied *desfontainii* and which I will describe further on, plainly show that I had taken a wrong view of it. It is a very useful lesson, to be borne in mind when dealing with numerous other instances of the same sort, which are afforded particularly by that extreme western Atlantic region. If one compares *desfontainii* with race *augusta*, Edw., proper to the warm southern counties of California, of *editha*, the species which is a grade less advanced than *gillettii* and *aurinia* in, the frigidipetal direction, and with exerge *sierra*, Wright, of *chalcedona*, a branch parallel to it, one is at once struck by their general resemblance. The genitalia next prove that this is not only a superficial one, produced by the warm localities they both inhabit, but that *desfontainii* actually possesses a saddleshaped process with a long slender branch, described with no hesitation by Reverdin as "analogous to the lateral apophysis of the *athalia* group"; it has also retained a terminal apophysis, although its shape has become different from that of any of the true *Melitaea* and reminds one of the broad forelegs of a mole-cricket, with seven spines along its edge. These facts make it perfectly obvious that *desfontainii* has not derived from an *aurinia*, which has returned to a warmer climate and to caloripetal variation, but that it has derived in a direct way from a species, like *editha* or a primitive exerge of *chalcedona*, which had never reached as high a grade in the frigidipetal direction as *gillettii* and *aurinia*, so that it has partially retained the apophysis of the clasps. It has in consequence, more ancient and less specialised features, except for the particular specific ones it has presumably acquired, in a way parallel with that of *aurinia*, since its line of descent has reached Asia and spread along the warm Southern routes, in the early Miocene, with the first flow of invaders from Asia to Morocco, which has consisted, as I have pointed out in other occasions, of species already suited to warm climates. It stands to reason that *beckeri*, Lederer = *iberica*, Obth., which is exactly intermediate, but not transitional, between *aurinia* and *desfontainii*, must have originated in the same way and followed the latter when the Miocene climate became cooler. It certainly is a distinct species from it, because they fly on the same grounds at the present day in Southern Spain and

cynaeas theoma	minuta thekla	cinaria	collina	didyma	trivialis
		agar yuentj	Timelaea		
		Euphydr. gillettii	desfontainii	[beckeri merope aurinia]	[glaciogenta]
leanira wrightii					

NOTE.—The positions of the *Euphydryas* are not adequately represented in this Table, because, having transformed further than the *Melitaea* in the frigoripetal direction, they have produced a larger number of stages, so that more columns would be required for them, before the one of the psychrotropic state. Thus, the Nearctic column should be split into four for *M. leanira*, *E. anicia*, *editula*, which I have had to leave out, and *gillettii*, and, after that of the Thermotropic state, with *desfontainii*, there should be three successive ones for *beckeri*, *merope* and *aurinia*, which I have been compelled to lump into one to get the Table in the size of the page. Exetges belonging to the same species are enclosed in brackets.

they keep perfectly separate from each other, but, rather than a third species, as sustained by Spüler, it more probably is a very distinct exerge of *aurinia*, standing to the latter and to *desfontainii* exactly as we will see, at the end of this paper, that *helvetica* = *pseudathalia* stands respectively to nominotypical *athalia* and to *dejone*. *M. dejone* in connection with *athalia*, brings us to precisely the same conclusion as *desfontainii* and cases of the same sort in many of the extreme western Lepidoptera are revealing themselves so frequently that this phenomenon is, beyond doubt, quite a general one. The fossil butterflies and fossils of all sorts fully agree with it, as a high percentage resemble American species and genera much more closely than any of the present palaeartic ones: thus a *Pieris* nearly exactly like the common *protodice*, Boisd., of the United States and a *Nisoniades* = *Thanaos* exactly like those of this region have been found at Aix-en-Provence, in Southern France. We shall soon have to conclude that, scientifically speaking, the flora and fauna of the Old World should have been called "nearctic" and those of the New World "palaeartic," because the greater part of the most ancient organisms have survived in the latter, whereas the greater part of those now living in the former are comparatively recent offshoots. I say "comparatively," because the term of "recent," as applied to species, when they are real species, is apparently becoming less and less appropriate, according to the knowledge we are gradually acquiring of them and of their history. One is continually finding out that their origin must be pushed further and further back than one thought and that most Holarctic species have existed for hundreds of thousands of years and very often for two or three millions. Even a great many exerges possess their hereditary differences since times of this sort.

As to the descent of the *Euphydryas*, it is quite easy to follow it from a little group of *Phyciodes*, which have a special type of pattern, standing out prominently amongst the others and repeating itself in very different kinds of butterflies; in other *Nymphalidae* it exists, for instance, in *Limenitis archippus*, Cr. = *distippe*, Godt., and in the *Apaturidae*, in *Apatura schrenckii*, Mén.; it consists in one or two dark bands across the middle of the hindwing, on the underside, and of another along the external margins, in the *Phyciodes* the latter is reduced to a black streak; thin dark streaks along the neuration tend to break the uniform light ground-colour into oblong spaces. Several *Phyciodes* have this pattern or are transitional to other types and to the *Eresia*, but those which interest us here are chiefly *theona*, Mén., of Central America and the Southern United States, and *cyneas*, God. and Salvin, of Mexico and Arizona. These are followed by *Melitaea leanira*, B., with the closely allied *wrightii*, Edw., of California, which still recall the *Phyciodes* by the shape of the apex, but which exhibit a pattern, which on the upperside somewhat recalls *minuta*, on the one hand, and which on both surfaces leads up to *chalcedona*, Doubl., and *phaëton*, Drury, on the other, transition to both these species being nearly perfect. One can compare, for instance, *wrightii* to race *nympha*, Ed., of *minuta* and the form *cerrita*, Wright, of the former to exerge *thekla*, Ed., of the latter. The transition to *chalcedona* and *phaëton* includes even their principal differential feature, consisting in the absence of orange-red spots in the central black band of the underside

of the hindwings in the latter; this difference already existed in the *Phyciodes*, as they are present in *theona* and lacking in *cyneas*. In the *minuta* branch and its palaearctic descendants those red spots vary very much in extent, but they are always present, and in fact they increase and blend into a continuous band in the most highly modified species (*didyma*). The tendency of the *Euphydryas* has been to vary in the same way, although the band is not so conspicuous in the *aurinia* group on account of its colour being less of a contrast with the ground-colour, but in reality it is broader than in any other species. It must be noted that the *Euphydryas* have all retained the fulvous marginal band of the underside, which is present in all the Nearctic *Melitaea*, except *leanira* and *minuta*; in *aurinia* it looks as though it did not exist, because the fulvous has faded away with the paleness of the whole pattern on that surface, but the two capillary streaks of its edges are there and *gillettii* is transitional. In the *Melitaea* and in the *Phyciodes*, which I have just pointed out as the closest living representatives of the ancestors of the *Euphydryas*, that band is reduced to one black streak, as it is in *minuta*, so that, possibly, the *Euphydryas* are not their direct descendants, but are those of an ancestry parallel to them, which has retained that band all along and which has entirely transformed into *Euphydryas*, leaving no specimens of its previous stages; it seems very natural this should have happened in a line of descent, which was so anabolically apt to transform organically, that it has responded much more than the other *Melitaea* to the change of climate, and become generically distinct.*

Turning our attention again to the true *Melitaea*, we find that also its *harrisii* group, after it had reached Asia, did not develop to any great extent and did not transform beyond adapting itself to the new surroundings by shifting its specific balance to *protomedia* and *dictynna*. This, too, can be logically explained by observing that it had already retained in America very similar features to those of the *Phyciodes* from which it had derived, so that it had changed aspect less than any other group of *Melitaea*. Its ancestors must have been amongst the most highly catabolic *Phyciodes*, which, owing to their great activity and their strong power of functional reactions to different sorts of surroundings, had spread from tropical to subtropical and temperate climates, and were living there, as some are still doing now. Some have not undergone any organic changes to the degree we call generic; others

* In connection with reaction to surroundings, what I mean is that the reaction is catabolic, or Katabolic, when it consists in movements, in secretions and in a rise of temperature, drawing the necessary energy from the reserves of the organism, as well as from its food, by *breaking down* chemical compounds, whereas it is anabolic when it consists in moulding the structures of the organism by gradual adaptation and it thus transforms it by *building it up* differently, according to changes of environment.—R.V.

Some of our readers may not know the significance of the terms "katabolic" and "anabolic." These, so far as I know, came into use some 30 years ago, introduced by Geddes and Thomson in their famous work the "Evolution of Sex." They defined them as follow:—"Such conditions as deficient or abnormal food, high temperature, deficient light, moisture and the like are obviously such as would tend to induce a preponderance of waste over repair—a katabolic habit of body." "Similarly the opposed set of factors, such as abundant and rich nutrition, abundant light and moisture, favour constructive processes, i.e., make for an anabolic habit."—Hx.J T.

however, presumably under the increasing stress of the new, colder, climate and having constitutions less catabolic than the preceding, had to specialise to it by organic transformations of that degree, if it is true that turning from *Phyciodes* into *Melitaea* they have become generically different (the doubt is due to the fact that there is very little diversity between these two groups and there are species, which some entomologists place in one and others in the opposite group). One of the species of *Phyciodes* of the *ismeria*, Boisd., and *nycteis*, Doubl., branch has turned into the *Melitaea* of the *harrisii* group. The latter has kept up the catabolic functional reaction more than the other lines of descent, and thus it has preserved its primitive organic state and aspect till this day and partially even in *dictynna*, which has travelled right across the Palaearctic region, without splitting into any specialised branch or even exhibiting very marked racial or individual differences of aspect anywhere. On the contrary the other primitive *Melitaea* yielded more to the effects of different surroundings and climates, during successive epochs, and split up into branches, of which the comparatively most catabolic went on spreading and resisting changes, whilst the most anabolic, were, so to say, left behind, where the conditions to which they had become organically or constitutionally specialised did not change and allowed them to survive. These groups thus exhibit a greater or lesser number of species and exerges in different regions, which are, for the student, specimens of the stages and variations of those groups in the past.

I have already spoken of the very variable *Euphydryas* of America and of the way they only passed into Asia in a highly specialised psychrotropic state, so that they did not develop much there.

The true *Melitaea* have behaved in exactly the opposite way, so that in America each line of descent is represented by a single species or by a very small group of closely allied ones; we can thus presume they arrived in Asia with constitutions nearly as catabolic as that of *harrisii*, but most of them then spread, divided and varied very much there. I have endeavoured to show the developments of the various lines by a table, which I think will help to follow the remarks I make. To follow the natural order of these lines, after the *dictynna* one I have just talked of, should come the *athalia* group, but, as this is a bulky subject I will have to deal with in detail, I think it preferable to begin at the opposite end in giving a short account of the other lines.

It is unfortunate that on paper we should be obliged to place the *didyma* line between the *Euphydryas* and the *cinxia* one, because the two latter are certainly closely connected and the *didyma* line is in no way intermediate. Its real position is parallel to *minerva* and *collina* on another plan, as, no doubt, its ancestry is very near theirs, but one does not find in America any *Phyciodes* or any *Melitaea* sufficiently similar to it to suggest a more or less direct descent, such as one finds in the other lines. I think, however, the peculiar little group, typified by *elata* and *chara* and considered *Phyciodes* by some and *Melitaea* by others, is beyond doubt the Nearctic representative of the *didyma* group. It has felt the effects of the cold climate to a very slight extent, so that it has scarcely turned into real *Melitaea*, whereas some much more catabolic species of the same origin has presumably spread northward, turned into a *Melitaea* and passed into Asia. The main lines of the simple pattern and colouring of *Phyciodes theona* are

sufficiently similar to those of *M. agar*, Obth., to make it possible that the origin of the *didyma* line should have been the same as that of *minuta* and of the *Euphydryas*. The reduction of the marginal black streak of the underside to internervular dots is a striking feature of *cinxia*, not found in America, but what makes it particularly noteworthy is that it has been carried on to an enormous degree by the outburst of the *didyma* group, as I have described it in a paper on this species. I have pointed out that *M. agar*, Obth., of the high mountains of Western China, exhibited intermediate features, including the presence of the black dots in the orange spots, and that the *didyma* line had no doubt culminated in the subtropical genus *Timelaea*, after passing through a *Melitaea* stage, which has survived in *yuenty*, Obth. I can now add that the genitalia fully confirm this conclusion, as those of the *didyma* group are like the ones of *cinxia* carried to a further degree and that another intermediate line has survived to the present day in the Nearctic *thekla*, Edw., closely connected with *minuta*, and in the very local and usually little known *M. collina*, Led., of Anterior Asia (Seitz actually places it as a variety of *trivia*!). Its aspect is intermediate between *minerva* and *didyma*, as shown by specimens collected by Major Graves and kindly presented to me, and its genitalia are quite of that group, as Captain Riley has been good enough to find out for me by dissecting a specimen of the British Museum and sending me a sketch. These less highly differentiated species are evidently on the point of extinction, but there may have been a time when they preceded *didyma* and *trivia* all over Asia, judging from the distant localities and the very different surroundings in which *agar* and *collina* have survived. *M. saxatilis*, Christ., is the last stage of *didyma* in the caloripetal direction, and it is very interesting to note that its genitalia have developed a small, but distinct uncus, like the one of the other parallel caloripetal line of variation, whereas it is entirely wanting in *didyma*, *cinxia*, *minerva*, etc.

In the accompanying table I have placed *acraeina*, Stdgr., and the genus *Timelaea* amongst the early thermotropics, but I have not dissected their genitalia, so that, if it were found they have an uncus, it might be discovered they should stand in the last columns, as advanced stages in the caloripetal direction.

New Forms of Lepidoptera.

In the *Am. Pap.* for Oct, p. 287, M. Cath. describes the two following aberrations:—(1) *Triphaena jimbria* ab. *iago*. The forewings olive green with the yellow colour of the hindwings and of the abdomen replaced by a coffee-brown tint. (2) *Arctia villica* ab. *dryope*. The anterior wings with spots confluent lengthwise and a yellow streak on the inner margin. Hind-wings entirely yellow except a small black point near the apex. Thorax yellow, slightly rosy between the "epaulettes," near the collar which remains black. Abdomen without black spots. Plt. V., fig. 13.

In the *Zt. Oesterr. Ent. Ver.* for December, Dr. Schawerda describes the following new forms:—(1) *Cidaria* (*Xanthorhoë*) *montanata* ab. *pseudolapponica*. The Northern ab. *lapponica* is smaller and much paler than the central European form. In the mountains of the Tyrol the form is of the normal size but equally weakly marked and is even paler

in colour. The central band quite obsolescent. But they are distinct in their size and in their general appearance, for in typical *lapponica*, the inner third of the forewings is strikingly pure white. (2) *Ematurga atomaria* ab. *kindervateri*. Two males near Vienna which have the first basal dark brown transverse line and the third the outside one standing out distinctly on the light ochre grey of the forewings. The middle one containing the discal spot is wholly wanting. On the hindwing the transverse line lying on the outer side of the discal spot is very distinctly emphasised.

In *Lambill.* for November, Van Mellaerts describes three new aberrations of Lepidoptera:—

(1) *Colias palaeno* subsp. *europome* ab. *striata* in which the black marginal band of the forewings is encroached on by the yellow ground of the wing and takes on a greenish tone; the nervures remain well expressed in black. Hindwings normal. Hautes-Fagnes, Belgium.

(2) *Argynnis lathonia* ab. *pupillata* is the ab. *interligata*, Cabeau, having a yellow dot in the centre of the black spot which forms the characteristic junction in *interligata*. Virton, Belgium.

(3) *Melitaea aurelia* ab. *cinerea* has the forewings suffused with a yellow opaque veil giving them a unicolorous appearance.

In the *Zt. Oestr. Ent. Ver.* for November, Dr. Schawerda describes the following aberrations:—

(1) *Aporophyla luteolenta* ab. *brunnea*, has the forewings, with the exception of the prae-apical costal streaks and the somewhat lighter brown stigmata, uniformly brown. The hindwings white with a brown trace along the margin and the distinct central band in the female quite light brown. Mostar.

(2) *Hadena satyra* ab. *variegata*, in which the stigmata and the large red-brown spot at the anal angle of the forewings are paler, yellowish, as also are a transverse basal line and the prae-marginal toothed line. Kufstein, Tyrol.

(3) *Plusia pulchrina* ♀ ab. *incipiens*, is without the two golden markings on the forewings. The distal mark is completely absent. Kufstein, Tyrol.

NOTES ON COLLECTING, etc.

GRACILARIA AZALEELLA, BRANTS., IN WILTSHIRE.—Early in February I received from Mr. Haynes, of Salisbury, a number of larvae, pupae and imagines of this insect, for which Meyrick in his *Revised Handbook* gives only one locality in England, namely Torquay. They were taken on azaleas in a greenhouse at Salisbury, kept at an average temperature of 56° F. All stages occurred together, as is usual in a continuous brooded greenhouse pest such as this insect is. It would seem that the species is extending its range in this country, and it would probably be found, if looked for, nearly everywhere where azaleas are cultivated in greenhouses.—WM. FASSNIDGE, M.A., F.E.S.

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at "Durandesthorpe" 19, Hazlewell Road, Putney, S.W., on December 3rd 1929, Mr. H. Donisthorpe in the Chair. Members present, in addition to the Chairman—Professor E. B. Poulton, Mr. H. Willoughby-Ellis,

Mr. J. E. Collin, Mr. W. J. Kaye. Visitors present.—Messrs. E. E. Austen, Robert B. Benson, K. G. Blair, F. Laing, G. C. Leman, Edward Step, W. H. T. Taus, Douglas Wilkinson, Dr. M. Burr and Dr. K. Jordan. The guests arrived at 6.30 and were received by Mr. and Mrs. Donisthorpe; tea and light refreshments were served in the drawing-room. The Chairman's collections were on view consisting chiefly of British Coleoptera and the special exhibits mentioned in a later paragraph. Supper was served at 8 o'clock and the guests departed about 11 p.m. after a most successful and entertaining meeting. The Chairman specially exhibited an enlarged photograph of the employees of the Crown Estate Office at Windsor including himself in a frame manufactured from Windsor oak, presented to him by the Chief of the staff. Also his first book on Natural History 'Warne's Picture Natural History,' which was given to him at four years of age, and cabinet drawers of British Myrmecophiles and British Longicorns. During supper the Argentine ant was found to be running about the table evidently having been brought into the house with some flowers which came from Windsor greenhouses.

Mr. W. J. Kaye exhibited a plant of the remarkable orchid *Catasetum tridentatum*, and said that until Darwin had looked into the structure of this flower the mystery of the invariable absence of a seed pod could not be explained. It was then found that the three species *viridis*, *discolor*, *barbatus* and *tridentatum* in three different genera *Monocanthus*, *Myanthus* and *Catasetum* were all one species and represented the female, the hermaphrodite, and the male flowers respectively. It was remarkable that in an orchid this should be so, as it was the almost invariable rule that orchids were bisexual and were fertile for either sex, although cross-fertilization was necessary in most cases. The extraordinary structure of the flower was explained, and the presence of the two antenna-like processes within the inverted labellum or hood were specially drawn attention to. These if touched even if very lightly at once caused the ejection of the pollen mass. In one case the pollen was ejected quite a couple of feet, and in a second case the pollen adhered to the pencil which touched the antenna. So tightly does the sticky base of the pollinia attach itself that it cannot be removed except with considerable pressure. The pollinia themselves however easily become released from their base.—H.W.-E.

REFERENCES FOR ALGERIA.—*Ent. Record*: vol. XXVI. p. 63, 83. March-April: *Ent. Mo. Mag.*, vol. XXII. p. 250, spring: vol. XXVII. p. 9, 55, April: vol. XXXI. p. 144, spring: vol. XXXVIII. p. 276, Feb.-April: vol. XL. p. 214, 265.: XLI. 37, 125.: XLIII. p. 6, 55, 125, 147, 187 (micros.): XLVII. p. 12, 187 (micros.): *Ent. XXXIX*. p. 84, 107, spring and summer: XLIV. p. 135, 170, May. Also *Novitates Entomologicae*, of Rothschild, *Études d'Entomologie* and *Lépidoptérologie Comparée*, of Oberthür.

The output of entomological reflections and work of our correspondent Dr. Verity is phenomenal. In the *Ann. Soc. ent. France* just issued there is a lengthy memoir discussing the Origin of European and Mediterranean Rhopalocera, which is really a continuation of the same theme as contained in the articles which have already appeared in our magazine on *Melitaea aurinia* and *M. didyma*, during 1928-9. He defines (1) his use of the term "race" as differing from the concept

"subspecies," (2) his own term "exerge" (including "synexerge") incidentally referring to the three separate routes of migration from the Asiatic central area, *viz.* the "Africo-Iberic" the "Egeo-Dinaric-Piedmontese" and the "Sibero-Russ-Germanic," and (3) his conception of "species" (including "hybrids"). The "general remarks" are a most useful introduction to the geological, geographical and climatic conditions and factors which have regulated the migration, variation, origins of our present Rhopalocerous fauna of the western Palaearctic area.

In the *Int. Ent. Zeit.* for December, No. 36, there is an interesting series of observations on the Lepidoptera Fauna of Thuringer in 1928, and also an account of the breeding ab ovo of *Polyommatus thersites* supplementary to the observations of the late Dr. Chapman, *Trans. Ent. Soc. Lond.*

Nos. 18 and 19 of *L'Amateur de Papillons* are recently to hand. There are two plates, the figures on which refer to various recent articles in the magazine. On plate IV. are a series of striking aberrations of *Boarmia (Cleora) lichenaria*, an aberration of *Melitaea didyma* with a strikingly dark transverse band on the hindwings below and very dark forewings, and a form of *Agrotis (Lycophotia) ripae* with the submarginal line on the forewings, very strongly emphasized by a narrow black band.

A series of Circulars and Bulletins on economic entomology have been distributed by the R. Scuola Superiore d'Agricoltura in Portici (Naples) dealing with the fruit fly, grain insects, the coccid of the fig, the Argentine Ant (an immigrant to Europe), aphids detrimental to agriculture, etc. All are profusely illustrated and especial information is given to the parasites which are destructive to each of the pests dealt with.

Our correspondent Capt. K. J. Hayward has contributed an article on "The Migration of Insects with especial reference to the Argentine," to the *Revista Soc. Ent. Argent.*, for October, in which he gives a considerable amount of classified data with a summary of the results they afford.

The *Ann. Nat. Hist. Mus. in Wien* for 1929 is a big quarto volume of nearly 500 pages with 14 plates and many figures in the text. The Entomological articles are, (1) a Revision of the large amount of Material of the Orthopterous Family *Gryllidae* in the Museum, by H. H. Karny and (2) Accounts of the *Tabanidae*, *Stratiomyidae* and *Ithyomyiidae* obtained by Dr. Zerny in his recent natural history journey up the Amazons, by Von O. Kröber and Dr. E. Lindner.

REVIEWS AND NOTICES OF BOOKS.

DER MINEN-HERBARIUM.—The second part of the *Minen Herbarium* by Dr. M. Hering (Berlin) has come to hand and it is quite equal to the first part which we reviewed on page 16 ante. In the Lepidoptera there are examples of the leaf-mines of the larvae of eleven species, *Phyllocnistis suffusella* and *P. saligna*, *Lithocolletis tremulae* and *L. pastorella*, *Nepticula pyri*, *N. atricollis*, *N. plagiocolella*, and *N. albifasciella*, *Tischeria dodonaea*, *Coleophora ahenella* and *Cosmopteryx eximia*. Mines

of six species of Diptera, two of Hymenoptera and one of Coleoptera complete the part. Each species is numbered so that it will be an easy matter to label a collection of the imagines with the reference numbers for the mines. When completed the work will be a most valuable adjunct to collections which in the past have been restricted to the imagines alone.—Hy.J.T.

SUPPLEMENT TO SEITZ' MACROLEPIDOPTERA OF THE WORLD, PALAEARCTIC RHOPALOCERA.—Seitz' volume on the Palaearctic Butterflies was concluded at the end of 1909 and such was the impetus given to further research in this group, that now twenty years after, it has been found necessary to publish a supplement. The issue of the volume on the butterflies (1906-9) at once enabled collectors to name and classify what they had and to recognise forms that were new and needed describing and recording. Our knowledge of the Rhopalocera increased by leaps and bounds, and there was a flood of new names and descriptions of forms, which it had hitherto been unable to deal with except by long and tedious research and expense. When we say that more than 70 new names have been introduced for *Papilio machaon*, more than 50 each for *Aglais urticae*, *Rumiccia phlaeas*, *Melanargia galathea*, etc., it will be seen that it was now quite time to get these new items into line with previous work, and to render their descriptions available to the ordinary student. The result is that the publishers of "Seitz," Messrs. Alfred Kernen of Stuttgart, have taken up this continuation and there lies before us 4 parts, consisting of 56 pages and 5 coloured plates, of the English edition. There is a very interesting Introduction by Dr. Seitz himself in which he makes very critical remarks on the modern custom of naming to superfluity, a few remarks on the international rules for nomenclature, which as, he points out, so few entomologists attempt to keep in their entirety, and a series of very useful items of information on the intricate south-eastern lines of demarcation of the Palaearctic Region, much of which he had investigated personally.

The order of treatment is the same as that in the first volume and in most species the references to the page and plate in volume I. are given. The species of the genus *Papilio* and other genera to *Parnassius* (*apollo*) are dealt with and on the plates there are nearly 150 well drawn and coloured figures. Dr. K. Von Rosen of Munich deals with the *Papilio* and allied genera and Chr. Bollow is responsible for the *Parnassius* species.

May we urge all, who have the previous work, to subscribe to the Supplement, and second the praiseworthy enterprise of the publishers in publishing it, not only in its original, the German language, but in both English and French. This duplication necessarily adds to the cost, but it also adds very effective aid to those who cannot readily understand the original; as it were it brings the information home to them. Later on we will take the liberty of summarising the remarks of Dr. Seitz on the Zoological Rules of Nomenclature, and of his remarks on the limitation of the Palaearctic Region.—Hy.J.T.

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EXCHANGES.

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Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima, populeti, gracilis* (Irish and Scotch and Manx), gothicina forms of gothica and selected unusual forms of incerta, gracilis and munda.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (Friv) type, eroides, anteros, *Melitaea trivialis*, *Melanargia larissa*, *Coenonympha oedipus*, leander.

Desiderata.—*Euchloë grüneri*, *damone*, *Melanargia a. arge*, *pherusa*, and other European butterflies not found in France or Switzerland.—*A. Simmons, 42, Loughborough Road, West Bridgford, Notts.*

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Galls.—In view of the forthcoming Monograph on British Zoo—and Phytoecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: *Prof. J. W. Heston Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 19th. April 2nd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. March 27th. April 10th.—*Hon. Secretary Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—*Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.*

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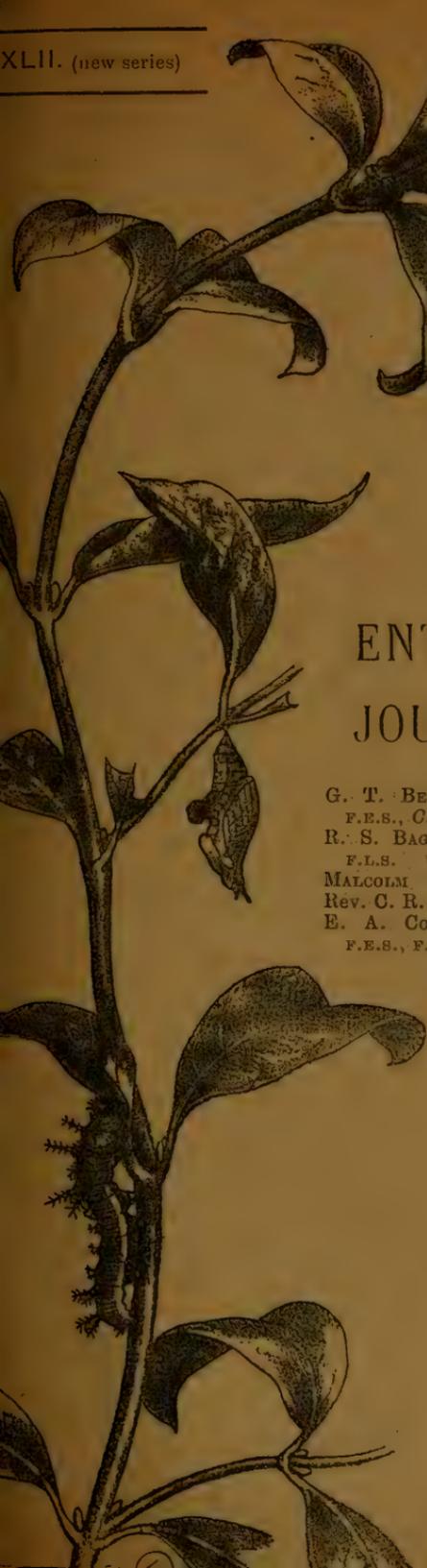
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Some Cornish Notes.

By CHARLES NICHOLSON, F.E.S.

We came to live in this delightful locality at the end of September 1928, and since then I have been so very much occupied with the house and garden, that I have had no opportunity to do any systematic collecting. I have, however, made a few interesting observations and think these notes may provide some pleasant reading during the dead season, especially as little seems to have appeared on the entomology of this county. This is a country of granite and killas (clay slate) and unfortunately lacks limestone and chalk; consequently the soil, which hereabouts is either yellow clay (not so hopelessly sticky as the London clay we lived on at Hale End!), or a stiff yellow loam, whilst reasonably fertile is inclined to be sour. My acre of land was part of an oak-holly-hazel wood with broom, gorse, bramble, and bracken in places and a general carpet of bluebells and primroses. The wild oaks in this neighbourhood are all *Quercus sessiliflora* as the soil is shallow, the native rock not being far down, and consequently *Tortrix viridana*, which apparently does not feed on that species, is unknown; nor, so far as I know, does it affect the Turkey and Evergreen Oaks, which have been planted more or less generally, especially the latter.

In the autumn of 1928 we saw *Colias croceus* several times in the garden and elsewhere and one var. *helice* on the side of the road. *Gonepteryx rhamni* was also seen occasionally, and also last year, but I have not yet succeeded in finding out where this species feeds. The only buckthorn bush I have seen was a rather poor example of *Rhamnus frangula* growing beside a bogstream about four miles from here as the crow flies, and I cannot think that all the *rhamni* seen about here fed up on that bush! An interesting point noticed was that *rhamni* here is devoted to the flowers of Red Campion (which is abundant everywhere and still in flower in places!), and I have not seen it at those of Wood Betony, which it especially frequents in the New Forest.

Vanessa io is common and *Aglais urticae* also, but *Pyrameis atalanta* is not, and the other Vanessids have not been noticed at all. The only species of Fritillary so far noticed has been *Dryas paphia* (2 males). The three Pierids are common, especially *P. brassicae*, which was all over the place last year. *Euchloë cardamines* is fairly common. *Epinephele jurtina* (*janira*) and *E. tithonus* are abundant and *Pararge aegeria* common in suitable spots, but *P. megera* is local, and I have seen nothing whatever of *Aphantopus hyperantus* or *Hipparchia semele*, and *Coenonympha pamphilus* only occasionally. The only Lycaenids seen are *Rumiccia phlaeas* (common), *Lycaenopsis argiolus* (both broods common), *Polyommatus icarus* (common) and *Strymon* (*Zephyrus*) *quercus* (rare). Of the Hesperiidæ, *Hesperia malvae* has been noticed once and *Augiades sylvanus* several times. Here I may mention that the verandah, which faces south-east, has a glass roof, which proved a fatal attraction for insects of several orders during the long spell of bright weather last year, as on finding themselves inside they at once flew up to the roof and rarely escaped without assistance. Diptera, Hymenoptera (including Wasps, Bees, Sawflies and Ichneumons), Lepidoptera (mainly butterflies, of course, including the Hairstreak above mentioned) shared pretty evenly in numbers, but the Diptera excelled in species. I have seen as many as 10 Pierids (mostly

brassicae) fluttering under the glass at once and I used to release the butterflies, wasps and bees frequently during the day; the Diptera being usually at the higher altitudes were left to find their way out or to be eaten by flycatchers, wagtails, or bats, which found the verandah a happy hunting-ground! An occasional moth was found at rest by day, but nothing of note.

On July 11th last I found several pairs and some odd specimens of *Pentatoma (Palomena) prasina* (Hemip.) on some plants of *Verbascum thapsus* and brought three pairs home. These were placed on a young potted plant of raspberry and covered with a glass cylinder with a perforated zinc top. Four batches of eggs were deposited and duly hatched. The little black nymphs kept together and grew to about twice their size when hatched, but then they dispersed and got lost, from which I surmise that although they got on well at first on the sap of the raspberry, animal food may perhaps have been necessary for them. On July 21st I saw a specimen of *Macroglossum stellatarum* ovipositing about 3.30 p.m. on *Galium mollugo* on the road side of my garden bank. I saw no sign whatever of the resulting larvae later, although I kept a lookout. In October, 1928, a nest of *Vespa germanica* was noticed in full swing in the stone bank of a field on high land near here and along this and other banks in the vicinity young larvae of *Lasiocampa quercus* were noticed at rest on bramble stalks, on which they were by no means conspicuous in spite of their blue markings. Full fed larvae of this species were seen crawling on a footpath on June 21st last. On August 10th I boxed an adult of *Enoplops scapha* (Hemip.) on one of the concrete blocks supporting one of my galvanised iron water butts. This species in its early stages has a broad flat abdomen and very robust antennae and it uses the latter to right itself should it fall on its back! I used to sweep young nymphs of what I believe were this species from low herbage at Bovey Tracey, Devon, but could never rear them through, although I tried them with various plants and insects. My specimens may, however, have been *Syromastes marginatus* or *Verlusia quadrata*, in both of which species the antennae of the nymphs are disproportionately stout and E. A. Butler records in his "*Biology of the British Hemiptera-Heteroptera*" the latter species as making use of the antennae in the way above mentioned. On September 10th I boxed a ♀ *Pholidoptera griseoptera* (Orthop.) on the same block as the *Enoplops*! She was placed in the glass cylinder with a root of grass in a pot and fed on flies and small moths until she died a natural death in 10 days time. On September 29th a nice male *Polia flavicincta* came into the sittingroom and was duly boxed. On December 5th a nice ♂ *Himera pennaria* was noticed at rest on the woodwork of the verandah to which it had probably fled for refuge during the night's gale. The most interesting Dipteron seen was *Chrysotoxum festivum*, but I was surprised to find one day in the verandah a dry and flattened female of *Asilus crabroniformis*, a species I have not otherwise seen in this district so far and there is no heathland nearer than 5 miles. Of course, it may have bred in the garden and I intend to keep a lookout for it in the summer.

On the whole insects generally were not abundant here in 1929, due probably to the long spell of dry weather. Several ♀ *Andrena fulva* were seen and this species obviously nests in this garden, as does also *Geotrupes sylvaticus* very freely, the beetles being often seen

throughout the spring, summer and autumn, usually crawling on the ground. When the ground was being dug in early September a larva, which I take to be this species, was uncovered in its cavity with its "sausage" of triturerated rabbit-dung, and was installed in a potted-meat glass with some moist earth and covered with a piece of perforated zinc. The larva resembled a small *Melolontha* larva and was about an inch long when found. It has continued to feed contentedly and for the most part maintained a curved position until now. All its sausage has apparently been consumed and I am expecting to see it prepare for pupation any day. It is interesting that this species feeds on rabbit-dung here, probably because it cannot find any other kind sufficiently plentiful, as cattle and horses would not frequent a private wood. In the New Forest I have seen the species in similar bracken-covered places, but *there* rabbits, horses, donkeys and cattle would probably provide the necessary pabulum. In Epping Forest (High Beach, etc.), *G. typhaeus* also stores rabbit-dung in its burrows and frequents similar localities with light soil. I have not seen this species here yet, but *G. spiniger* is common and *G. stercorarius* less so.

A very noticeable point was the scarcity of Aphides, and only two ladybirds have been seen here since we came: these were *Coccinella septempunctata* in the garden and *C. variabilis* in a neighbouring lane.

The river being tidal Odonata do not breed in it, but a large lake of fresh water nearly opposite our house has supplied a specimen of *Aeschna juncea* and probably several *Agrion puella*, which I have noticed amongst the herbage in the garden.

Females of *Dryophanta folii* are now emerging from the well-known "cherry galls" in the oak leaves, which are abundant about here, but the marble galls of *Cynips kollari* are not particularly common. I have however found a bunch of 7 and several cases of 2 fused into a mass as large as a walnut.—TRESILLIAN, CORNWALL. *January, 1930.*

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

(Continued from p. 44.)

The existence of *trivia* as a twin species of *didyma*, standing extremely close to it and yet spreading with it over the Central zone and flying on the same grounds as some of its thermotropic races, cannot be explained very satisfactorily; one can only say it apparently is a more anabolic branch, which has acquired a more stable constitution, only suited to certain dry surroundings restricted by its single food-plant and that it can live with *didyma*, because their larvae have taken to entirely different plants, so that there is no competition between them.

The *cinxia* line of descent is, apparently, as catabolic as that of *dictynna*; it exhibits more variety of aspect, but then it also stands much broader variations of climate and this fact, together with its extremely quick flight, proves its high degree of functional vitality. As a consequence it has kept to a single specific line and even when it has passed from America to Asia the transformation from *minuta* to *cinxia* has been very small; the chief difference to be seen is that

minuta has on the underside a premarginal black streak or a nearly continuous row of slightly curved lunules, as they have been retained by *minerva* and *arduinna*, whereas in *cinxia* they are reduced to a row of internervular dots, as in the *didyma* line.

The *minerva* and *arduinna* line seems to occupy a perfectly central position between the aspects of the two great groups of true *Melitaea*. The appearance of *arduinna*, more particularly, is quite intermediate between that of *cinxia* of the group described above and that of *phoebe* of the group I will next deal with. It has the black dots on both surfaces of the hindwing, which are a feature of *cinxia*, of *agar* and also of *aurinia* and *maturna* (in some *minerva* there are vestiges of them); it has, together with *minerva*, a tendency to the breaking of the inner marginal line of the underside into separate streaks, although they are never reduced to dots. On the other hand they retain the capillary black arches along the inner edge of the orange spots, just as they are in *baicalensis*=*arcesia*, *phoebe*, etc., and the general shape and look of the wings is more like the latter than like *cinxia*. The genitalia of *arduinna* have long terminal apophyses, as in *cinxia*, but they are not as long, they are thicker and their apex exhibits some marked tooth-like points; all these differences are precisely those which become considerably more accentuated in *phoebe* and which evidently foreshadow some of the fundamental characteristics of those of the *athalia* group. If one compares the Nearctic species, one notes that the variations of those of the *palla* group, which one can consider as the most direct ancestry of *phoebe*, Schiff., point in some cases, such as *acastus*, Edw., to the *cinxia* look and that they usually exhibit a combination of the black dots in the orange spots with rudiments of a black edge to the latter. This makes it obvious that *minerva* and *arduinna* are the most direct surviving offsprings of species which stood between *minuta* and the *palla* group; when they passed into Palaearctic surroundings the intermediate aspect was kept up, whilst the specific changes, which took place, were quite parallel in the three lines. It is worthy of notice that all three of these lines (the *cinxia*, the *arduinna* and the *phoebe* one), which occupy a central position in the genus, have developed to a very much lesser extent than the two extreme groups of lines of descent. This fact falls in well with the theory that natural groups of organisms, such as genera, consist in a certain number of more highly catabolic lines of descent, which spread a great deal and in a comparatively rapid way, changing aspect and constitution comparatively little, and in a circle of other more anabolic lines, which have transformed in various ways and to greater or lesser degrees, adapting themselves to the different surroundings they have met with. In a natural classification, in which we wish to place the groups according to their comparative grade of transformation from the most primitive ones, the group just described, taken as a whole, should come next to the *harrisii-dictynna* one, in a central position. Their close connection is visible in all stages of their short evolution: at the *Phyciodes* stage they are only the extreme variations of a group of several closely allied species, extending from *ismeria*, through *nycteis*, on the one hand, to *mylitta* and *barnesi* on the other; at the Nearctic *Melitaea* stage *harrisii* is closely approached by the *palla* group and particularly by *whitneyi*, Boh; at the Palaearctic stage the general appearance of the two lines has become much more different, so that

in the past their near relationship had not been recognised, but the genitalia have shown that it still exists to a much greater degree than might be thought at first sight. Those of *dictynna* have in every respect a great deal of resemblance to the *minerva* ones, as already stated; in both the terminal apophysis has the shape of a long cone, but there is a notable difference at its apex, where in *dictynna* it divides into two sharp diverging points, whereas in *minerva* it ends in a single, rather blunt one, and the second is only represented by a minute point, inserted considerably lower than the apex and pointing in the same direction as the latter; more proofs of the close connection between *dictynna* and this group, also including, in the following respect, *cinzia*, *arduinna* and *phoebe*, are afforded by the lateral apophyses, which are perfectly smooth down to their base, with no lateral teeth, and by the ostium-keel of the aedeagus or penis, which is either lacking entirely or of a merely membranous nature (not chitinous).

Now, it is important to note that the genitalia of *M. baicalensis*, Brem., p. 13 = *arcesia*, Brem., p. 15, are extremely similar to those of *minerva* and those also of *asteria*, Freyer, resemble them by their simple structure, with very small and smooth apophyses, as I will point out further on, when I show that *asteria* and *baicalensis* together with *sindura*, Moore, are the most primitive ones of the *athalia* group. The closest Nearctic species to their ancestry, now living, is, to all appearances, *hoffmanni*, Behr, a mountain species of California and Nevada, which has attracted attention owing to the extraordinary frequency with which it produces abnormal individuals, including the most extreme aberrations; this denotes it had already attained a high degree of anabolism in America and it stands to reason that its Asiatic descendants should have varied more than the other *Melitaea*, under the influences of all sorts of new surroundings. It had, moreover, itself derived, presumably, from the *tharos*, Drury, group of *Phyciodes*, which was already very anabolic, as shown by its numerous seasonal, local and specific variations; amongst them *pratensis*, Behr, appears to be, by its look and by its northern habitat, the nearest representative of the ancestor of *hoffmanni*.

When dealing with the *athalia* group I will mention the discovery made last year of *M. mayi*, Gunder, in Alberta (Canada), which is more or less identical with *latefascia*, Fixs., of Amurland and *coreae*, Vrtz., of Corea. This is not surprising as the *athalia* group had already attained in the Nearctic *hoffmanni* an aspect very similar to its Palaearctic one; this is shown in the Table by the column of the "Palaearctic stage still recalling Nearctic" being blank, whilst *baicalensis* and *sindura*, which are of this description, stand aside as a parallel branch now extinct in America.

It is to be regretted that one should be obliged to place the *harrisii-dictynna* line of descent between the *hoffmanni-athalia* and the *palla-phoebe* ones because the *Phyciodes* from which the two latter derive are connected, from *tharos* to *mylitta*, by a continuous series of gradations. As in the case of *didyma*, we are obliged to do so on paper, but in nature the three lines stand on different planes and are all connected to each other in a way one might compare to a bunch; instead, the *minerva-arduinna* line stands outside it, on the *palla-phoebe* side, and

connects it to the other large bunch, which includes *cinxia* and *didyma*, bound to the *Euphydryas*.

There seems to be little doubt that the remarkable similarity of the genitalia of *minerva* and *baicalensis* = *arcesia* and their affinity to those of *dictynna* on the one hand and to those of *cinxia* on the other is due to the fact that they are the corresponding most primitive surviving palaeartic stage of their respective lines of descent. *M. dictynna* is probably a little more advanced than the two first species mentioned, but it is culminating in its line. *M. arduinna* and *phoebe* still have a considerable resemblance to them, because they are only a stage further on, and the former more than the latter, because its line has fewer *athalia* factors in its constitution and more *cinxia* ones mixed with them; the *athalia* factors are those whose evolution has produced the most highly differentiated and complex genitalia. Those due to the *cinxia* and *didyma* factors are, on the whole, long and slender and smooth (with no teeth and points, or very few); those produced by the *athalia* factors can be seen developing through the various species and exerges into a highly characteristic aspect: they become, on the whole, broad and thick; also the terminal apophysis, or posterior process, of the clasps becomes short and broad; deep dents appear on its further edge, which has become larger with the broadening of the apophysis; there appears at the end of the tegumen an uncus, not found in any other group of *Melitaea*, except the rudimental one of *savatilis* I have mentioned, and except for the two short and broad homologous processes, set widely apart from each other, of *maturna* and *aurinia*; the aedeagus acquires a prominent chitinous ostium-keel; the lateral apophyses of the clasps develop an increasing number of points or teeth in a row along an increasing portion of their length.

(To be continued.)

Adalia bipunctata, L. Some observations on the type form of *ab. perforata*, Marsham.

By G. CURTIS LEMAN, F.E.S.

1. Marsham's original description (*Ent. Brit.* 151) in 1802 is as follows:—

Perforata. 6. Cocc. coleoptris rubris; punctis duobus nigris fissurâque elongata; margine nigro," to which he adds the note, "omnibus simillima *C. 2-punctata* fissurâ exceptâ. An lusus ejusdem insecti."

Marsham here employs the unusual word, "fissura," and the question is what did he intend to convey thereby. He only employs this term in his description of his *C. perforata* and wherever elsewhere he wishes to convey the meaning of band or line, he employs the more familiar "vitta" or "lineola."

I suggest that in its strict sense the term "fissura" means a fissure, an elongated dent or perforation or cleft. This presumably in his specimen ran through or perforated (*perforata*) the normal black spot in whole or part, and not a detached band or line, otherwise I fail to understand why Marsham should have used this particular name for his specimen.

I find however that later authors do not accept my construction and in fact depart widely from Marsham's own description in other respects and I propose to add some of these for comparison.

2. Haworth, in *Trans. Ent. Soc. Lond.* I. 271 (1812), adds the words "anticâ transversâ" and enlarges this to extent of "lineolâ transversâ valde impressâ inter punctum et basin."

Here we may notice that, while retaining the term "fissura" in quoting Marsham, he for the first time introduces the term "lineola" and in addition locates this definitely between the spot and the base, but he gives no authority for doing so.

3. Mulsant in *Séc.* 51 (1846) suggests the presence of yet another mark or spot situate "elsewhere than on the transversal line":

"Var. G. Elytres offrant, outre de point normal, une tache ou un autre point situé ailleurs que sur la ligne transversale du milieu. *C. perforata*, Marsh, *Ent. Brit.* 151. 6."

There is no authority for this additional blotch or spot, which cannot represent Marsham's "fissura," or even Haworth's "lineola."

4. Weise in *B.T.* goes even further:—

C. Flgd. mit 4, 6, oder 3 P. Der eine P. davon steht nie in der Querreihe, sondern meist zwischen Normal-punct under den grunde der Flgd . . . v. *perforata*, Marsh."

which in *B.T.* (1885) he modifies to extent of:

"Zwischen dem Normalpunkte und der Basis, selten auf der Schulter."

These specimens are obviously a very long way from *ab. perforata*, Marsh.

5. Bovie in "Les Cocc. Belg." (*Ann. Soc. Ent. Belg.* XLI. 145-7, 1897) slightly varies Weise's descriptions:

"Var. *perforata*, Marsh. El. ayant 4, 6, ou 8 p. aucun des ces p. ne se trouve entre le point normal et la suture: ils sont le plus souvent à la base, rarement sur l'épaule."

6. Ganglbauer in *Kaf. Mitteleur*, III., 1014 (1899) adds his version to the confusion:

"Tritt bei der Normalform oder bei var. *Herbsti* ober *unifasciata* noch ein isolirter Punct auf der vorderen Hälfte der Flgdn auf, so entsteht var. *perforata*."

7. Reitter in *Faun. Germ.* III. 142 (1911) is even wider of the mark:—

"Oder die Flg haben auf jeder mehr als 2 Punkte: a. *perforata*, Marsh.

This obviously ignored a good few aberrations of Marsham, Fabricius and Weise.

8. Della Beffa in *Rev. Cocc. It.* 123 (1913) describes an *ab. perforata*, Muls., as under:—

"Elitre con una fascia nera transversale nel mezzo costituita dai tre puncti, talora divisa. Vi sono inoltre altri uno due o tre punti; o sul disco nella prima metà o nella seconda metà dell' elitre, o sui callo humerale, o nell' angolo scutellare (Tav. IV. fig. 28) . . . *ab. perforata*, Marsh."

His figure shows the broad medial confluent band of *ab. unifasciata*, F. and three isolate spots. His specimen is certainly not *ab. perforata*, Marsh., nor even the var. G. of Mulsant, which has only one blotch or spot situate outside the medial band, nor can the name of *ab. perforata*, Muls., stand as it is preoccupied by Marsham's *ab. perforata*.

9. This seems to exhaust all the material references to *ab. perforata*, Marsh., the type of which was in the collection of Dom. Latham, but

whether the type is still extant I cannot say. The conclusion, however, I venture to draw is, that Marsham's aberration was only a sport in which the normal spot was in part or whole perforated by some fissure or perforation through failure of the black pigment owing to some pathological accident and in this view I am supported by Herr Leopold Mader, who in his *Evidenz der pal. Cocc.*, treats it as a synonym for the type form. Incidentally, though I have in past years handled a goodly number of *A. 2-punctata*, I have never met one approaching this sport or freak of Marsham's.

Stray Notes on Erebiid Species.

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

E. pawloskii, Men.—My last article on this species (in the February number of this magazine) was only just in print, when I received a further most remarkable confirmation of the unquestionable connection between *pawloskii* and *theano* in the shape of yet another specimen of an intermediate form. In the case of the recently described ssp. *connexa* we had a race of *pawloskii* varying towards both *ethela* and *theano*, while in this further example we have the exact converse; a specimen of *theano* varying towards *pawloskii*. *Connexa* was in structure and size a typical *pawloskii*, and also had the unicolorous fringes of the latter, coupled with a *theano*-like design, and to a considerable extent, coloration also. The new form has the typical *theano* design and chequered fringes, but approaches *pawloskii* in structure, size and coloration. Yet this specimen looks so different from *connexa* that they might well be distinct species. I have only one specimen of this remarkable *theano*-form, but the fact that the genitalia (although still nearest to the *theano* type) show a deviation which can only be regarded as correlated to the superficial line of variation, and that the neuration is perfectly symmetrical, suggests that this is a racial form rather than an aberration, and we may hope for the discovery of further specimens. It may be described as:—

E. pawloskii theano race *approximata*, nov.—Size as *pawloskii*, fringes strongly chequered as in *theano*. The markings of both the upper and undersides exactly as in *theano*, but, on the upperside, of the dark red-brown coloration typical of the markings in *pawloskii*, while on the underside they are a little lighter, of a more yellowish tone, but still far from the bright yellow-orange normal in *theano*. Type, a ♂ in my collection, from the western Altai.

E. jeniseiensis, Trybom.—So much has been written on the specific difference of *E. ligea* and *E. eurjale*, that I suppose it is no longer necessary to emphasise the fact that they are two distinct species. Any careful systematic worker who has followed the work of Reverdin or Sparre Schneider will feel perfectly satisfied on the point. But there still exists a lot of uncertainty as to which of these two species some of their various races belong. This is directly the result of writers endeavouring to classify these races, without giving a thought to their structural characteristics. Superficial resemblance among the Erebiids is apt to be even a more untrustworthy guide to relationship than in other genera, and the morphological data I have accumulated,

demonstrate that very similar superficial facies, must, not infrequently, have been derived from quite separate sources. *Jeniseiensis* has suffered a good deal from this superficial method of classification and has been treated as either *ligea* or *euryale* by various authors. In point of fact it is neither, but stands as a very distinct species probably more closely related to *tristis*, H.-S. (= *eriphyle*, Frey., which unfortunately falls to *eriphyle*, Stoll.) than any other species. At the first glance the genitalia show a considerable likeness to *euryale*, but this likeness is not supported by those features, which the examination of hundreds of dissections of *Erebias* has shown to be of most value for specific differentiation. The latter demonstrate clearly that the two are quite distinct, and this is confirmed by other structural differences, equally convincing. It is interesting to note, that superficially there is no difficulty in separating these two species, or *jeniseiensis* from *ligea* either, the facies of the former being very constant. It is often stated that the band on the forewings in *jeniseiensis* is broken up into rings, but this is not the case, it is reduced in width (compared with *euryale*) and restricted centrally, assuming an hour-glass formation which is very characteristic and very constant; occasionally it is entirely severed in the centre. I regret being unable to give fuller anatomical details here, but this would involve far too much elaboration for a magazine article.

E. lefevrei, Boisd.—It might be thought that Oberthür's work had covered all the races of this beautiful species, but strange to say the finest of all the racial forms is still unrecognised; for which I am largely to blame, for I captured a nice series of it nineteen years ago. One of the chief features of this race is that, on the average, it is as large as, or even larger than the type; while all the spots and their white pupils are very finely developed. All of the races already described are on the average, smaller than the type, and have the black spots and their pupils more or less reduced in size and frequently wanting. I am dedicating this race to the memory of Mr. H. Rowland-Brown, who was my companion when we discovered it. It is also not inappropriate that a butterfly from the Central Pyrenees should bear a name so much associated with the legends of the district.

E. lefevrei race *rowlandi*, nov.—Varies in size as the type does, but on the average quite as large, and sometimes larger than the latter. ♂ entirely black on both upper and underside, sometimes with a faint lightening of the ground colour on the underside of the forewings, where the band would be in the type. ♀, upperside dark brownish-black, without any (occasionally just the least trace) of the reddish band around the black spots; on the underside of the forewings this band is present, but much obscured and reduced. The underside of the hindwings is thickly suffused with grey, much more pronouncedly than in the type. In both sexes the black spots and their white pupils are very finely developed, on all wings both upper and underside. Types in my collection, from the valley below the Pic de Goupey, which leads up to the Col de Lurdé (Basses Pyrénées).

This very fine race occurs as an aberration among the type form at

Gavarnie, and specimens of the type occur, rarely, with *roulandi*.^{*} It is nearest to Oberthür's race *pyrenaea*, but differs from it in:—(1) large size, (2) the fine typical development of the black spots and their pupils, (3) that these spots are always present on the hindwings, which, although mentioned by Oberthür in the original description of *pyrenaea* is by no means the rule among the Canigou specimens; (4) that there very frequently are four spots on the hindwings, as also occurs in the type, but is extremely rare in *pyrenaea*; (5) the much greyer underside of the hindwing in the ♀.

* The females of the latter aberration although having the red-brown band as in *lefebvrei*, still have a much greyer underside hindwing than is normal in the type.

Through Central Europe to Montenegro.

By P. HAIG-THOMAS, F.E.S.

(Concluded from p. 38.)

July 24th.—We again went up Mt. Vlasulja and found *E. melas* males common but only got three females. In addition to the insects taken on the 22nd I took *Parnassius apollo*, *Erebia pronœ*, approaching form *pitho*, one *Erebia epiphron* subsp. *cassiope* worn, with a few *Strymon spini*, Mr. Cox got female *Heodes alciphron*.

July 25th.—Leaving Gadeko we motored via Bjeljani to Meikovic and on to Spalato where we stayed the night. Near Bjeljani we hunted for half an hour and took *Melanargia larissa* ab. *herta*, very worn, and a nice series of *Pieris ergane* quite fresh. The country around Meikovic should be well worth a visit in May or the end of April, and there appears to be a very good hotel there. Between Meikovic and Spalato the country was exceedingly barren, there being practically no water till we got near the sea about 25 kilometres from Spalato; here we saw *Satyrus circe*, *S. aleyone* and *S. briseis*.

July 26th.—A fine day, but except for half an hour beyond Sebenico we spent the day motoring. Here in the little valley where there was a stream I took *P. ergane*, *Coenonympha pamphilus*, *S. briseis*, *Plebeius medon* (*astrarche*), *Polyommatus meleager* and *Lycanesthis argiolus*. We spent the night at Karlstein.

July 27th.—Leaving Karlstein early we hoped to spend several hours on the Löibl Pass; unfortunately the weather broke soon after we got there. We managed however to obtain a large form of *Erebia aethiops*, which was common above the Jugo-Slavian Customs House. *P. coridon* was also abundant, and I again saw *P. l-album* at the top of the pass, *Erebia nerine* was still flying, some fresh, but after taking one ♀ a thunder-storm came on and we motored down to Klagenfurt and on to St. Veit.

July 28th.—We motored in dull weather up to Stelzing but the weather again broke and we decided to leave the district and spend as much of the bad weather as possible travelling. We slept the night at Sicilian close to the Italian Frontier.

July 29th.—We motored through Bolzano to Franzenhöhe below the Stelvio; the only insects taken were *Melitaea didyma*, *Satyrus dryas* and *Plebeius aegon* near Bolzano.

July 30th.—Collected in the morning on the top of the Stelvio and took 18 *Erebia alecto* and the race *glacialis* mostly worn. In the

afternoon we motored over the Ofen Pass to Zernetz and took a few male *E. nerine* race *stelviana*.

July 31st.—Above Zernetz *E. nerine* race *stelviana* in both sexes plentiful and in good order and we got all we wanted. Common insects male abundant here than anywhere we have been except perhaps on Trebevic at Serajevo.

August 1st.—Drove to the Albula to look for *E. manto* race *pyrrhula*. After half an hour it poured with rain for the rest of the day. However we managed to take a few *E. pronoe* v. *pitho*, but not as dark as those I have taken at Bex in the Rhone Valley.

August 2nd.—It rained hard all day but we moved up to Preda.

August 3rd.—Still raining hard so we left and motored to Brugg between Zürich and Basel. On the way the weather cleared and we took a short series of *Araschnia levana*, in the Murgthal rather worn.

August 4th.—Motored through Basel on to Colmar up to the Schlucht Pass on the Vosges and stopped at the Grand Hotel. We collected around Mt. Hochneck 4000-4500 feet and found *E. epiphron* both sexes in the greatest abundance, *E. ligea* fine but males mostly worn. *E. manto* race *vogesica* abundant males rather worn. We took six females with the blotches on the underside of the hindwing pure white. *Polyommatus semiarqus* were still fresh and I got a freshly emerged *Euvanessa antiopa*.

August 5th.—It poured with rain all day.

August 6th.—We spent another fine day around Mt. Hochneck and besides the insects taken on the 4th we found *Strymon w-album* worn, *Polygonia c-album* fresh, *Argynnis aglaia* and *Dryas paphia* fresh, *Heodes hippothoe* worn, *Agriades comma* fresh.

August 7th and 8th.—Were spent motoring down the Rhine Valley and up the Meuse, through Luxemburg to La Roche in the Ardenne.

August 9th.—We tried all the highest ground we could find up to 2000 feet but saw no signs of *Brenthis pales* race *arsilache*, almost all the ground except the forests is cultivated but we found two or three open swamps at 2000 feet which looked promising; the only insects seen were *B. selene* 2nd generation, *P. napi*, *E. jurtina* and *C. pamphilus*. Lower down and a few kilometres from Marche in a clearing where the road and railway run together we took *P. napi*, *B. selene*, *B. ino* both worn, *Strymon pruni* very worn, and two specimens of *Heodes virgaureae* one quite fresh. From here we motored to Bruxelles, where I left my friends and took the night express home via Dunkirk.

Our trip was obviously too rushed but we managed to obtain good specimens of the more local *Erebia* species, which was the main object of the journey, during which we motored over 2500 miles.

Collecting Notes, 1929.

By H. B. D. KETTLEWELL, F.E.S.

I think we were all particularly keen to see what 1929 had in store for us after the unusually severe winter of 1928-1929, when at that time it seemed that nothing could possibly survive unless under the first six or seven inches of frozen earth; but it has only shown us once again that it is wet and not dry cold that counts in decimating our insects.

My first expedition of any note was early in April when I worked

the Wye Valley (S. Wales) from its mouth at Chepstow up to its source in the Welsh mountains—my particular quest being *Xylina furcifera*, in which I may as well say now I was unsuccessful, but in working the sallow blossom I was very much struck by the local scarcity or abundance of the various *Taeniocampidae*:—at Tintern the commonest Taeniocampid by far was *T. gracilis* with comparatively few *T. stabilis* and *T. pulverulenta*, also an odd *Xylocampa areola* and one ♀ *Oporina croceago* from which Mr. Newman got eggs and bred a series. Further north at Symonds Yat, where the cold had been intense so that all laurel hedges and evergreens were brown and withered, I found insects in enormous numbers. The hibernated *Orrhodia vaccinii* and *Scopelosoma satellitia* being common at both sugar and sallow, and the *Taeniocampidae* in their thousands,—in particular *T. gothica*, *T. stabilis*, *T. pulverulenta* and *T. incerta*—*T. gracilis* was less in evidence and I took a solitary male of *Pachnobia leucographa*. The sole lepidopteral evidence of the mighty frosts was in the complete absence of *Polygonia c-album*,—even though the days were warm and sunny and I have it as good evidence that this insect was particularly abundant at this spot in the autumn of 1928,—indeed I did not see one the whole length of the valley.

After leaving the Wye we proceeded up to North Wales and reached Conway as our base on April 8th.

On April 9th I made a night expedition to the summit of Tal-y-fan after *Agrotis ashworthii* larvae by searching the bilberry with a lamp—as soon as I reached the top however an impenetrable cloud screen made it impossible to see a yard ahead and in the following hours of attempted descent I picked up large numbers of nearly fullfed larvae of *Oporinia siliagrammaria*—nearly all in small colonies—also of *Agrotis lucerneae* (fullfed) but no *A. ashworthii*.

However, the following night I took a solitary larva of this species on a neighbouring mountain—only about $\frac{1}{4}$ of an inch in length—also many larvae of *Boarmia repandata* (which all produced normal forms).

The days were hot, and on the 8th I saw both *Pieris rapae* and *P. napi*, together with hibernated *Aglais urticae*, but no *P. c-album*, in a spot where I had seen it common some years ago.

Early in May I was collecting in the Cambridge district. On May 3rd I took my first *Strymon pruni* of the season in a Huntingdon wood—an extremely small larva—and on the same day found fullfed larvae of *Cirrohaedia xerampelina* as common as last year.

On following days of hard beating I took four other larvae of *S. pruni* and I consider it a poor year for the species—though I have since heard that the imagines were abundant in a nearby wood later in the season. I also took a few larvae of *Ruralis betulae*, which was not so common as last year.

On May 25th in company with Dr. Cockayne and Messrs Worsley-Wood and Demuth we were again in the Huntingdon Woods, and eight full-fed larvae of *S. pruni* fell to our lot, together with larvae of *Asteroscopus sphinx*, *Lymantria monacha*, *Hylophila bicolorana*, and I took upwards of seventy *Zephyrus quercus* on half-a-dozen oaks.

On May 27th my friend Demuth and myself beat large numbers of full-fed larvae of *Strymon w-album* from elm in the Wimpole district.

Throughout this month I collected a very large number of *Xanthia gilvago* larvae from wych elm around Cambridge.

This species was exceedingly abundant—more so than its cousin *Amathes circellaris*, it being not uncommon to take 30 at a single beat of a bough—I bred through a very extensive series but was only rewarded with eight good “true *gilvago*” forms—that is the Continental type, all the rest being the usual darkly suffused English form (=ab. *suffusa*).

Throughout the month both Demuth and I concentrated the greater part of our energies on beating sallows in the Northampton woods in the hope of obtaining *Apatura iris* larvae after having seen one which had been beaten in this district a few days previous to my first introduction to this larva—in all cases were we unsuccessful but were bombarded continually with hosts of *Bombycia viminalis*, *T. pulverulenta* and *Hydriomena fureata* (*elutata*).

(To be concluded.)

New Forms of European Rhopalocera.

NOTE.—The newly observed forms of European (Continental) Lepidoptera are so increasingly numerous that space cannot be found for their description. It will probably be of use if the references to the original descriptions be given as we meet with them. This will be confined mainly to the Rhopalocera in which our readers are more interested with an occasional summary of all the forms so far listed in a particular species.

Melitaea didyma, L., race *majellensis*, Dnhl., *Mitt. Münch. Ent. Gesel.*, 1927, p. 2 etc. Majella.

Melanargia japygia, Cyr., ab. *flavescens*, Dnhl. and ab. *ochrea*, Dnhl. l.c. Majella.

Erebia mnestra, Hb., ab. *pupillata*, Dnhl. l.c. Stilsfer-Joch, Tyrol.

E. euryale, Esp., ab. *mendolana*, Dnhl. l.c. Mendel.

E. lappona, Esp., race *marmolata*, Dnhl. l.c. Dolomites, Pala group.

E. lappona, Esp., race *cibiniaca*, Dnhl. l.c. Cibinsgebirge.

Satyrus dryas, Scop., ab. *hamadryas*, Dnhl. l.c. S. Tyrol, etc.

Coenonympha arcania, L., race *enthymia*, Dnhl. l.c. Sabine and Simbruine Mts., Italy.

Coenonympha iphis, Schiff., race *oikeia*, Dnhl. l.c. Simbruine Mts.

Epinephele lycaon, Rott., race *nyctymos*, Dnhl. l.c. Tyrol.

Libythea celtis, Lach., ab. *pallida*, Dnhl., and ab. *pygmeaa*, Dnhl. l.c.

Plebeius aegon, Schiff. (*argus*, L.), race *majellensis*, Dnl.; race *abruzzensis*, Dnhl.; race *sirentina*, Dnhl. l.c. Abruzzi.

Polyommatus optilete, Knoch, ab. *ochrostigma*, Dnhl.; and ab. *illustris*, Dnhl. l.c.

P. dolus, Hb., ab. *punctigera*, Dnhl.; ab. ♀ *rufomaculata*, Dnhl.; ab. *splendida*, Dnhl.; and ab. *elachista*, Dnhl. l.c. p. 7.

P. damon, Schiff., race *centralitalica*, Dnhl. l.c.

Erinmys alcaee, Esp., race *centralanatolica*, Pfeiff. l.c. 44.

Brenthis pales, L., subsp. *generator*, Stdgr. ab. *extrema*, Wnkwsy. l.c.

B. freija, Thnb., subsp. *jakutensis*, Wnkwsy. l.c. Jakutsk.

Melanargia suwarovius, Hbst., ab. *obscurior*, Wnkwsy.; ab. *minor*, Wnkwsy.; ab. *subflavescens*, Wnkwsy. l.c. 78. N.E. Siberia.

NOTES ON COLLECTING. etc.

SYNANTHEDON FLAVIVENTRIS IN SURREY.—In an attempt to fill a gap in the known range of this species Mr. C. N. Hawkins and I went to look for the galls in Surrey and found a few in a wood in the south of the county. A typical gall was opened and the larva was seen.—E. A. COCKAYNE, (A.M., D.M., F.E.S.), 116, Westbourne Terrace, W.2. March 9th, 1930.

CURRENT NOTES AND SHORT NOTICES.

Two volumes of *Memories Soc. Ent. Ital.*, VII. (1928) and VIII. (1929), have come to hand. The first contains a "Revision of the Gryllacridi in the Museums of Geneva and Turin," by Signor H. H. Karney; the second contains several small *Memories*, among which Signor Rocci has contributed two:—(1) A study of the several generations of *Euchloë (Anthocharis) ausonia* as observed in the various races of Italy. (2) Notes on various species of Lepidoptera occurring widely in Liguria, including accounts of the generations of the races of *Pieris brassicae*, *P. manni*, *P. napi* and *Pontia daplidice*. [There is a rather curious arrangement about the distribution of these volumes which is so extraordinary, that they arrive in a more or less dilapidated condition. Our copies had passed through the hands (by the labels) of two local carriers of luggage and general produce, presumably given to one of them by a grandmotherly sort of arrangement, so that the recipient pays the carriage (sixpence in our case), receiving an untidy torn bundle, screwed up and tied with a piece of dirty string like a bunch of vegetables. Some while ago there was a newspaper stunt "Make the foreigner pay!" Evidently this idea has been taken up abroad and carried into effect in this arrangement, and we pay our own sendings and the foreign sendings as well.]

The *Entomological News* for December contains another very interesting article from J. D. Gunder, the Academy of Natural Sciences, Philadelphia, with two plates, including a portrait group of the staff and photographs of the old and the modern buildings, the home of the Academy. This number contains a long list of the intricate and pettifogging amendments proposed in the International Rules of Zoological Nomenclature to be brought before the Zoological Congress at its next Meeting. It is quite time entomologists cut themselves adrift from this entanglement.

Vol. III. of the *Bull. of the Hill Mus.* is now completed with Nos. 3 and 4. There are four plates and a large number of Descriptions of new species and forms received from collectors in Africa, Indo-Australia and Hainan and a further instalment of A. Hall's Revision of the Genus *Phyciodes*. We notice that several non-comparative descriptions have crept in this time; these may be excusable when figures are given, but are useless otherwise.

In the current numbers of *Ent. Rundschau*, Dr. Seitz is contributing a series of articles on Collecting Microlepidoptera; at present he is dealing with the *P'yralidae* of the world in a general way, basing his remarks on the well-known European species and their representatives in extra-European areas.

In *Iris* part IV. for 1929 Stichel continues his criticism of the

group *Erycinidae* as treated in Seitz volumes; Dr. Arnold Schultz discusses the early stages of the high-Andean *Satyridae* of Columbia, with coloured plate; Dr. Corti contributes further notes on *Agrotidae*, the same family as occurring in the Caucasus and Central Asia is dealt with by Prof. I. Kozhantschikov.

Two further parts (5 and 6) of the *Supplement* to Seitz *Palaeartic Rhopalocera* have come to hand, the rest of the *Parnassius* species completing the Papilionid section, of course with the usual valuable List of references to the original descriptions of the whole of the new forms mentioned in the text. The space taken up by this section has been greater than was anticipated, but unless the letterpress be adequately full the high pitch of excellence would not have been obtained. *Parnassius apollo*, on account both of its numerous forms and the multitude of names attached to it, demanded an unexpected amount of space. Its forms have been dealt with in geographical groups, such as those of the Tyrol, Scandinavia, Asia Minor, Central Alps, Carpathians, etc., etc. The fact of it being not a lowland species presents a certain amount of isolation to these groups. The 2 plates comprise 50 more figures of the *Parnassius* species. To those possessing the vol. I., this supplement is most necessary, bringing in as it does, the mass of further facts which have been accumulating for the past quarter of a century.

REVIEWS AND NOTICES OF BOOKS.

“AMEISENKUNDE. Eine Einführung in die Systematik und Biologie der Ameisen” by Dr. Anton Krausse, pp. 172 with 63 text figures. Stuttgart (1929).

This delightful little book is admirably constructed, embracing, as it does, every branch of the study of ants in a compact and convenient form; valuable alike to the student and the more experienced Myrmecologist.

The work is divided into two parts. Part I. consists of twenty-nine sections as follows:—1. Myrmecologists; 2. Literature; 3. Bibliography, biographical and historical sketch; 4. Systematical position of ants; 5. The most important morphological technical terms; 6. Nomenclature; 7. The five subfamilies; 8. Preliminary remarks on systematics; 9. The Ponerinae; 10. The Dorylinae; 11. The Myrmicinae; 12. The Dolichoderinae; 13. The Camponotinae; 14. The Systematical Problem; 15. Di-, Tri-, Tetra-, Polymorphism; 16. On Morphology and Anatomy; 17. Geographical distribution; 18. Palaeartic Region; 19. Xerothermic Region; 20. Spreading and Introduction; 21. Local faunas; 22. Ants in amber and copal; 23. Equipment for excursions; 24. Artificial nests; 25. Collecting apparatus; 26. Packing, preparing, collection; 27. Optical instruments; 28. Determination, purchase, exchange; 29. Publications.

Part II. is divided into twelve sections:—1. Metamorphosis; 2. Colony founding, mixed colonies, and compound nests; 3. Food; 4. Nest building; 5. Habits; 6. Myrmecophily; 7. Ants and Termites; 8. Ants and Plants; 9. Ants and the soil; 10. Ants and men; 11. Senses of ants; 12. Psychology of ants.

It will be obvious at a glance at the above lists how many-sided this little book proves itself to be, and also that space will not allow us to deal thoroughly with all this matter. It must suffice to glance through the various sections, noticing a point here and there which

calls for remark. An excellent list of the known myrmecologists is given, as also a most useful account of the literature.

The works of Wheeler, Escherich, Forel, Wasmann, Seitz, Emery, Donisthorpe and Hüber are said to be indispensable.

The author divides the Insecta into no less than 71 orders; ants, of course, belonging to the order Hymenoptera. The short account of the morphology is direct, and to the point, and the text figures are clear and well chosen.

Under "Brust" (thorax) we notice the following sentence. "On the underside of the Metathorax, in the metasternum above the junction of the coxa, one finds the mouth of a gland, the metatarsal gland, *which is only to be found in ants*" (the italics are ours). This is no doubt true, but it is the first time we have seen it definitely stated as a cold fact.

Wheeler [*Les Sociétés d'Insectes*, Paris, 131 (1926)] wrote that no taxonomist apparently has noted that ants alone possess this gland which is present in all species and all casts of ants. He had been unable to find it in any others of the Aculeata, nor in the inferior sub-orders of Hymenoptera, and that before one could pronounce on the taxonomic significance of this, a complete comparative study of the metasternum of all the Hymenoptera was necessary.

Both Lubbock (1892) and Janet (1898) described and figured this gland and as we pointed out in *British Ants* (1915), the latter author has suggested that the secretion from these glands gives to the ant's body the nest-aura, by means of which the ants in a colony recognize their fellows. The author appears to only recognize 5 subfamilies, leaving out Wheeler's *Pseudomyrminae* (1920), *Cerapachyinae* (1920), and *Leptanillinae* (1926). He also uses the old name *Camponotinae*, for the subfamily now called *Formicinae*.

A list of the sections, tribes, subtribes and genera, after Emery is given; and all the German species are dealt with. Under artificial nests the author describes the observation nest invented by himself consisting of a glass bowl with a wide border or rim, extending outwards from the upper edge; oil being placed in this outer rim to prevent the escape of the ants. There are three holes in the sides of the nest below the rim so that it can be connected with other nests, or apparatus, by means of glass tubes.

He also uses for collecting a large funnel into which nest materials, moss, etc., may be placed, and by heating the top by means of a copper plate, or water apparatus, myrmecophiles, etc., are driven down through the narrow end of the funnel into a receptacle to catch them.

Under colony-founding, several original interesting experiments, with small colonies in observation nests, are given.

All the different forms of nesting, nest materials (some of which are figured), covered ways, cattle sheds, etc., etc., are briefly described; and the various habits of many species of ants are set forth.

Under *Synechthrans*, an "earwig," *Euborellia moesta*, is recorded which in Sardinia at least (though it can exist without ants) robs ants of their brood. Here we have the case of the beginning of a *Synechthran*, or an instance of what I have described as experimenting in the myrmecophilous habit. Enough has been said to demonstrate how useful this little book on ant lore is, and to prove, if proof were necessary, that it should be in the hands of all myrmecologists.—

HORACE DONISTHORPE.

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P.
Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and
Manx), *gothicina* forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and
munda.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—*Thais cersyi*, *Polyommatus zephyrus* (Friv) type, *eroides*, *anteros*,
Melitaea trivialis, *Melanargia larissa*, *Coenonympha oedipus*, *leander*.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first
class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of
the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytoecidia by
Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls
are requested. Material will be willingly identified, acknowledged, and, where necessary,
illustrated. Address such to: *Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong
College, Newcastle-on-Tyne.*

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of
British Isles.—*C. Zacher, Erfurt, Weimar, Street 13, Germany.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. May 7th.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
April 24th. May 8th.—*Hon. Secretary Stanley Edwards, 15, St. German's
Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London
Entomological and Natural History Society and the North London Natural History
Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and
third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—
Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

List of British Geometers
with named Varieties and Synonyms
(page references to Seitz: Meyrick: and
South)

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Communications have been received from or have been promised by Messrs. Dr. Verity, K. J. Hayward, A. H. Martineau, W. H. Edwards, Dr. Malcolm Burr, H. Donisthorpe, H. P. Jones, F. W. Edwards, P. P. Graves, A. J. Wightman, H. Willoughby-Ellis, H. B. D. Kettlewell, W. E. China, J. P. Bird, G. Talbot, and Reports of Societies.

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IMPORTANT

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BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXVI.)

CONTENTS OF Vol. I. (Most important only mentioned.)

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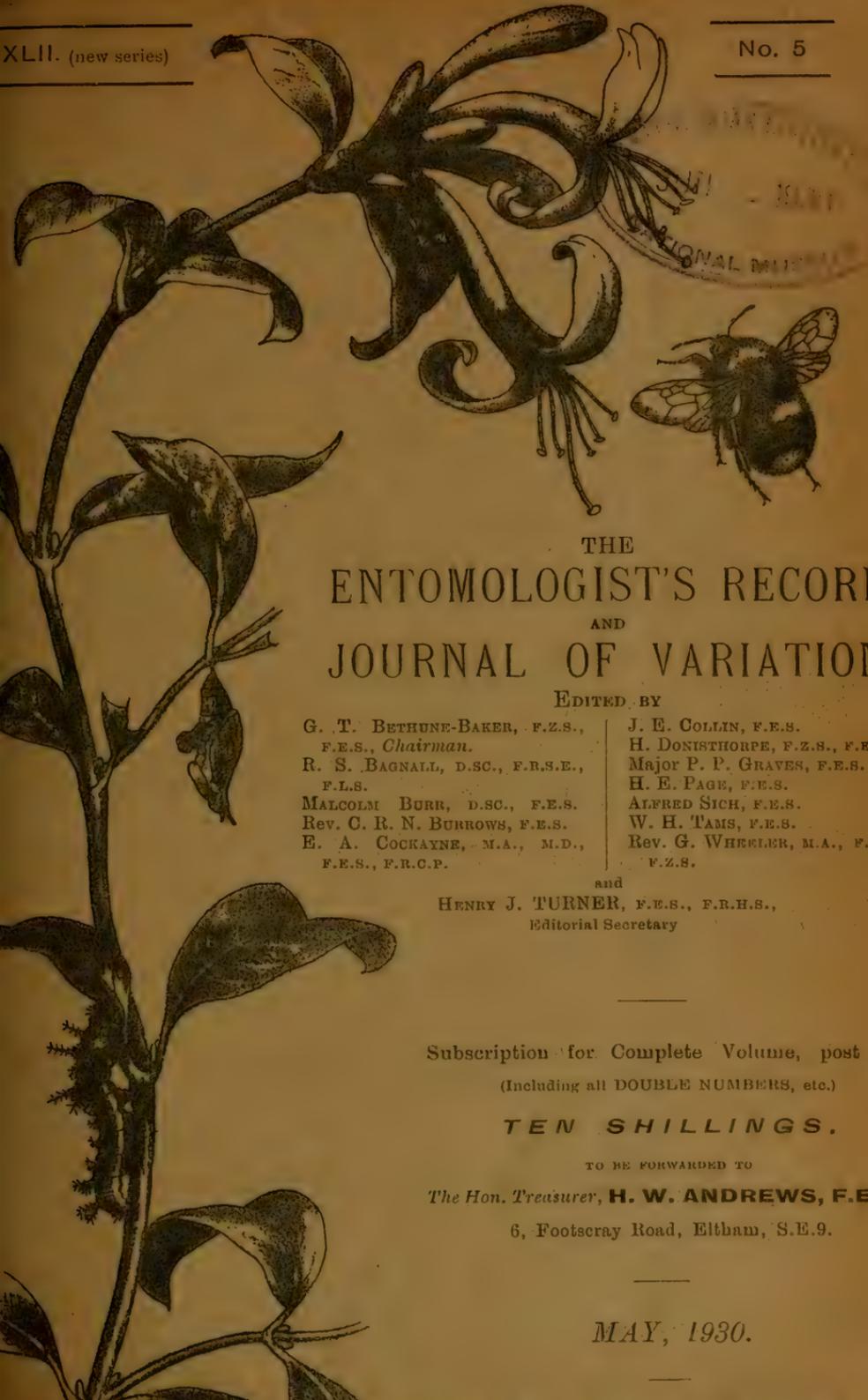
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Notes from Northern Rhodesia.

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

I. FIRST IMPRESSIONS.

On January 2nd, 1928, I motored out from Elisabethville to lunch with the officers of the British Frontier Delimitation Commission at a place called Kapushi, which is exactly on the Congo-Rhodesian boundary and is famous for the extraordinary richness of the ore in the mine that has made the locality known. As we drove up to an open cleared space in the dense forest of lofty trees, I saw the Union Jack and stepped out of the car on to British territory, the first time in a wandering life that I have touched a part of the empire outside Great Britain itself.

It was here that I met the first brother entomologist in Africa; it was Dr. Silvester Evans, Medical Officer of the Commission, well known for his extensive and important collections of Coleoptera made in Fiji. Dr. Evans is now making as complete a collection as possible of Coleoptera along the frontier, and he took my breath away when he told me that he mounted every specimen. This seems to be a counsel of perfection, impracticable for most of us, and with most orders of insects, but it has immense advantages, not the least being that the specimens are prepared and ready for determination immediately on arrival in England.

Dr. Evans and I spent a few hours together in the forest, but came across no Orthoptera of any striking interest; most were immature.

A few days later I left the Congo for Broken Hill. The scenery changes now from a dense and rather gloomy forest with tall but not gigantic timber to flattish country covered with bush and numerous trees of somewhat smaller stature; it might be described as openwork forest country, green and smiling at this time of year, with the grass about knee-high. Broken Hill itself is but a mining camp; we were too busy during our few days there to do any sight-seeing, which would be confined to the mine and the site of the discovery of the famous skull. It was on Friday, January 13th, regardless of superstition, that we started off once more into the bush to the scene of our operations for the coming year.

We motored out towards the south-east for some forty miles over decent roads, past the Mulungushi dam which was opened by the Prince of Wales, and pitched our camp by the roadside at a spot where a Kaffir path leads off at right angles to the Luano Valley.

This remarkable depression is in the southernmost end of that great rift which nearly split Africa in two, beginning in palaeozoic times and continuing throughout time right into the Tertiary. It is marked on the map by the north-south line thrown into relief by the great lakes, especially Tanganyika, and extends away to the north and includes the Red Sea and the Dead Sea and the Valley of Jordan.

After about three hours trek through the openwork forest we came suddenly upon the edge of a cliff and looked down to the valley far beneath us. It seemed a rolling, wooded country, cut by some meandering streams and dotted with clearings bright green with the fresh grass; on the far side a blue range of hills showed the opposite face of the escarpment. It is a relatively long and narrow rift,

countersunk in the plateau of Rhodesia, and the drop down the face of the escarpment is some 1800 ft. Owing to a mischance, we had to climb down that face during the hottest part of the day and that was the first time that I felt it really hot in Africa, nearly as hot as I had felt it in Spain, Montenegro and Macedonia, but here it was a damp and oppressive heat. It was a real climb, requiring hands as well as feet, to grip trees and rocks to steady oneself and it was a great relief to reach the stream at the bottom. Nearly two months of town life and the fleshpots of Elisabethville had made me soft and out of condition so it was a relief to sit in the shade and drink a dozen or so cups of tea.

The ground we marched over from this point was hard going; we kept crossing small but steep ridges capped with gravel, and separated by brooks; it was a constant gymnastic climb up and down, with the occasional relief of a level strip along the back of a ridge; this passed into more level country where the track took us sometimes through dense and shady jungles haunted by biting flies, sometimes through open valleys thick with a plant like a potato and with wild asparagus. We heard the self-satisfied grunting of hippo as we touched the Mulungushi but the noise and smell of a caravan of a hundred odd native porters keeps all game at a distance. There was a fair amount of spoor but we saw nothing to shoot on the road, except a green mamba which was too quick for me and fell short of his reputation in bolting instead of attacking, for which I was profoundly grateful, and a couple of duck like big sheldrake. We had to cross the Mulungushi twice, once in a dug-out and once by fording waist-deep; here the stream was so strong that I had difficulty in making my way across and in a few weeks it will doubtless be impassable at that ford.

One small stream offered a bridge, consisting of a tree felled across from bank to bank. The porters waded, waist-deep, but my head boy led the way across the bridge; he had not gone a yard before he yelled, and made a frantic dash to the far side regardless of danger of falling and, once across, began dancing and cutting the wildest capers, screaming and cursing in a variety of tongues. For the tree was alive with driver ants. These red devils march in columns of countless numbers and all creatures flee before them. Their method of attack is to swarm over their victim and, it is said, all bite simultaneously, as at a given signal. I was too far over to retreat but relatively secure in that I was wearing field boots and breeches, a costume which the Rhodesians consider eccentric, for they invariably wear shorts. Had I followed their examples, I should have been invaded by their countless battalions, but as it was I got across with a hundred or so on me, which I quickly shook off when once across and only a few succeeded in reaching my flesh. Poor Pavel Stepanovich, who was following some way behind, was less fortunate. He was wearing slacks, and when half way across he saw his danger; they were already on him, so he sprang at once boldly into the the water; still, when across he had at once to undress and pick off the countless foe and detach their formidable mandibles. About half a mile further on we crossed another part of the column marching through a mealie field. They say that these ants will send an elephant mad, by swarming up inside his sensitive trunk and then biting simultaneously.

The banks of the Mulungushi where we crossed by dug-out are flat,

and bordered with broad belts of tall reeds in which the heat is so great that it is almost intolerable; it is dotted with open beds of pinkish gravel and sand, and here I found an interesting little *Chrotogonus*. I had always regarded this genus as a member of the desert fauna but yet it is said not to occur far from water; on the spot where I took it the conditions resembled a desert as a beach resembles a desert, but the place was reeking with moisture; on the same banks there were larvae, of which I took one adult, of a grasshopper, with blue wings and no dark fascia. To my eye it seems to be our familiar south European *Sphingonotus caeruleus* and it seemed strange meeting it in this locality, but Mr. Uvarov identified it as *Conipoda*, sp.

During our trek through the bush I picked up two adult females of a yellow-faced *Thericles*. It is always a particular pleasure to me to take a species of the *Eumasticidae* as they are quaint and odd little creatures and little is known of their method of life. They are distinguished by their very short antennae and by the face being flattened as though pressed against a board. My first attempt at a serious entomological paper was an essay on this group, written when a freshman at Oxford, and last year in Angola I made the acquaintance of the living creatures for the first time, about thirty years later.

They are not a numerous family and are confined to the tropics and offer a considerable diversity and originality of form. I was always curious to know under what conditions they live, as they are so very individualistic a group. The African genus *Thericles* contains several quite apterous, small grasshoppers of a predominantly green coloration; the abdomen of the male is tucked up posteriorly; I find them numerous in low scrub and catch them by sweeping; they sit on bushes and shrubs in the undergrowth in the forest. In Angola they were chiefly green marked with white; here in the Luano I find them equally common, but generally green with a dark dorsal stripe. I cannot reconcile this with the idea of protective coloration, as the dark stripe makes them quite conspicuous when sitting on a green leaf, though with a little imagination one might mistake it for a stain on the leaf. There are some allied genera, also Ethiopian, as *Penichrotes*, *Peodes* and *Euschmidtia*, but in these the face, though equally flat, is sloping, whereas in *Thericles* it is vertical. Another curious characteristic of at least some of these genera is that when they are sitting they keep their hind legs not in a vertical plane, as does *Thericles*, but in a horizontal plane at right angles to the body, akimbo so to speak, as do certain *Truxalidae*, though to a less marked extent. At Huambo I took one or two minute specimens which at the time I took for larvae, but now believe they were adult *Penichrotes*, and they had this habit; here in Luana I took a nymph of a winged form, probably belonging to one of these genera, which also held its hind legs akimbo. The habit has been noted many years ago, by Bolivar I believe, when he gave the name *cruciformis* to one species.

We pitched our camp eventually in a clearing in the forest at a place called Chisorwe. I have not yet found out what this name actually designates, whether a stream or a village but it is likely to be my home for a year or more and so, I hope, will become a familiar name of entomological labels. One of the difficulties of work in Africa is to define localities precisely. A river is virtually length without breadth and native village names are useless, for villages here are very

different from those in Europe; the very idea is totally distinct. There are no streets, no shops, no public buildings; there is but a collection of huts in a clearing. And the villages have no name of their own but bear the name of the chief, with whom the village is identified. On the death of a chief, the site is abandoned and a new "village" built at another place. Village names, therefore, are the despair of the cartographer and useless for registering localities for zoological or botanical specimens until the White Man comes along and makes a mine or power station or some other work which definitely fixes the site upon the map; such cases are common in mining districts, as in the Katanga, where such names as Kapushi, Panda and so on have become permanent.

The first thing to welcome me in my new home was a female Pamphagid, like a knight of the chessboard, turning clumsy somersaults. It seems to be of the same species that I took sporadically in Angola and I was rather surprised to find it in a forest clearing, as I always regarded these curious creatures as typical desert-haunting insects, of either sandy or rocky wastes; for this reason, when I took them in sandy open spaces in Angola, I regarded them as members of a relict fauna, but that argument seems hardly applicable in this wooded valley. Males seem rare, but they are often winged and active; the female is apterous and clumsy and may be easily picked up with the fingers. I also took a nymph sitting on a green shrub.

The season in January here seems to correspond to the early middle summer in Europe. Young larvae of Orthoptera abound, but adults are few. I find *Catantops* fully grown, seemingly the same species that I found abundant at Huamba in western Angola in May and then all through the year wherever I collected. On the high ground, an *Oedaleus* or *Gastrimargus* was common in the adult stage, and in long grass I find one or two *Truxalidae*, one resembling *Ochrididia*, but otherwise the Acridian grasshoppers are all immature. In the Locustines, there are two or three species of *Phaneropteridae* in the nymph stage crawling among the herbage and a few adults have appeared; *Conocephalus* is busy chirping, and flew to light at Broken Hill, where I also took a *Heterodes* chirping, apparently the same species that I found commonly in the highlands of Angola but much smaller than the big spidery one that I found in swarms on the Atlantic coast at Benguela Velha. This genus seems to be adult all through the dry season and I have already noted how I took an adult hibernating under a termite nest in Angola in September.

Young larval Mantids and Phasmidids are abundant in the grass. This is curious, as in Angola I found immature ones common in the early part of the dry season. Possibly these youngsters will be fully grown by the end of the rains and start a new family at the beginning of the dry season, in which case there will be two broods in the year. Mantids first appeared in the adult stage in Angola at the end of June, half way through the dry season, which corresponds to the European winter, but they were not frequent until September, the beginning of spring. The Empusids I found adult at the end of the rains, and in Europe they are adult in May and then the larvae appear during the summer.

I took a very dark brown *Conocephalus*, which is surprising, as the rains have been in full swing for over two months; I expect it is a

chance survivor from the dry season, and perhaps its age is the cause of the dark colour; during the dry season they are generally buff. The natural colour of all the Locustine Orthoptera seems to be green, which survives to the adult stage, at least in patches, in many forms which are normally brown or grey, fading away within a few hours of the completion of the change. Orthopterists in England have probably noticed this with our dull grey *Metrioptera grisea*, which is common along the south coast. In this extensive genus, the southern forms are almost without exception grey; the only green one I know is a remarkable all green species, discovered by me in the Transcaucasus, which Uvarov has described as *M. burri*; the central European and northern forms, however, usually have at least some green on them, as in *M. brachyptera* of our moors and its allied species; clearly, green is the dominant colour of the vegetation in central and northern Europe, but in the south, a dull grey is characteristic of the summer.

In the same way, the grass-haunting species in the tropics are generally green during the wet season and buff during the dry. It is customary to assume that this is in order to assimilate with the dominant colour of the vegetation; no one has suggested that the vegetation turns yellow to adapt itself to the colour of the Orthoptera. I see no reason, however, that the change of colour should not be the direct result of the climate, due to the same cause as the change of colour of the vegetation. When the chlorophyll of the leaves decomposes, the xanthophyll that is usually present becomes visible and we get "autumn tints." It seems possible that the change of colour from green to buff in so many Orthoptera is directly due to the dryness of the atmosphere. The green Locustids turn brown on drying and this may be accelerated by forcing the process. When in despair as to how to dry my specimens when trekking during the rains in Angola and the whole atmosphere was reeking, I tried putting my specimens on hot sand; I had it too hot, however, and a fine green *Saga* turned yellow immediately. I have not noticed *Saga* during the dry season, but think it very probably changes colour too, as brown forms occur in Europe and I had a rich dark brown one from the Caucasus in my collection.

I was interested to come across a living Pseudophyllid for the first time. This is an interesting family of Locustine Orthoptera occurring only in tropical countries; they are generally grey in colour, with dark dorsum and wings. In Angola a native brought me one, a green one, but here I found one for the first time myself. It is a beautiful creature, of a pearl grey colour, with darker specks and was resting on a bright green leaf. In spite of the contrast of colour, there was something so natural in its position and appearance that I almost overlooked it; the antennae, four and a quarter inches long, were extended straight out in front, like the forelegs of a Phasmid when it "freezes," and it lay there motionless. I could not make up my mind what it resembled, whether a withered twig or a large bird's dropping, yet it seemed perfectly familiar and natural. In this specimen, a male, the wings are rounded and with a tessellated smoky pattern, as occurs in some Mantids, and the dorsal surface of the abdomen a uniform plain dull black, while the pleurae and ventral surface are creamy. It is a striking insect and it will be interesting to learn something about its habits. I should expect it to resemble in this respect the *Phasgonuridae*, and probably be crepuscular, at least partly carnivorous and with a strong voice.

Should all Variations receive Names?

By G. TALBOT, F.E.S.

Many entomologists will answer this question in the affirmative, and Mr. G. Curtis Leman is one of them. His article, in the February number of the *Record*, is a startling one, at least to me. He gives names to 54 aberrations of the Coccinellid *Synharmonia conglobata*, L., and admits that this "Cannot pretend to exhaust all the possible combinations." Therefore it may be presumed that if another thousand or so were discovered somebody would have to give them names. Each name represents a certain arrangement of the eight spots. Excepting, perhaps, a Coccinellid specialist, no one will be able to remember what any one name stands for. These variations might have been numbered or lettered in some way, and reference to them thereby made even easier than by using a name.

If this method of naming "aberrations" is employed in treating of the variation of all insects subject to variable combinations of pattern, the existing literature on insects, enormous as it is, may be multiplied several times. It is some consolation to reflect that such names have no rank in nomenclatorial priority, and are not likely to burden bibliographical records.

If Mr. Leman had, for instance, the genus *Heliconius* (Lep. Rhop.) before him, he would find that in more than half the species each specimen would have to be named, and furthermore, he could obtain thousands of such specimens. We submit that this kind of variation cannot be dealt with by the use of names (not terms), and we regret the growing tendency to give a name to every slight variation. This important study of variation is only retarded by such obstacles to its progress.

A name represents a variation of some importance. These variations include all sorts of lesser ones which themselves include other and even microscopic variations, and so on, for no two things are exactly alike. The line must be drawn somewhere.

Names ought, perhaps, only to be given to forms which, if not anatomically distinct, are possessed of a definite pattern either known to be recurrent (including colour forms), or which is not a mere rearrangement of the species pattern shown by a typical form.

The tendency to name these comparatively trivial variations is due to various causes. We have the dealer who, by creating a "type" is able to enhance the value of a common insect very considerably, and so dispose of it in a certain market at a good profit. We have the general entomologist who, knowing little about the group concerned, fails to grasp the significance of the variation he sees. Then also there is the collector who is most anxious to see type-labels in his collection, and who may often be inclined to stretch a point and pin a name to yet another variation or maybe a freak he has secured.

Whether it be due to the cold commercialism of the dealer, or to the hot enthusiasm of the collector, the periodical literature continues to be burdened with a mass of useless names, work which does not commend itself to the scientific student. We need hardly mention the vogue in Germany of giving names to teratological aberrations, rightly called by Gunder the "Unnameable."

Seitz and Nomenclature.

Dr. Seitz in the introduction to the Supplementary volume makes remarks on the various points in nomenclature. On naming generally he says, "If the present system of giving names to every chance variety is continued there is every likelihood that in the near future names will be allotted to such variations in colours and markings which may yet be possibly discovered. For instance with the majority of *Erebia* there exist specimens both with and without pupilled ocelli in the wings, and it may be concluded that it is only chance, that such anomalies have not yet been found in a great number of species, and that their discovery is only a matter of time. Therefore anybody calculating on this may name all sorts of combinations by a simple form of mathematically applied "variety-formula" as already has happened, for instance, with the elytra marking of certain European coleoptera, where names have been given to colour variations, which are known to occur, and also to colours that may eventually be found (or which it is expected will be found in the course of time) and with these latter a note is made that "should such and such an aberration be found it is to be named x, y, z." There can be no doubt whatever that such methods and provisional denominations should be forbidden.—Hy.J.T.

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

(Continued from p. 54.)

Next to *baicalensis* = *arcesia*, at about the same primitive palaeartic stage, stands *sindura*, Moore, and not far from them, but at the culminating stage of frigidipetal evolution and highly specialised in a psychotropic condition, are *asteria*, Freyer, and *varia*, Meyer-Dür, or more exactly *alataunica*, Stdgr. These represent various parallel branches, which have culminated in various species and exerges of the present day, but, no doubt, the actual ancestors of the latter never passed through as high a psychotropic state as that of *asteria* and *varia*; they kept to milder climates and turned back to caloripetal variation before reaching that extreme. That is why, owing to the highly anabolic nature of this group I have spoken of already, they have gone on transforming and they have left us extremely few specimens of their past stages; *asteria* and *varia* have instead been preserved, because they became fixed by their highly specialised conditions and they could not reverse their evolution to a caloripetal one, precisely as in the cases I have pointed out of the most extreme *Euphydryas*: The line *septentrionalis-britomartis*, which is an extremely close ally of *asteria*, as we will presently see, and the *parthenie* line, which stands equally close to *varia*, have kept up a very much greater variability, presumably owing to the reason, I have just suggested, that they have never faced glacial climates to the same extent. *M. athalia* must have steered still clearer of any influence which could oblige it to specialise or stop, or slow down, its evolution, so that it has transformed considerably under the influence of the new palaeartic surroundings, which, on the contrary, evidently had a stimulating

effect. The optimum of these conditions has been afforded by the warm, moist climate of the extreme east, as I will point out more exactly further on, and this produced the giant exerge *niphona*, with peculiar elongated genitalia and a very long pointed uncus, such as no other *Melitaea* possesses. Further north and westward the moist, but colder, climate of the Northern route only transformed the *athalia*, which underwent it and which became the nominotypical exerge, about as much as it did *britomartis* and *parthenie*. Those *athalia* which spread westward by the Central route found themselves under the less stimulating influence of a warmer, but drier, climate and this only carried them to a lesser degree of change, which we will see is represented nowadays by the western *helvetica* = *pseudathalia* exerge, with an inconstant and, anyhow, always very small uncus, and with all the apophyses less developed. Finally, a group which must have passed by the Southern route and kept to very dry and hot surroundings had to specialise to these conditions at a very early date, just as *asteria* did to glacial ones, and it presumably became so stabilised organically that it has retained features to all appearances about as primitive as those of *asteria*; its living representative is *dejone*, which greatly resembles *baicalensis* by the genitalia (never any uncus) and other features, although the lateral apophyses differ by having numerous teeth.

One must place *sindura*, Moore, next to *baicalensis* = *arcesia*, because it is very similar to it, although some of the very variable races it exhibits in its extensive habitat have a considerably different superficial look and even somewhat recall in some cases the look of *dictynna*. No doubt it is one of the most primitive palaeartic species, still standing very near its nearctic ancestors and it has spread to the Himalaya in company with *Parnassius himalayensis*, Elw., which so resembles the American *smintheus*, B., that, if it were not for the labels, one could not tell whether some female specimens came from the Himalaya or from the Rocky Mountains. The mountain sheep (mouflon) followed the same route, as shown by the fact that some of their variations, which exist in America as individual ones, are quite distinct and locally constant in Asia, so that they are considered specific in this region.

The most striking feature, pointing to the close relationship of *sindura* and *baicalensis* = *arcesia* to the *hoffmanni* group and to the Nearctic species in general, except *minuta*, consists in the former having retained the fulvous marginal band on the underside, between the two capillary black streaks, which exists in all the American species of that group. This band is present also in the *harrisii* to *dictynna* line of descent, so that it increases the resemblance I have just mentioned between *baicalensis* and *dictynna* in connection with their genitalia, and it goes towards proving that *baicalensis* and *sindura* are more primitive than the *athalia* group, which has derived from them and become more distinct from the other parallel lines than they are.

This palaeartic outburst is only equalled by that of the *didyma* line of descent and it may be worth noticing that these two lines resemble each other, both in America and in the Old World, by having, on the whole, a narrower and rounder wing-cut than the other lines of the *Melitaeidi*. This shape goes with the slow, flapping flight of

anabolic constitutions, as a general rule, but it does not impede the dashing one of some *didyma*, in which it is less pronounced.

M. asteria is, in general appearance, perfectly similar to the rest of the *athalia* group and, in some particulars, to the species and exerges which live, like it, in glacial surroundings, such as *varia*, Meyer-Dür., but its genitalia are very distinct from the usual aspect they have in it: there is no uncus; the clasps are longer, as in *baicalensis*=*arcesia* and *minerva*, and taper into the base of the terminal apophysis in the same way as they do in the latter; in *asteria*, however, the apophysis is shorter and it ends in two points, as in *varia*; these are set further apart from each other, so that they again recall *minerva*, where the lesser point is set very far back, and still better *dictynna*, in which the two points are however very much longer and sharper and the second is curved backwards. There is certainly also some resemblance to the genitalia of *phoebe* and this is very natural: in both these species, on the whole, the genitalia can be described as transitional to the *athalia* type, and, according to what has been said above, this would be due to the fact that *phoebe* has been a weak attempt to produce the *athalia* variation, whilst *asteria* actually stands at the root of the branch which has developed into it. I think we can safely consider both *asteria* and *varia* as having derived very directly from an ancestor quite similar to the present *baicalensis*=*arcesia* and *sindura*.

M. varia, Meyer-Dür., of the present day has reached a stage further than *asteria* in the *athalia* direction, but it is only accompanied by one near ally, namely *parthenie*, proper to temperate climates. The question as to whether this is a distinct species or not, which has been raised on the strength of the differences in the genitalia, could, it seems to me, only be solved by finding them on the same grounds or by breeding experiments; differences which simply consist in two successive degrees of development due to climatic causes are no proof of specific distinctness and *varia* and *parthenie* might stand very naturally to each other as the Glacial and the Temperate exerge of one species. Suschkin has examined the genitalia of *alatauica*, Stdgr., which Seitz had shifted from *parthenie* to *athalia*, and his description and figure of them may be seen to agree exactly with those of *varia*, Meyer-Dür., as published by Reverdin. There thus can be no doubt that it is the Asiatic progenitor of the latter and I must say I would have come to the same conclusion simply from its general aspect in Seitz's own figures (I take that of the female "*sibirica*" to be meant for *alatauica*, as the former name is mentioned nowhere in his text and does not exist anywhere in literature and anyhow it would be a primary homonym of an *aurinia*). The Ala-tau lies to the north of the Ferghana channel, so that, as far as we know at present, *parthenie* has originated and kept entirely in the Northern Zone, like *britomartis*.

M. asteria has the most rudimental genitalia, as just described, and the most peculiar general aspect of the entire *athalia* group, part of which has presumably originated from an ancestor very similar to it. The broad premarginal lunular silvery-white spaces on the forewings, as well as on the hindwings, and stretching on the former as far as the tornus (anal-angle) recall those of *baicalensis-sindura*, of *dictynna* and of their American equivalents and thus sustain what the genitalia suggest in the way of its being an intermediate stage between them and the *athalia* group. Some of the most conspicuous characters of

the *asteria* of the present day, such as its diminutive size, its extreme melanism and its peculiar rushing flight, suited to meet the violent gusts of wind of the great altitudes it is confined to, are no doubt the results of its adaptation to very glacial conditions: its distribution, restricted to the Altai and to the Alps of Europe, is no doubt a recent state of things, posterior to the Glacial periods of the Pleistocene, during which it probably multiplied and spread very much along the outskirts of the ice-sheets. This specialisation would logically explain the fact that this branch has never transformed and that it has thus retained some of the ancestral features, whilst the groups which have lived in milder climates and especially in more variable ones at different epochs, have been stimulated to further developments, as I have already remarked.

One of the first and lesser steps has been fixed and preserved till our days by *aurelia*: there is in it still no attempt to develop an uncus; the clasps from the the oval shape of *asteria* have turned to the globular one of the following species, but their terminal apophysis is only slightly longer and the more numerous barbs it has are small, so that the two principal points that are to be seen in the species described above still stand out prominently amongst these new lesser barbs. Also this *aurelia* branch has remained very firmly fixed at one stage and, notwithstanding it has spread as far as the Alps of Europe and the north of France, its variations have only consisted in some slight racial features. The much more accentuated ones, that have been attributed to it, we will presently see do not belong to it at all and constitute a different specific branch.

The fact that the latter specific group, standing between *aurelia* and *athalia*, has not been recognised and that its broad variations have been attributed to the first of these species in some cases and to the second in others has been the chief cause of the confusion and of the doubts which exist in connection with these insects and their nomenclature. I will show further on that it at last embodies the mysterious *britomartis*, Assm., and that this name must be applied to it.

At the root of this branch and obviously connecting it closely to *asteria* by its general appearance, as well as by its genitalia, is the little *Melitaea* of Kamtebatka, to which the name of *orientalis*, Mén., has hitherto been applied, but which, for reasons I will presently state, I now name **septentrionientis**. I take as "co-types" the series of specimens I have received from Bang-Haas, to which belonged those whose genitalia have been illustrated by Reverdin under the former name; they exactly agree with Alphéraky's description and figures of that insect. We must begin by noting that it is surprising no writer of the past, I am acquainted with, should have pointed out its remarkable resemblance to *asteria*, Fr. Their underside patterns are exactly the same and, notably, they both have the excessively broad premarginal silvery-white spaces on the forewing as well as on the hindwing and stretching on the former as far as the tornus (anal angle). This peculiarity alone considering it never exists in either *athalia*, *aurelia* or *parthenie*, would, it seems to me, strongly suggest a much closer connection between it and *asteria* than either show to any of those species; as the general look of these insects suggests the same thing and as the genitalia are also those which resemble each other most, I do not see how one can do otherwise than conclude that *septentrionientis* is a distinct species,

much more closely related to *asteria* than to any of the three others mentioned above and more especially distinct from *athalia*, to which it has hitherto, on the contrary, been attributed under the name of *orientalis*. One difference to be observed is that *septentrionalis* always has the thin, but visible, second capillary line along the outer margin on the underside, whereas the fact that it is usually obliterated in *asteria* is considered the most important specific peculiarity of the latter. Now, it seems to me that this is greatly overrating the importance of a feature of this sort and the best proof of it is that specimens of *asteria* in which it is quite detectable are found; it goes together with the minute size and the general lack of development of the insect, due to its deeply anabolic and sluggish constitution. Another difference, which has considerably more importance, is that *septentrionalis* is the first grade of variation in the *athalia* direction, which has developed a small and short, but perfectly distinct, uncus, and that in other respects these genitalia have reached about the same grade as those of *aurelia* and resemble them, in fact, so much, that, if it were not for the uncus, they could not be separated from them. We will presently see, however, that in this case the presence of the uncus is really indicative of a complete specific distinction. A notable character of *septentrionalis* are the palpi, covered in most individuals with bright red hairs, both above and below, to an extent one only finds in some extreme *aurelia*; this suggests a closer relationship to *aurelia* than to *athalia* and the size and the general aspect as well as the genitalia, confirm it fully.

(To be continued.)

Collecting Notes, 1929.

By H. B. D. KETTLEWELL, F.E.S.

(Concluded from p. 61.)

June saw us once again in the Wicken-Brecksand district.

The first night (the 7th) Demuth sent me out into the Mildenhall district to the most unsuccessful night's collecting at headlights of the car I have ever had—except for a few nice white varieties of *Dianthoecia carpophaga* and an occasional *Neuria reticulata*—while he at Wicken took at sugar, *Eumorpha elpenor*, *Leucania obsoleta*, *Mamestra (Hadena) thalassina*, *H. adusta*, *Xylophasia rurea* (dark vars.), *Apamea unanims* (common), *Meliana flammea* and at light took *M. flammea*, *Cidaria lignata (vittata)* and a most perfect newly emerged male of *Hydrilla palustris* which came at 11.10 p.m. (summer time).

The following night (8th) was a poor night at Wicken except for a few *Arsiloneche albovenosa* at dusk, while I carried the net into the innermost precincts of Chippenham—nothing came to the acetylene flares I had so laboriously carried with me, but I found a large number of *Senta maritima* late at night, singly and in pairs, on the reeds, including var. *bipunctata*.

On June 10th Demuth and I went down to Wye in Kent. The first night produced only one *Pachetra leucophaea* and two *Siona lineata (dealbata)*.

The following day we went to the neighbouring field where we had been so successful in 1928, and took upwards of 40 *S. lineata* in an hour. At sugar one *D. leucophaea*, one *Agrotis cinerea* and a few *Mamestra (Hadena) genistae*.

On June 12th we had a couple of hours in the Folkestone district and took a large number of small larvae and ova of *Dianthoecia albimacula* and *D. conspersa*. At sugar in the evening back at Wye, thanks to the kind help of Captain Duffield, we took 18 *P. leucophaea* also *A. cinerea*.

On June 13th, en route for the New Forest, we called at Dungeness and picked up a good number of larvae (small to fullfed) of *Pachygastris trifolii*, although it was much too windy for them to be sitting well up on the broom on which they feed here; we also saw many larvae of *Dasychira fascelina*.

Sugar in the New Forest proved to be an utter failure, except for a couple of hibernated (?) *Gonoptera libatrix* on the 13th and an *Aplecta prasina* on the following night, though a few days later my friend took this species commonly together with a few *Moma orion* in the same district. In the daytime *Hemaris fuciformis* was common flying over the rhododendron blossoms.

On June 16th I was back in Cambridge.

On the 17th I found *L. obsoleta* very common near Ely together with *Apamea unanims*, and *Manestra sordida*, also a few normal *Senta maritima* (no vars.).

The following night (18th) I tried a certain insignificant reed bed close to Cambridge and found to my astonishment that *S. maritima* simply swarmed here in countless hundreds and for the next week I collected every night here. I took the following varieties of *S. maritima*: -14 var. *bipunctata*, 6 var. *nigrostriata* and 3 beautiful var. *wismeriensis*, also *L. obsoleta* (a few) 2 *M. flammea*, *M. sordida*, *Noctua augur* and *Apamea obscura* (*gemina*), while *Theretra porcellus* was common at dusk flying over bedstraw and the reeds teemed with larvae of *Nonagria geminipuncta* and, strangely, with them a few *N. dissoluta*, also a few *Calamita lutosa*, while on the osiers we took larvae of *Leuconia salicis*—an altogether delightful spot.

I made one or two daytime excursions into the Breckland district of Suffolk between June 17th and 21st. *Agrophila trabealis* (*sulphuralis*) was common with a few *Melanthia rubiginata* in one particular spot, but on account of the strong wind few were netted. No *Lithostege grisata* were seen and I believe this insect is becoming less common than formerly. I also took a very large number of *D. irregularis* (ova and small larvae) well over a hundred and fifty, which species seemed particularly abundant this year.

As will be seen from the foregoing information and taken into account with last year's results, we have for two or three reasons made a fairly good number of expeditions within a wide detour of Cambridge both using headlights and sugar and in particular during the months of May and June, and I should like to take this opportunity of asking readers of the *Ent. Rec.* for information about *Hadena atriplicis*, which for some unaccountable reason seemed suddenly to have disappeared about twenty years ago from a wide area where it was then regularly taken. I have heard of no record of its appearance in recent years and I would like to hear of when exactly it was last seen or taken.

Except for some unprofitable days on the Goathland moors of Yorkshire in early July I was abroad for the rest of the season so was unable to work for migratory species in S. Devon as I have done in the past.

Two most successful nights at ivy blossom in Mid. October near Malvern terminated my season's notes. *Sarothripus verayana*, *Miselia oxyacanthae* (*capucina*), *P. meticulosa*, *Hadena protea*, *Ochria aurago*, *Xanthia fulvago* (1 ♀), *Amathes lota*, *A. macilenta*, *Amathes helvola*, *A. lychnidis*, *A. circellaris*, *Orrhodia vaccinii*, *O. ligula*, *Scopelosoma satellitia*, *Xylina semibrunnea* (1), *X. socia* (5), *X. ornithopus*, *Calocampa vetusta* (1), and one *Plusia gamma*. Some species were in enormous numbers. I give this list not because of individual rarity, but because it is such a particularly full list for two night's ivying. Nearly every species that could have turned up did show itself.

I may also mention a *Pyrameis atalanta* flying about on November 1st and a *Polygonia c-album* earlier—both five minutes from the centre of Birmingham.

"Guests of British Ants. By H. St. J. K. Donisthorpe."

By W. E. CHINA.

CHAPTER VI. HEMIPTERA.

In this chapter Mr. Donisthorpe gives an excellent account of those British Hemiptera, which are known to be associated with ants. Fourteen species are recorded, which may be divided into three sections. Firstly there are six species, which themselves more or less strongly resemble ants and belong either to the indifferently treated lodgers, to the myrmecophags, or to those insects which merely obtain protection from their enemies by their resemblance to ants. Secondly there are three species which although not "mimicking" ants are always found associated with them, including the rare *Megacoelum beckeri*, Fieb., first discovered in this country by Mr. Donisthorpe. Thirdly there are five species which have occasionally been taken with ants in Britain. Of these fourteen species, six belong to the *Capsidae*, two to the *Lygaeidae*, and one each to the *Anthocoridae*, *Microphysidae*, *Ceratocombidae*, *Coreidae*, *Tingitidae* and *Nabidae*. It is interesting to note that in spite of the fact that one or two at least of these species are common insects, in no case is the complete life-history known.

The chapter is illustrated by a plate and two text figures. The former, as is usual with low magnification photographic reproductions of insects, is rather unsatisfactory, but the text figures are quite good. A few examples of myrmecophily amongst foreign Hemiptera are given in the introduction and elsewhere, but no mention is made of those British species of which myrmecophily has been recorded abroad. This is a pity because such a list would indicate to the student where further examples of myrmecophily in British Hemiptera might be looked for. With regard to the case of *Dictyonota tricornis*, Schrk., it is interesting to point out that this species was until recently the only Tingid found in association with ants. Two myrmecophilous species of this family, however, have now been discovered in Australia. *Cantacader leai*, Hack., has been found in the nests of *Amblyopone australis*, Erich., and *Lasiacantha* (*Myrmecotingis*) *leai*, Hack., with *Iridomyrmex conifer*, Forel.

In the section on Homoptera the author draws attention to the association between ants and the families *Fulgoridae*, *Membracidae* and *Cercopidae*. No mention is made of the family *Jassidae* the members of a whole subfamily (*Pogonoscopinae*) of which are found in the nests of various species of *Camponotus* in Western Australia.

CURRENT NOTES AND SHORT NOTICES.

In the January No. of *Zeit. Österr. Ent. Ver.*, Dr. Schawerda contributes an article dealing with his fifth sojourn in the high-mountain region of Corsica with two plates; and the discussion on *Dysstroma truncata* still continues.

The *Classification des Géométrides*, by F. Derenne Meyers, Bruxelles. This admirable work is really an annotated Catalogue intended to introduce to Belgian lepidopterists the modern classification for which L. B. Prout is responsible. All the species found in Belgium are listed, with their aberrations and local forms occurring in that country, to which is added a short diagnosis of each form, a short description of the larva and a statement on the area over which the species is recorded to occur. Cross references are given to Seitz' volume on the Palaearctic Geometers, to Staudinger's Catalogue of 1901, to the volume written by Lambillion and to M. Culot's *Iconog. Géom. d'Eur.* Numerous other references and notes help to make the volume one of very great use to the author's countrymen and might be consulted with much advantage by students of the lepidoptera in other countries. We congratulate M. Derenne on his enterprise. There is a good index.

At the present rate of "progress" (!) we shall soon get all our similiar names changed. In the *Bull. Soc. ent. France*, No. 17, Dr. Verity discusses the various races of the species so long known as *Argynnis adippe*, which name was some years ago shown by the British Nomenclature Committee to be wrong, and was replaced by the prior name of Linnaeus, *cydippe*. Now comes in the wretched "homonym" rule of the Zoologists, and Dr. Verity suggests that Bergstrasser's *phryca* be substituted. Linnaeus gave the name *cydippe* to two butterflies, i.e., two *Papilio*. One the insect we have so long called *adippe*, an *Argynnis*, and the other a Malayan species, a *Cethosia*. Surely it is the height of absurdity to accept such a principle to base an alteration on. It serves no scientific purpose whatever but delays future work. Another stupid rule is also illustrated in this article. The name *ab. cleodora* was first used for a form of *Argynnis niobe* but subsequently settled down for long years as that of a form of *Argynnis (adippe) cydippe*. Now Dr. Verity, under this other wretched rule of the Zoologists, desires to change the name *ab. cleodora* of *cydippe* to *pseudocleodora* and leave *cleodora* to its original parent *niobe*. What an absurd method of nomenclature! How advantageous it would be to use the *same varietal name* in every species for that form which had the same characteristic.

Lambillionea for January has a photographic plate of 10 figures illustrating an article on *Colias croceus (edusa)* and its variations, a short summary of entomology in Belgium in 1929, a long extract from Dr. Graham-Smith's paper on *Pieris brassicae* in our columns, the sixty-fourth supplement to the *Cat. Lep. Belg.* and a further plate of two aberrations of *Apatura iris*. A really good and useful number.

The *Ent. News* for January contains a short account of the Entomological portion of the Brooklyn Museum, New York, by J. D. Gunder. The tenth of the series of sketches. The Photographic

reproductions attending these papers are most interesting shewing the buildings and members of the staff whom we know by repute. There is also an interesting account of "Marking moths and finding them again," the species being of the genus *Catocala*; and records of the night flight of diurnal butterflies.

The *Report of the U.S. National Mus.* for 1929 records an unprecedented increase in the number of specimens received. In 1927-8 the number was largely made up of 300,000 insects from the Philippines; in the period 1928-9 the increment considerably exceeds half a million specimens. The Report is a most instructive and detailed account of the work done at the Museum in all the various departments and sections, even to the special work done by each of the smaller subsections. Would that we could get such a record of the yearly work of our own museum. Some of us know it is done and plenty of it done, enough to more than fill 200 pages similar to the above volume each year.

Part 4 of the *Ann. Soc. ent. Fr.*, for 1929 contains the second portion of the *Lépidoptères Hétérocères du Tonkin* by J. de Joannis, with four plates, one of which is coloured, and two are devoted to the early stages of the *Psychidae*.

Fasc. 2, Vol. VI. of the *Bull. Soc. Lépidoptér. Genève* contains the obituaries of two of the most prominent of the Society's members Dr. Jaques-Louis Reverdin and John Julien with portraits, together with the Proceedings of the Society 1928-9 and an article on three new forms of palaearctic species with a coloured plate by Dr. Reverdin.

Societas Ent. for February contains in tabulated form the distribution of the *Gracillariidae* in the former Austrian-Hungarian area, including the whole of the species in *Caloptilia* (*Gracillaria*, *Coriscium*, *Ornix*), *Bedellia* and *Lithocolletis*.

Int. Ent. Zeit. of February 15th has an article on the Eyes of Lepidoptera with 2 plates and text figures by Herr H. F. Friederichs.

Part V. of the *Deutsche Ent. Zeit.* for 1929 contains Mell's further Notes on the lepidopterous fauna of China, treating the *Brahmaeidae* and *Europteridae* with 10 plates (3 coloured) and 81 text figures. There have been four sections dealt with previously.

REVIEWS AND NOTICES OF BOOKS.

Parts 7 and 8 of the SUPPLEMENT to *Seitz Palaearctic Rhopalocera* are to hand and form the complete section on the *Pieridae*, with 2 plates. In the chapter on this family in Vol. I. 1907, aberrational names were very few; in the *Supplement* these are practically all registered and the characteristic of each given. An introductory note says, "Opinions are divergent in regard to the necessity or value of such names." And again, "The large proportion of characteristics of ascertained generations or localities and the giving of names thereto is only of sense when specimens can be denominated even without the particulars of the locality and the date." As examples of the completeness of the register there are 21 under *Aporia crataegi*, 75 under *Pieris napi*, 136 under *Euchloë cardamines*, 15 under *Gonepteryx*

rhamni, 52 under *Colias hyale*, etc. In this the section is exceptionally useful to British entomologists who must consult an encyclopedic reference to carry on any further work in the study of our common Pierids. A footnote to *Pieris napi* says "It is to be hoped that no one will consider himself a 'specialist' and proceed to work up *napi* 'scientifically' similarly to the way of *Parnassius apollo*."—Hy.J.T.

We should like to call attention to a useful publication which has now apparently become an annual. The *Novitates Macrolepidoptera* compiled by Herr Otto Bang-Haas and issued by the firm Dr. O. Staudinger and O. Bang-Haas of Leipzig. It is a Catalogue of the Palaearctic Lepidoptera which are not contained in the four volumes of Seitz great work, that is, it contains the list with page references of all aberrations which were not included and of all the very numerous forms which have been more or less recently described. Four small volumes have been issued so far, bringing the list to 1928 publications. The order followed is the same as in Seitz to which the page reference is given for each species dealt with. In addition there is a valuable list of all the journals, other works and faunal lists from which extracts have been made, to the number of about 700. In a work like this omissions must occur, for it is a most difficult matter to pick up an odd description often made in a more or less obscure local publication of only a contracted local circulation. Still that an attempt has been made to secure that even from such publications references be extracted is evident from the literature list. We can recommend this work to all who take interest in any particular fauna or collect in European Continental areas. In vol. IV. there are no less than 22 faunal lists which have been extracted for the year, and previously more than 120 have been dealt with. A most useful work which should be encouraged.—Hy.J.T.

OBITUARY.

Prof. E. G. R. Waters. M.A., F.E.S.

In the death of Prof. Waters, at the early age of 39, we have lost one that could ill be spared. Not only was he a brilliant scholar in literature, particularly in the Romance and older French literature, but marvellous to say, he was, at the same time, the most brilliant field-worker in the study of the British micro-lepidoptera, which we have had of recent years. To converse with Prof. Waters was a lasting pleasure; one felt that one was in the presence of a "master." He was full of knowledge, practical field-knowledge of the "beasties" he loved to breed, arrange and study; he was full of knowledge and enthusiasm for his university work, endeavouring to follow the footsteps of the great professors who had preceded him. His skill in breeding and mounting the minute gems of his collection was second to none; I well remember expressing wonder and delight while standing beside the late J. H. Durrant as he opened a box of beautifully set and arranged micros, subsequently to learn that they belonged to Prof. Waters. His career was short, but useful and inspiring; he gave of his best in all he did. It is to be hoped that his collection will find its way to the Hope Museum at Oxford, where under the guidance of his great friend Prof. Poulton so much has been done to promote the study of entomology and its bearings on the problems of life.—Hy.J.T.

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse*, Hill House, Frances Street, Chesham, Bucks.

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P. Jones*, Nat. Hist. Museum, Wollaton Hall, Nottingham.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins*, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), gothicina forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—*A. J. Wightman*, "Aurago," Bromfields, Pulborough, Sussex.

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (Friv) type, *eroides*, *anteros*, *Melitaea trivialis*, *Melanargia larissa*, *Coenonympha oedipus*, *leander*.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

A copy of: Schrank, Enumeratio Insectorum Austriae. 4 plates; 1781. Leather binding (back repaired); recently catalogued at 30/-. This copy belonged to Stephens, and bears his autograph with the date 1821. Any fair offer accepted.—*B. C. S. Warren*, 14, Av. de l'Eglise Anglaise, Lausanne, Switzerland.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—*C. Zacher*, Erfurt, Weimar, Street 13, Germany.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. June 4th, 18th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. May 22nd, June 12th.—*Hon. Secretary* Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month. at 6.30 p.m. (except July and August). Visitors welcomed:—*Hon. Sec.*, A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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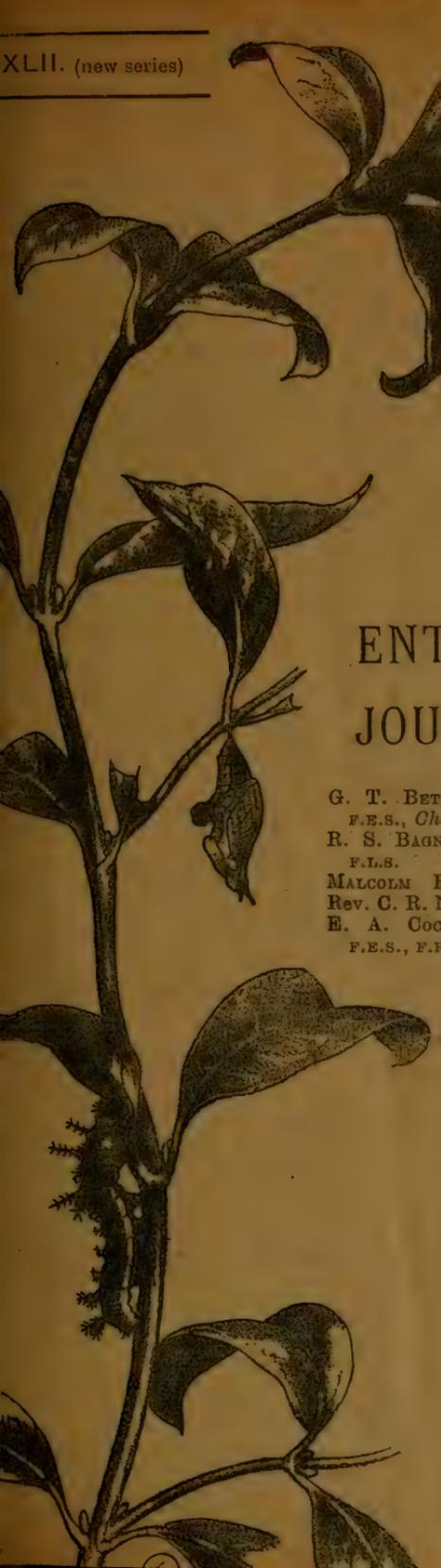
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The Genus *Heodes*, Dalman.

By G. T. BETHUNE-BAKER, F.Z.S., F.E.S.

I had occasion recently to refer to my "Synonymic Notes on the Ruralidae," *Ent. Rec.*, XXVI., p. 133, and I want to amplify my remarks as there given. In that summary I stated that "in his generic synopsis Dalman only mentioned the species *virgaureae*, and that therefore this is the Type." This statement is quite correct, but the genus was first created by Dalman, *Vetensk. Acad. Handl.*, 37, p. 48, 1816, and he placed in it *hippotohø*, *chryseis*, *virgaureae*, *phlaeas*, *helle*, *jarbas*, *rubi*. It is thus quite obvious that he intended to subdivide the great omnibus genus *Lycaena* of Fabricius, to which he refers, and divide it into three parts; to the 'Hair streaks' he gives the name *Aurotis*, to the 'Coppers' *Heodes* and to the 'Blues' *Cyaniris*. I have only given the references to the genus *Heodes* as I am not now concerned with the other two genera. He describes the generic characters, *l.c.* pp. 62 and 63 with unusual detail for that time, referring, apart from structural characters, to the colour and general pattern with great accuracy. There can be no question that he thus created the genus *Heodes* for the "coppers" and that he did it with intention.

Under these circumstances it appears quite clear that the action of Curtis in citing *phlaeas* as the type of *Lycaena*, which was included by Dalman in *Heodes*, is 'ultra vires' and should not be adopted. This applies especially to these days, when we are investigating the old authors and endeavouring to give each his due.

Dealing with the question of *Ruralidae* versus *Lycaenidae*, it appears to me both unwise and quite unnecessary to change from the old and universally accepted name *Lycaenidae*.

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

(Continued from p. 75.)

I have already noted that it has been a mistake to call *orientalis* the Kamtchatka race. This name was erected by Ménériés in 1859 on the strength of a single specimen collected by Schrenck at Bourri, on the Amur river, and in extremely bad condition. He attributed it to *parthenie*, but Alphéraky examined it again and placed it in *athalia* (*Mém. Romanoff*, IX., p. 321), extending it to the race of Kamtchatka, which he figures very well, pl. XIV., f. 2, a, b. Comparing the latter with Ménériés's very bad original one, it is perfectly clear they do not represent the same insect. As pointed out by Alphéraky, the most prominent feature of the Kamtchatka race consists in the considerable breadth of the white premarginal spaces on the underside of the hindwings, well represented by him and by Seitz in his figure called *orientalis* on pl. 67, but this character lacks entirely in Ménériés's figure. One is thus not at all sorry to find that the name of *orientalis* is a primary homonym of *aurinia* race *orientalis*, II.-S., so that the International Code condemns it never to be used again. Ménériés's name of *ambigua* is not in the least a synonym of *orientalis*, as stated by Staudinger; the description of Seitz, *Fauna Pal.*, I., p. 222, who

evidently copied Rühl's note p. 793, is entirely false, the silvery-white band he gives as its characteristic exhibiting no peculiarity; the upperside original figure agrees very well with the specimen figured by Seitz under the name of *kenteana* and there are several exactly like it on both surfaces in a series I have from Mondy, m. 2600, in the eastern Sajan mountains; it cannot, in consequence, replace *orientalis*. Race *mandschurica*, Fixsen, renamed *bathilda* by Frühstorfer, who seems to have quite mistaken the meaning of Fixsen's name, is a large one from the Amur, quite similar to the Japanese *niphona*. If, however, one reads Fixsen's original description of his *latefascia* from the Upper Amur (his specimens from Corea are only said to be similar to it, but are not the "type," and it is queer how later authors have actually referred the name to the Corean race alone) it becomes clear that it is exactly the same as *orientalis*; it agrees with the figure of the latter in size (18 to 20mm. of length of forewing), in the fact that Fixsen, like Ménétrés, had taken it for a *parthenie*, in the breadth of the central space on the underside, which is described, however, as yellow, and in other details. Therefore *latefascia*, Fixsen, replaces *orientalis*. Mén., for the smaller *Melitaea* of the Amur, and the name of *menetriesi*, which Caradja substituted for the latter in *Iris*, VIII. p. 50 (1895) on the strength of the homonym I have mentioned above, is only a synonym of *latefascia*. I don't think the colour (yellow or white) of the central space on the underside can be a constant racial feature in Asia any more than it is in Europe, where in most races there are individuals of both colours, but Leech notes particularly that in his specimens from Corea it is always white and not yellow, as in *latefascia*. Anyhow, as Fixsen says, besides, that his from Corea are larger and more handsome than those from the Amur, it will probably be well to distinguish them as race *coreae*; Seitz's figure of *latefascia* on pl. 66 is larger than the size given by Fixsen, so that it is evidently from a Corean specimen.

As to the position of races *latefascia* of the Amur and *coreae* of Corea, we cannot gather it from the genitalia, because they have not been examined, but I believe we can safely forecast they differ very little from those of *septentrionientis* and that these three races are co-specific. The fact that Alphéraky, with the "type" of *orientalis* from Bouri, before him, applied this name to the Kamtchatka race, shows their resemblance was such that he found no difference worth considering. We are, nowadays, more analytical and we find that the reduction of the premarginal white lunular spaces on the underside indicate a good step forward in evolution, as the species spread southward, towards the more highly characterised *athalia* pattern; it will be observed, however that the central band of *latefascia* has remained as broad as in *septentrionientis*; hence the former name.

In connection with the position of these three allied races, it is to be noted that the genitalia of *septentrionientis* are distinctly different from those of *athalia* and that the two others, whose genitalia are not known, inhabit the same regions as some races of *athalia* (we will presently see these are *ambigua* in the northern parts of Amurland and *niphona* from its southern parts to Corea) and keep perfectly distinct from them, so that there can be no doubt they belong to another species. Alphéraky, Staudinger and all his followers have been quite wrong in attributing them to *athalia*. Ménétrés and Fixsen had had

a better insight, but their mistake was referring them to *parthenie*. To establish the limits of the unrecognised species they are part of and the specific name it should bear we are obliged to clear our way through several difficulties, which arise more from the confusion in the nomenclature of the past than from the actual facts in nature.

The unfortunate name of *kenteana*, one finds mentioned, with no description, by Rühl, p. 406, in 1896, as already being in use in collections, but the first to give it a status was Seitz, although he only says it "is a somewhat doubtful form from Kentei" and he makes no effort to define it. Nevertheless, his figure pl. 67 must, henceforth, be considered the "type" and I believe it is quite synonymous with *ambigua*, Mén.; it has an aspect intermediate between *mandschurica* and the smaller western races of true *athalia*. Also *tinica*, Frühst., from Irkutsk, is of the same description, and its more heavy black markings are simply an individual variation.

As to the specimen from Tchita in Transbaikalia (between the Kentei Mts. and the Amur), which Reverdin figures under the name of *kenteana*, it is easy to see that this name can in no way be maintained for it, because it is totally different from the figure fixed as the type by Seitz's act. It is one of those *Melitaea* which to the naked eye are impossible to distinguish from *aurelia*, so that it is not to be wondered at that its genitalia should have been found to be nearly exactly like those of the remarkable little Piedmontese insect named by me *aureliaeformis* for the same reason and that, compared with those of the western *athalia*, they should be a distinct approach to the genitalia of *aurelia*. As the Tchita race differs from *aureliaeformis* of Turin by its much thicker black pattern, I think it will be useful to have different names to designate races from regions standing so far apart and so different in nature, and I name it **imitans**.

A series of specimens I possess, collected in July at Tunkinsk, 2,000m., in the White Mountains of eastern Sajon, to the S.W. of lake Baikal, in the Irkutsk government is extremely instructive: the average aspect is similar to Reverdin's figure, I have just named *imitans*, the females are very much more loaded with black and exactly correspond to the one of Sajon figured by Seitz as the "type" of that sex of his *aurelia seminigra*. If one adds to this his own remark that the characteristic red hairs on the palpi are so mixed with black ones that they appear entirely black, it appears to me one can be about sure Seitz's insects are not *aurelia* at all, but a race of the unrecognised species we are dealing with, and that this race only differs from *imitans* by a greater amount of melanism also in the male sex, as figured by Seitz. In the real *aurelia* of that region, belonging to race *mongolica*, Stdgr. (this name must be replaced by **mongolicola**, being a primary homonym of the same one given to a race of *ichnea*, B., in the preceding pages of Staudinger's paper), there is much less variation and no tendency to such a melanism. The opposite extreme of variation in my specimens from Tunkinsk exhibits much broader fulvous spaces than *imitans* and on the underside the pattern lacks the characteristic neat and even look of the latter's; these specimens are perfectly similar to *latefascia* and obviously show that the two are simply races of the same species, but there is a still more conclusive piece of evidence to this effect in the statement which Reverdin makes about the genitalia of his "*kenteana*"; he has found that one of the

four he dissected is similar to those of the Kamtchatka race; the differences he has found in the others are slight variations, which, together with the perfectly analogous ones of *aureliaeformis*, point to the more highly characterised features of the rest of the *athalia* group of species, and precisely to those of *athalia*; this is exactly what one sees also in the general aspect of the individual variations of the species in question. There only remains to complete these remarks by recalling that Dr. Suschkin, in the *Zeit. für wissenschaft. Insektenbiol.*, 1913, p. 323, has described and figured the genitalia of specimens from Charkow, in Southern Russia, the Southern Ural and the Tarbagatai, which exactly agree with those we are dealing with, as illustrated by Reverdin some years later.

One can conclude from what I have said above that this specific group consists in a chain of races stretching from Kamtchatka and probably from Corea, across Amurland and southern Siberia, to Russia, and finally to Piedmont. The apparent gaps along this very long route are no doubt chiefly due to the difficulty of separating it from *aurelia* without examining the genitalia, so that it has been overlooked. Now, a most fundamental information is furnished by Suschkin: the specimens whose genitalia he has examined were captured by himself at Charkow and in the Tarbagatai flying in company with *athalia* and in the Southern Ural with both *aurelia* and *athalia*. This seems to do away with any possible doubt in connection with the specific distinctness from these two species, but the fact that they have all three spread from the Pacific to Piedmont along the same Northern route and they inhabit the same sort of localities would have been a sufficient proof, even if nobody had actually seen them together.

With regard to the name this specific group should bear, we find that Suschkin uses that of *britomartis*, Assmann. One does not feel fully satisfied at having to bring in a name which has been a puzzle for nearly a century and which has been the cause of considerable confusion. Nevertheless, after reading the original description and the important remarks Lederer makes five years later in his *Lepidopterologisches aus Sibirien (Schriften zool.-bot. Vereins, 1853)*, p. 7, on comparing some specimens collected by Kindermann in the Altai with one of Assmann's male "co-types," I can only say there is no mistake about it and that the *Melitaea* of southern Siberia which are similar to the one figured by Reverdin under the name of "*kenteana*" are *britomartis*. Suschkin gives no description of the general appearance of his specimens, but their genitalia are exactly like those illustrated by Reverdin, as I have just said, so that he was perfectly right in applying that name to them. As he has found specimens with genitalia of this sort as far west as Charkow, this brings them comparatively near to Breslau, whence *britomartis* was described, and the exactly similar genitalia of *aureliaeformis*, Vrtý., of Turin, carries them still further west. It is quite comprehensible that nearly no one, except Lederer, Zeller, Rühl and Suschkin, should have been able to make out the real *britomartis*. Even Rühl only accepted it as a variety of *aurelia* and Suschkin was the first to discover its real specific characteristics in the genitalia and to prove their value by his observations on the field. The way I have become acquainted with it is instructive: the series from Tunkinsk, I have already spoken of, I

received from Bang-Haas under the name of *aurelia* and other specimens from Chulugaisha, m. 2600, in the same eastern Sajan, I picked out of a large series of the small and very dark race *erycina*, Lederer, of *M. dictynna*. This shows how some *britomartis* are exactly similar to *aurelia*, whilst others recall the look of *dictynna* to a remarkable degree, although the genitalia are perfectly constant and characteristic and prove there is no real transition between these species. It is a fine example of the repetition of characters of major groups on a lesser scale in their later subdivisions, which is apparently a general law, as I have pointed out in my papers on the *Zygaenae*, on the *Anthocharidi* and on other Lepidoptera. This phenomenon has often led systematists wrong and one finds groups and forms, which resemble each other, grouped together as though they were related in a direct way, whereas they are the result of parallel variation and repetition of features and their real connections are earlier and must be looked for in stages which have now, on the contrary, a different aspect.

Assmann, Lederer and Rühl have, all three, found it necessary to introduce *dictynna* as a term of comparison of two or three features in their descriptions of *britomartis*. Lederer points out particularly the elongated wings, with a sharper apex and a straighter (less convex) outer-margin and this shape is certainly striking in the individuals which resemble *dictynna* most. Other characteristics in the original description are: the rich, dark and dull tone of the fulvous (this is accentuated in the more *dictynna*-like individuals, the opposite extreme being quite as in *aurelia* and the former tone existing occasionally also in the latter species, though it never is as dull); the fulvous of the underside of the forewing is, as a rule, darker too, as in *dictynna*, and the spotting stands out very boldly and sharply, as in the latter; the russet spots across the hindwing are of a deep tone and very often contain a black or, at least, a darker central spot (I should say this is lacking in about half the individuals and sometimes even in those which, otherwise, are like *dictynna*); the space between the two capillary marginal streaks is always filled with a "darker" colour and its intensity varies according to that of the russet spots and bands (this is a most useful feature to separate *britomartis* from *aurelia* and *athalia* at first sight, when it exists and the colour is reddish, but in my Asiatic specimens it is in some cases reduced to pale yellow, such as is now and then seen in *aurelia* too, and in the Turin race, which is always of the *aurelia* aspect, also that marginal colour, is exactly as in the latter and the peculiarity fails one).

(To be continued.)

Field Notes from Northern Rhodesia.

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

II. CHISORWE, LUANO VALLEY. March 3rd, 1928.

This Luano Valley is a remarkable place. It is sharply different from the open plateau of the country around, sunk abruptly nearly 2,000 ft., separated by a sharp cliff-like escarpment; it has a different climate, a substantially different flora, and a distinctive fauna. During the rainy season the climate is like that of the palm house at Kew; the breezes pass over the top, as do many of the

storms. February is said to be the wettest month but we have been lucky this year, with only three rainy days, though that is bad for the mealie harvest for the scattered villages.

Along the low ground there is the matted jungle called the Lusaka Bush, of which the local folk say it is better to go three miles around than half a mile through. On the more sandy ground and pebbly country at higher levels this jungle cannot grow and vegetation thins out; here the dominating tree is *Copaifera mopane*, so this type is called the Mopane Bush. The mopane grows to a respectable size, has a rough, grey corrugated bark and twin leaves like butterflies; it affords a home to a number of interesting insects including several remarkable Orthoptera.

The first is one of my old favourites the *Eumastacidae*. I have noticed the nymphs about in the bush and that they have a preference for exalted situations; I often see them sitting high up on my tent ropes or on my towels drying on a tree, but for a long time came across only isolated specimens. Then one day I found a number of cast skins lying on the big leaves of the undergrowth; still this did not give me the clue I wanted. But one evening I found them. In the neighbourhood of the camp are a number of stumps of mopane that have been felled for timber and on these I found a number of these curious little grasshoppers, adult about the end of February. They sit on the leaves and on the stems of the leaves; in the latter position they are well hidden, as the dark back, with short elytra, harmonises with the twig and the bright green long hind femora, always at right angles to the body, have the air of stems of leaves. They are extremely active and when disturbed or on the approach of an enemy, they leap like an arrow out of a bow; I have never seen one open its somewhat abbreviated wings, and they fall to the ground, but an adult will clear a distance of two and a half yards with ease. Still, by carefully watching for them in the evening, especially for the shadow showing through the leaf against the sun and by using a butterfly net instead of a sweep net, I have been able to catch plenty. In the nymph, the scales of the future elytra may be dark or green but I have not seen an adult with anything but dark elytra; another curious point is that in the nymph, in which green is the dominating colour, though often varied with blackish, the face is almost invariably black, and this black remains prominent on the empty cast skin, but I have not seen an adult with a dark face. Nearly every day I see one of them slowly climbing up the trunk of a mopane towards the foliage, doubtless recovering a position lost through a leap.

A second species of the same family also occurs on this tree, but not often and I am by no means sure that it is its normal station; this is a *Thericles*, closely resembling the common species which is numerous on the low herbage, but somewhat larger, with different pronotum and armature of the posterior femora; individuals are scarce, but all that I have found have been sitting on leaves of mopane at a height of five or six feet above the ground.

Another interesting denizen of the same tree is a very curious Acridian, *Mecostibus* sp., or an allied new genus. I had come across isolated specimens, all found on the trunks of a mopane, and once or twice on my towels, and was struck by their assimilation to the bark. One afternoon Pavel Stepanovich called my attention to something

moving on the trunk of a big tree; I went up and saw that it was a lizard, which instantly disappeared; but there an inch or two in front of it was a stout Acridian, incredibly harmonising with the bark, dark, stumpy, totally apterous, with lumps on the pronotum; he was sluggish and I pulled him off with my fingers; he stuck obstinately and then bit me sharply, the acrid juice expressed from the mouth making the place sting for an hour or two. A few days later I came across a pair *in copulâ*, on a low mopane shrub. The male is about half the size of the female, paler in colour, smoother, without the excrescences and with bright green posterior femora, and the long slender tarsi are bright red; he clings tightly to the back of the female. It was when hunting for the Eumastacid that I found the manner of life of this curious grasshopper with ungrasshopper-like habits; it sits clinging tightly to the twigs and branches of the mopane; it is extremely hard to distinguish. I look carefully along the branches till I see an excrescence against the sky, an increase in diameter, and then pick it off; it holds on very tightly. When it sees me approaching, it rotates in an instant round the twig, always keeping the wood between itself and me, just as a grasshopper in the grass; it seldom leaps, and not far and is easy to pick up. I have taken one male, and seen one other which succeeded in escaping me, with a bold chequer pattern in black and white along the flanks. I have detected them, as a swelling on a twig, at a height of twenty or more feet above the ground, with field glasses and only definitely recognised them by the antennæ. To be quite sure, I sent a nigger up the tree and he shook it down. I have no doubt they are numerous on the higher branches.

Another species which I find on the tree is the handsome grey Pseudophyllid referred to previously, I believe a species of *Cymatomera*; its greys and mottlings harmonise so as to make it almost invisible; the legs are tucked away closely and the long antennæ stretched straight out along the wood. It is only visible as a flat excrescence except when it makes a mistake; this it seems often to do for on several occasions I have found it on leaves and on grass and on low herbage, always apparently sound asleep in the evening. It is noteworthy also that I have found only females. I think it is also an arboreal creature and of nocturnal habits and should be looked for at night among the branches of the trees, quite a difficult task.

The Mopane Bush is not a jungle but fairly open woodland and in the dry season, I am told, the undergrowth withers and leaves the ground bare. This accounts for the presence here of *Lamareckiana* a Pamphagid which I was surprised to find in numbers on the low herbage, climbing up to a height of about a couple of feet and resting on the stalks of plants during the heat of the day. He too has afforded me a surprise. When held in the hand, it moves its hind legs to and fro and so produces a squeaky stridulation, evidently a protest; the surprising thing about this is that during the motion there is clearance between the legs and the sides of the abdomen, the only contact being at the joint itself. The female does the same thing.

This led me to test other Orthoptera and I find a couple of species of *Cataloipus*, occurring in long grass, one a handsome fellow in black and green, the other in brown and yellow with a little green. I can get no sound out of the female, but the male squeaks a faint protest when held in the hand; but the remarkable thing about this is that he produces

the sound when all the legs are held immovable; that is to say, he has a sound-producing apparatus independent of the legs; the faint squeaky sound appears to come from the inside of the creature.

Locustids are appearing more in evidence. *Conocephalus* is now adult, flying freely in the high grass; an occasional brown specimen is, perhaps, due to the earliness of the dry season this year. For several weeks a rather large spidery Phaneropterid has been common in the low herbage; the female is very different from the male in tint and shape and is also wingless, but I have no doubt about their relationship. There are also a very small and a medium sized species of *Phanoptera* probably *Zemmeria*, and another genus, remarkably compressed probably *Eurycorypha*, only appears to light, at dinner time. I have never yet seen it at any other time nor taken it under other circumstances. I expect it is arboreal and nocturnal in habit; there are two species, differing slightly in details of elytra, ovipositor and tint. There is also a fine handsome species with golden yellow wings, of which I have taken two flying in the evening on high shrub in the Lusaka Bush, the only species that I have noticed as haunting that dense jungle.

On the more open stony ground of the Mopane Bush there are several species of Acridian; where the grass and herbage happens to be a little thicker there are the two species related to the *Thisoicetrus* mentioned above and hopping clumsily among the roots a heavy, brachypterous creature *Aerophynus*, resembling *Paracaloptenus*, which started copulating at the end of February. *Gastrimargus* flashes its yellow and black wings occasionally, and there are plenty of an *Acrotylus*, probably *A. patruelis* that we have in southern Europe and I took in Angola as well. There is also a very small Stenobothrid grasshopper and a somewhat larger species with abbreviate elytra and wings notable for the bright red tip of the abdomen (apparently of a new genus). In the grass and herbage there is an *Aulacobothrus* with fawn elytra and red legs which is abundant.

As to Mantids, a small spidery *Ligaria* runs nimbly and hops and takes short flights on the pebbly ground; another somewhat bigger pearl grey species flies commonly to light; I took one in the act of oviposition; she lays her eggs on a stem of grass, in a series of rows in échelon, smearing them with a frothy substance exuded from her abdomen which quickly hardens, leaving a long oval pale lump on the grass resembling the cocoon of a burnet moth but longer and more slender. I noticed that while at work her cerci took no part in the operation, but the styles of the subanal plate were used as a trowel to smooth the paste. The green Mantid larvae have been rapidly growing and taking to higher positions on the vegetation; when quite small they were low down in the grass; when in the nymph stage I found them on the leaves of big bushes and small trees, always with abdomen tucked over their backs as though for balance; they are very nimble and on the approach of danger slip round to the other side of the leaf to hide; on March 2nd I took the first adults, in which the abdomen is held horizontally.

Another characteristic but not very common creature is a big locust like *Oenithacris*; the female is a splendid insect. The remarkable thing about them is that the dominant colour is bright green, and I am waiting to see this replaced by buffs and yellows when the dry season is really with us.

The little brook called Chisorwe which supplied us with water is in flood after a few days rain but dries rapidly in fine weather, leaving a few pools interspersed with banks of sand and of mud. Here on the sand I take a blue-winged *Cenipoda* just like our common European *Sp. caeruleans*, a pink-winged *Acrotylus*, probably *A. patruelis*, another small Oedipodid with yellow wings banded with black and also the red-winged form of *Morphacus sulcata*, a generally distributed African Oedipodid with several colour varieties. On the muddy banks there are quantities of a rather large *Tettix* (or *Acrydium*) of the long type, like *T. subulatus* and one or two of the thick-set form like *T. bipunctatus*. On the wet mud there are plenty of *Tridactylus*, a fully winged form which seems to me somewhat different from the European *T. variegatus*. I am wondering what happens to these little creatures when the river is in flood. The winged forms can clear off to the neighbouring banks, but the water rises high and rapidly. I should not be surprised if these minute *Tridactylus* find a refuge under stones and remain under the water. I have never seen them on dry mud and they seem to be semi-aquatic.

But probably they save themselves by flight, as I have been surprised on some evenings to find them landing on our dinner table, illuminated by an acetylene lamp. It is curious that some evenings we get many aquatic creatures, as *Gerris* and *Corixa* and a few water-beetles; but *Tridactylus* was certainly a surprise as a night and light flyer. This makes its occurrence in widely isolated boggy patches understandable. Its neighbour *Tettix*, of the *subulatus*, slender, type of body often accompanies it. The heavier, *bipunctatus* type, is much less mobile and more usually brachypterous.

Earwigs are scarce. I have taken but two specimens here so far, both common African forms. One *Diaperasticus erythrocephalus*, Oliv., of which a few fly to light, is distributed throughout the continent south of the Sahara; the other *Forficula rodziankoi*, Sem., is the large dark East African race of *F. senegalensis*, which has also a general Ethiopian distribution. It is regarded as a savannah form and is scarcely known from the forest regions of the Congo, but this Luano Valley is certainly a forest. I hope luck and patience will bring me some of the specially interesting African earwigs which are rare in collections and seldom represented by more than a few odd specimens.

Macro-Lepidoptera of a Gloucestershire Garden.

By J. F. BIRD.

I have, in a previous paper, recorded the Lepidoptera of a Gloucester garden (*Ent. Rec.*, Vol. XL., p. 105), and for comparison now propose to give an account of the Macro-Lepidoptera met with in another garden, which is three miles further out into the country, and almost half-way between Gloucester and Cheltenham. What a difference a few miles out from a town can make, entomologically! The Macros observed in the Gloucester garden only numbered 135 species; whereas here, in my present garden, I have recorded, since March, 1927, no less than 210, or a quarter of the Macros to be taken in the British Isles. I do not think this is a bad total for so small an area as $1\frac{1}{2}$ acres, half of this being a small paddock which, by the way, has

only contributed to the list that follows two species not yet seen in the garden, *i.e.*, *Xylophasia hepatica* and *Euclidia glyphica*.

I might mention here that 107 of the insects recorded below have been attracted by light; these I have marked with an asterisk.

RHOPALOCERA.—*Pieris brassicae*; *P. rapae*; *P. napi*; *Euchloë cardamines*. *Colias croceus*, the first in my garden on August 11th, 1928, and several others observed the same year, up to August 30th, flying about the railway bank, which borders my garden and field. *Gonepteryx rhamni*. *Rumicita phlaeas*, common in 1929, especially the 2nd brood which frequented the flowers in the garden up to September 27th, showing a preference to the Michaelmas daisies; but in the five preceding years this butterfly was apparently very scarce in this part of the country as I only noticed two specimens during that period. *Polyommatus icarus*; *Lycaenopsis argiolus*. *Polygonia c-album*, not common, but a few seen in the garden and neighbourhood every year. *Aglais urticae*. *Vanessa io*, usually not uncommon, but I did not see a single specimen during 1929, and it will be interesting to know if this butterfly was absent or scarce in other districts. *Pyrameis atalanta*. *P. cardui*, a number seen in 1928, the last in the garden on October 3rd, going to the Michaelmas daisies. *Pararge aegeria*. *P. megera*, a fresh example of a 3rd brood, a ♂, was observed in my field on September 27th, 1929. *Epinephele jurtina*; *Coenonympha pamphilus*; *Adopaea flava*; *Angiades sylvanus*.

SPHINGIDAE.—*Amorpha populi*. *Theretra* (*Metopsilus*) *porcellus* (26 vi. 29 to 13 vii. 29), a few ♂'s only, netted at dusk off *Centranthus ruber* and campion (*Silene inflata*). *Eumorpha elpenor* (12 vii. 27), one very worn ♀ netted off *Centranthus*, which I boxed hoping to obtain a few ova, but the only two laid proved infertile. *Macroglossum stellatarum*, several in 1928, the first on July 16th and the fresh brood from September 4th to October 30th.

NOTODONTIDAE.—*Cerura bijida*, a few larvae on poplar showing a remarkable likeness, in both form and colour, to the leaves curled up and reddened by the attacks of Aphides. I also found a freshly emerged ♀ at dusk on June 13th, 1928, drying her wings above the cocoon which was situated at the base of a small poplar, a few inches from the ground. **Dicranura vinula*, **Pheosia tremula*, one at light in July, 1927.

LYMANTRIIDAE.—*Orgyia antiqua*; *Dasychira pudibunda*; **Leucoma chrysoorrhoea* (*similis*). *Stilpnolia salicis* (19 vii. 29), a ♀ flying round poplars at dusk.

LASIOCAMPIDAE.—**Malacosoma neustria*; **Poecilocampa populi*; **Cosmotriche potatoaria*.

DREPANIIDAE.—**Cilix glaucata*.

NOLIDAE.—*Nola cucullatella*.

ARCTIIDAE.—**Diacrisia menthastri*; **D. flava* (*lubricipeda*), *Diaphora mendica*; *Arctia caja*; *Hipoerita jacobaeae*. **Lithosia griseola* and *L. lurideola*, both scarce.

NOCTUIDAE.—**Acrionicta megacephala*; *A. psi*; **Metachrostis* (*Bryophila*) *perla*. *Agrotis segetum*, I think it is worth recording that I bred a ♂ on January 17th, 1930, which I believe is a very unusual time of the year for this moth to appear, even in a breeding cage. *A. puta*; *A. nigricans*; *A. tritici*; **A. exclamatoris*; **A. ypsilon*; **Noctua augur*; *N. c-nigrum*; **N. triangulum*; *N. festiva*; **N. rubi*;

N. umbrosa; **N. xanthographa*; **N. plecta*; **Axyليا putris*; **Triphaena comes*; **T. pronuba*; *T. fimbria*; **T. janthina*. *Aplecta advena*, appeared for the first time in 1929, when I obtained a short series netted at dusk off *Centranthus ruber* and *Hesperis matronalis* (Dane's Violet), between June 19th and July 21st. **Mamestra brassicae*; **Hadena oleracea*; **H. genistae*; **H. thalassina*; **H. pisi*; *H. nana* (*dentina*); *Dianthoecia capsicola*; *Hecatera serena*. **Epineuronia popularis*, the ♂'s swarmed at light in August and September, 1929, all being very typical, as were two of the three ♀'s which also turned up, the exception being a very nice ♀ with smoky-black hindwings and abdomen. **Charaas graminis*; **Diloba caerulescephala*; *Luperina testacea*; **Cerigo matura*; **Apamea obscura* (*gemina*); **A. basilinea*; **A. secalis*; **Miana strigilis*; *M. bicoloria*; **Xylophasia lithoxylea*; **X. monoglypha*; **X. hepatica*; *Polia chi*; **Asteroscopus sphinx*, two at light in November, 1927. *Phlogophora meticulosa*; **Mania maura*; *Naenia typica*; **Hydroecia nictitans*; **H. micacea*; **Ochria ochracea*; **Lencania pallens*; **L. impura*; **L. comma*; **L. lithargyria*; *L. conigera*; *Grammesia trigrammica*; **Caradrina morpheus*; **C. alines*; **C. taraxici*; *C. quadripunctata*; **Rusina tenebrosa*; **Amphipyra pyramidea*; **A. tragopogonis*; **Taeniocampa gothica*; **T. incerta*; **Cosmia affinis*; **C. diffinis*; **C. trapezina*. **Tethea subtusa*, two at light in 1929. **Cirrhoedia verampelina* (8 ix. 29), one beautiful specimen at light. **Amathes lota*; *A. circellaris*; **A. lychnidis*; *Xanthia fulrago*; *Scopelosoma satellitia*; *Xylina ornithopus*: **Xylocampa areola*. *Cucullia umbratica*, not seen until 1929, when it was most abundant at flowers in the garden at dusk. *Pyrhnia umbra* (16.vii.29), one netted off *C. ruber*, and I think I missed another on June 26th, the same year. *Scoliopteryx libatrix*; *Plusia moneta*; **P. chrysis*. **P. bractea* (1.viii.28), one at light, and so far as I have been able to ascertain this moth has not been recorded for Gloucestershire before. **P. pulchrina*; *P. iota*; **P. gamma*: *Abrostola tripartita*; *A. triplasia*; *Euclidia glyphica*. *Catocala nupta*, the larvae sometimes abundant on the poplars. *Laspeyria flexula* (16.vii.28), one netted at dusk. *Zanclognatha tarsipennalis*; *Z. grisealis*; **Hypena proboscidalis*.

GEOMETRIDAE.—*Alsphila aescularia*; *Hemithea aestivaria*; **Calothysanis amata*; **Scopula imitaria*; *Sterrha dimidiata* (*scutulata*); **S. seriata* (*virgularia*); *S. subsericeata*; *S. bisetata*; *S. trigeminata*; **S. aversata*; **Larentia clavaria* (*cervinata*); *Ortholitha chenopodiata* (*mensuraria*); *O. bipunctaria*; *Anaitis plagiata*; **Acasis viretata*; **Oporoptera brumata*; **Oporinia dilutata*; **Triphosa dubitata*. *Philereme vetulata* (19.vii.28), once. *Lygria pyrralia*; *Lycometra ocellata*; *Plemyria bicolorata*; **Chloroclysta miata*; **Dysstroma truncata*; **Xanthorhoe fluctuata*; *X. montanata*; *X. spadicearia* (*ferrugata*); **X. ferrugata* (*unidentaria*); **Euphyia bilineata*; **E. silaceata*; **E. rubidata*; *Epirrhoë alternata* (*sociata*); **Perizoma bifaciata*; *P. flavofasciata* (*decolorata*); *Hydriomena furcata*; **Farophila badiata*; **Eupithecia exigua*; **E. centaureata*; **E. assimilata*; **E. vulgata*; **E. icterata* (*subfulvata*); *Gymnoscelis pumilata*; **Chloroclystis rectangularata*; *Abraxas grossulariata*; *Lomaspilis marginata*; *Ligdia adustata*; *Cabera pusaria*; *C. exanthemata*. **Deuteronomos fuscantaria* (11.ix.29), once. **Selenia bilunaria*, and f. *illunaria*; **Gonodontis bidentata*; **Colotois pennaria*; *Crocallis elinguaris*; *Ouvapteryx sambucaria*; **Opisthograptis luteolata*; **Epione repandaria* (*apiciaria*); **Theria*

rupicapraria; **Erannis marginaria*; **E. defoliaria*; **Phigalia pedaria*; *Hemerophila abruptaria*; **Boarmia rhomboidaria*; **B. repandata*. **Ematurga atomaria*, the first brood, appearing in April and May, are yellower than specimens I have taken from other localities, while the second brood, on the wing in July, are more like the ordinary type. *Itame wauaria*; **Chiasmia clathrata*.

In conclusion, it may be interesting to note that the following moths, recorded in the Gloucester garden, have not yet appeared in the garden here:—*Smerinthus ocellatus*, *Mimas tiliae*, *Pterostoma palpina*, *Pygaera bucephala*, *Gonophora pyritoides (derasa)*, *Pharetra rumicis*, *Hadena dissimilis*, *H. trifolii*, *Mamestra persicariae*, *M. sordida*, *Xylophasia rurea*, *Euplexia lucipara*, *Taeniocampa stabilis*, *Pseudoterpna pruinata*, *Calocalpe cervinalis*, *Lygris mellinata (associata)*, *Eupithecia subnotata*, *E. innotata r. fraxinata*, *Horisme tersata*, *Bapta temerata*, and *Biston betularia*.—EASTHOLM, CHURCHDOWN, GLOS.

New Forms of British Species of Lepidoptera.

In the *Mitt Münch. Ent. Gesells.*, for 1927 the following new forms are introduced.—

1. *Pieris napi* ab. *marginestixis*, described by Franz Dannehl, "Among the pale summer forms *nepaeae* and particularly in the *meridionalis* race in the females, here and there examples occur, which without the least increase of powdering of the veins of the hindwings, have a row of more prominent, submarginal, streaklike spots across the ends of the veins. This row of spots stands out strongly in the otherwise pure white surface of the wings." S. Carpathians and Campagna Romana.

2. *Leptosia sinapis* ab. *simbruina*, Dnhl. A local race of the Sabine and Simbruine Mts. Closest to Stauder's *stabiarrum* from the S. Italian Mts. Comparatively large, but not approaching the Dalmatian race. The milk white is characteristic, in which in the males of both generations equally sharply margined and nearly round apical spots and somewhat short but thin deep black costal margin cloud stands at the base, while the females are completely markingless, and in this distinguished from *diniensis* that they possess in both generations a curve of pale grey scales mostly broken up into single spots. The apical spots are milky white without black shaded inner spotting worth mentioning and not divided by the veins.

3. *Leptosia sinapis*, L., gen. vern. *lathyri*, Hb. race *pseudodiniensis*, Pfeiff. *Mitt. Münch. Ent. Gesell. l.c.* 35. Comparable to the S. European summer form. The chalk mountains of Inner Anatolia, Asia Minor.

4. *Callophrys rubi*, L. race *herculeana*, Pfeiff. *l.c.* 40, ♂♂ 31mm., ♀♀ 33mm. The outstanding characteristic is the large size.

5. *Euchloë cardamines*, L. subsp. *septentrionalis*, Wnkwsky. *l.c.* 70. Smaller, h.w. below greenish-grey, the white colour divided into minute white spots, slightly larger orange apical blotch. ♂ 36mm. N.E. Siberia.

6. *Euvanessa antiopa*, L. subsp. *borealis*, Wnkwsky. *l.c.* Slightly smaller, 53-55mm. N.E. Siberia.

7. *Dryas paphia*, L., ab. *pusilla*, Wnkwsky. l.c. 71. Much smaller. 50mm. Tomsok.

8. *Agrotis triangulum*, Hfn. ab. *obscurior*, Salzl., l.c. XVIII. 62 (1928). Resembles *A. stigmatica* in a striking manner by the chocolate ground and clouding of both fore- and hindwings, but distinguished from it by the usual markings of *triangulum*.

9. *Phragmataecia castaneae*, Hb. ab. *melaina*, Daniel, l.c. 82. Sooty-black forewings, lighter ground colour along the veins. Hungary.

NOTES ON COLLECTING, etc.

HYLOICUS PINASTRI.—I have never come across this species in England but have done so many times on the Continent and perhaps some notes on its habits there may be of interest. In my experience the moth is rather a mountain species and, as far as Britain is concerned, I should have expected it to have made its home in Scotland rather than in the lower land of Suffolk and the south of England.

Curiously I have never found the moth at rest on *Pinus sylvestris*, but many times on *Abies alba* or on *Picea excelsa* and usually about six feet from the ground. These moths do not always, however, choose tree trunks on which to rest. One I found on the plank of a shed at St. Vincent in Piedmont, one on the white wall of a cottage at Campo Taures in the Alto Adige, 2,900 feet. One on a curtain in a bedroom at Disentis, July 14th, 1928 (over 3,800 feet). The earliest date I have is May 27th, 1929, when two moths were found at rest, close together, on a spruce fir at Rheinfelden, Switzerland, about 900 feet. Another also on spruce fir near Zurich, over 1,200 feet, June 8th, 1921. At the end of July, 1923, this species was fairly common on the Bürgenstock, 2870 feet. I saw one which I was able to identify flying rapidly, one evening, in bold curves about an electric light, on the roadside at the edge of a fir wood. It was here also that I had the pleasure of seeing some half-a-dozen moths hovering over a bed of petunias. They reminded me more of *Macroglossum tellatarum* in their manner of feeding than of *Sphinx ligustri*.

The larvae of *H. pinastri* are most frequently observed when full grown and about to pupate. In this stage they may be seen wandering over the brown needles that cover the ground in the fir forests. As far as my observations go, it is only in the smaller woods, or in the outskirts of the forests that one meets with them in this way. In fact, I have never found either moth or larva in the inner, denser and darker parts of the forests. I think I have seen the larva, in the stage above mentioned, in July, but the earliest date I have is August 14th, 1928, at Disentis, and the latest October 10th, 1923, at Meran.—ALFRED SICH (F.E.S.).

EUCOSMA QUADRANA, HÜBN., IN SOUTH HANTS.—On May 6th I found this local Tortrix flying freely and in considerable numbers in the Great Cover, near Southampton, at a spot where last year I had taken a few odd specimens. The evening was dull, threatening rain and thunder, and not very warm. The moths began to fly at about 5.30 p.m. and were still flying freely at 7.30 p.m. summer time. They

settled frequently on last year's dead stalks of golden rod, but although scabious occurs in the same place, no single moth was disturbed from it, nor did I see one settle on a dead stalk of scabious, or on a living plant. I observed females several times settle on young leaves of golden rod, and these moths invariably dropped when I attempted to box them.—WM. FASSNIDGE (M.A., F.E.S.).

CURRENT NOTES AND SHORT NOTICES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.—Nearly ten years ago the Entomological Society of London at the instigation of a few enthusiastic members led by Mr. W. G. Sheldon took a "plunge," as it were, into the clouds. The Annual subscription was doubled, funds were gathered by donation and loan and nearly £10,000 were spent on permanent freehold premises almost under the shadow of the Natural History Museum. Some Fellows saw not only failure, but disaster ahead and held their enthusiasm for the Society somewhat in check. However the unexpected happened; instead of losing Fellows by the doubled subscription, membership increased rapidly and within half a decade the society had repaid its borrowings and now as a whole looked forward to a splendid accomodation for their library and a meeting room second to that of no scientific society in London, its own inalienable property. Under the great Treasurer's care and skill fresh funds accumulated and at last the Council agreed upon a building programme for the long dreamed of ample, sufficient accomodation for all the energies of the Society. At this juncture, an old enthusiastic supporter of the Society, Mr. R. Wylie Lloyd came forward with a grand offer to panel and fit the meeting-room as a copy of the wonderful old Bromley Room one of the gems of decorative interior architecture now in the National Science and Art Museum at South Kensington. This splendid offer was finally accepted and, in spite of various great difficulties, the whole project was successfully carried through and on the evening of May 7th a very large gathering of Fellows and friends assembled at the opening ceremony when the Right Hon. Christopher Addison, M.D., M.P., Parliamentary Secretary, Ministry of Agriculture and Fisheries, declared the meeting room and library open. The President, Dr. Karl Jordan, was in the chair and in a short address urged the pursuit of entomology as an economic necessity.

At the close of the meeting light refreshment was served in the old library and the company, after admiring the beautiful room in detail and the new library and its fitments, gradually dispersed. It was noticed with much satisfaction the acoustic properties of the room were all that could be desired. This is always more or less an unknown factor in any new meeting room. For the first time in its long history of nearly a hundred years the library can now be consulted with ease and comfort. The new officer, Registrar, has the whole library at his finger tips. Accommodation ventilation and lighting are a great contrast to the old room at Chandos Street where one almost wanted a bath after a few hours laborious and often unrewarded search among the inadequately housed and necessarily ill-arranged dusty volumes.

To mention names is perhaps invidious, but one cannot close this note without referring to Dr. Neave, the ever present and ever ready Hon. Secretary, who never ceased to think during the years of growth and advance, to suggest without force, to carry out amicably and well every desire of the Council, and to step into any emergency with real and efficient effect.—Hy.J.T.

We were extremely pleased to see the name of Dr. Guy A. K. Marshall, C.M.G., D.Sc., F.R.S., F.Z.S., F.E.S., in the recent-list of Birthday Honours, as a recognition of his work in Entomology. Entomologists have received honours before, but not as entomologists, and we have the greatest pleasure in congratulating Sir G. A. K. Marshall for his really well-merited honour.

The *Int. Ent. Zeit.* for Feb. 22nd, contains a list of the *Noctuidae* occurring in Wurttemberg and Hohenzollern by C. Schneider, and a morphological account with two plates of the hybrid of *Valeria oleagina* and *V. jaspidea*.

In the *Bull. and Ann. Soc. Belg.* Feb. 1930, M. Dufrane has attempted to unravel the species of *Nepticula* alleged to be attached to the willows of Belgium. The species are *N. salicis* with its ab. *februella* and another form which he has named ab. *crombrugheella*, in which the white band of the typical form is much restricted in width in its center, *N. intimella* and *N. rimineticola*. He suggests that possibly three further species attached to the sallows might be sought, viz. *N. uniformis*, *N. obliquella* and *N. dewitziella*, all found in the central plain of Europe.

The December number of *L'Amateur de Pap.* contains a list of the Rhopalocera of Tonkin.

The *Ent. News* for March contains a record of the assemblage of no less than 82 specimens of the male Saturniid moth *Telea polyphemus* by two caged females on the night of July 10th, 1929, in Fredericktown, Ohio. It also contains an account, with 3 plates, of the American Museum of Natural History, New York.

Messrs. Standinger's *Series List* is to hand. It contains offers of useful sets of Lepidoptera illustrating different phases in Biology. Sexual Dimorphism: pairs of species from S. America, Africa, Indo-Australia. Protective Resemblance: a similar set of undersides. Warning Colours: species of the most striking and obtrusive coloration. Mimicry: pairs of species, including both moths and butterflies. Day-flying Moths: moths of general butterfly habits and appearance. The sets of Palaearctic butterflies are also useful to collectors of Continental material as furnishing an opportunity of obtaining species and forms of the more eastern part of the region.

In Heft 1 of the *Deut. Ent. Zt.* of the current year, Dr. M. Hering, whose work on the mines of insects we reviewed some while ago, announces, describes and figures the discovery of an Agromyzid (Dipt.) mine as a fossil from the Tertiary deposits at Dysodil of the Upper Miocene formation. Incidentally the writer refers to the record of the mine of the *Nepticula fossilis*, Heyd. (Lep.) The note is illustrated by a plate and a text figure. There is also a description, in the same part, of a new *Leucania*, *L. selfersi*, from Berlin-Charlottenburg, with a fine coloured figure.

Parts 9 and 10 of the Supplement to Vol. I. of Seitz Palaearctic Rhopalocera are to hand. They contain the completion of the refer-

ences of the Pierid section, the portion dealing with the *Danaidae*, and the *Satyridae* additional up to page 114 in the main work, concluding the genus *Erebia*. Plates 12 and 13 are issued with these parts. The genus *Erebia* is dealt with by v.d. Goltz, who expresses the difficulties of collecting the details of these new forms which are scattered in the literature of so many peoples. Another great difficulty he states tersely as follows. "The author [of a new name] is responsible for the nomination of a form and the preciseness of its description, and not the editor. In some cases it has not been possible for me to ascertain exactly which form an author has actually intended with his denomination. This applies particularly to the diagnoses of *Fruhstorfer*, which are often genially exact, but often are based on insufficient material and so imperfectly described, that they drive a conscientious reorder to desperation." The italics are ours. In passing he pays tribute to the *Noritates* of O. Bang-Haas which aid research to a very great extent. The compiler points out the absence of knowledge of the earlier stages of the *Erebia*, which are almost without exception high mountain species, and are probably a "primeval genus," which existed before many of the old land connections were broken through. This supplement is not a mere list with short diagnoses, but will form a valuable and suggestive addition to the original work.

The February number of *Lamb.* is an equally good and useful part. There is a photographic plate of three forms of *Apatura*, one of *A. iris* and two of *A. ilia*, another portion of the Catalogue of Belgian lepidoptera, a list of addenda to the Catalogue of Geometrides recently issued, with other interesting matter.

In the *Amateur de Pap.* Vol. V. no. 1. M. Stempffer continues his notes on the French *Lycaenidae* and in this number considers in detail the variation in *Polyommatus thetis (bellargus)*. The status of *polonus* is discussed and the evidence of the chief authors is stated.

The *Int. Ent. Zt.* for March 22nd contains a further contribution from Fritz Wagner on the Lepidoptera of the interior of Anatolia, with the help of O. Bang-Haas, Dr. Corti, Dr. Rebel and Dr. Zerny. There is a plate of 19 figs. of new species and forms.

The *Can. Ent.* for February contains a long article on the Distribution of Coleoptera with new additions to the Fauna. The wording on the cover would lead one to suppose that something serious had happened to the state itself.

The *Zeit. Oestr. Ent.-Ver.* for March contains a useful plate illustrating various aberrations in the Collection of Dr. M. Kitt of Vienna: *Cidaria alternata (sociata)*, *Boarmia punctularia*, *Abraxas marginata*, *Boarmia luridata*, *Lygris pyraliata (dotata)*, etc. Dr. Schawerda's account of his Corsican captures and observations is still being continued.

Lambillionea for March gives two further plates (1) of aberrations of *Pieris napi*, *P. rapae*, *P. brassicae* and *Euchloë cardamines*, which have already been described in its pages; (2) a plate of genitalic details to illustrate an article by Comte Bentinek on *Lithosia lutarella*, *L. pallifrons* and *L. pyracola*, and also of *Caradrina quadripunctata*, etc.

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalin aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), gothicina forms of gothica and selected unusual forms of incerta, *gracilis* and *munda*.—*A. J. Wightman, "Aurago," Bronfields, Pulborough, Sussex.*

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (Friv) type, *eroides*, *anteros*, *Melitaea trivialis*, *Melanargia larissa*, *Coenonympha oedipus*, *leander*.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

A copy of: Schrank, Enumeratio Insectorum Austriae. 4 plates; 1781. Leather binding (back repaired); recently catalogued at 30/-. This copy belonged to Stephens, and bears his autograph with the date 1821. Any fair offer accepted.—*B. C. S. Warren, 14, Av. de l'Eglise Anglaise, Lausanne, Switzerland.*

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—*C. Zacher, Erfurt, Weimar, Street 13, Germany.*

CHANGE OF ADDRESS.—Kenneth J. Hayward, F.E.S., F.R.G.S., from English Club, Buenos Aires, to Estancia Santa Rosa, Patquia, Provincia La Rioja, F.C.C.N.A., Argentine Republic.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 1st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. June 26th, July 10th, 24th.—*Hon. Secretary Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—*Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.*

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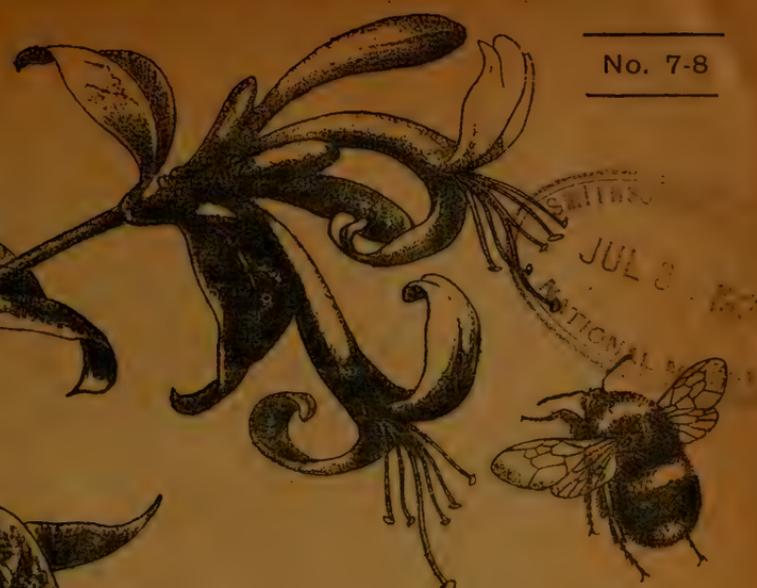
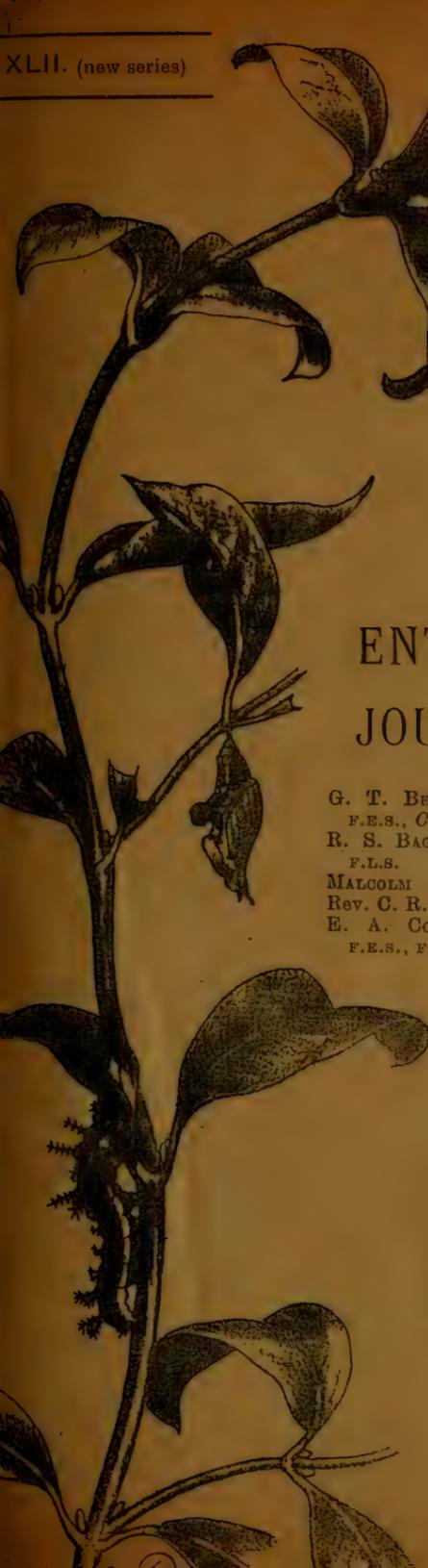
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Notes on Collecting in Ireland.

By P. P. GRAVES, F.E.S.

I paid a short visit to S.W. Kerry in 1928 spending two days at Killarney and nearly a fortnight at Parknasilla on Kenmare Bay. I returned by way of Dublin and collected both at Rush near Malahide, a good locality, on the Murrrough of Wicklow where I looked in vain for *Plebeius aegon* (*argus*), reported by Birchall but never since taken, and with the guidance of Mr. Eugene O'Mahony to whom I here express my gratitude, also on the North Bull sands, a good locality for *Polyommatus icarus*, *Hipparchia semele*, *Zygaena filipendulae*, etc. In 1929 I stayed for three weeks at Parknasilla visiting Kenmare, a good locality where there is a patch of limestone country, Derrynane and the country near Staigue Fort. Much of my time was taken up with fishing and the weather was not always favourable, especially in 1928 when high winds and drizzle lasted for several days. Still I saw enough to convince me that Kerry may have some further surprises for collectors, and incidentally obtained evidence showing that *Leucodonta bicoloria* survives in several parts of the county. I looked for *Melitaea athalia* near Killarney in woods where cow-wheat abounds but saw none. I was too late in any case to expect more than stragglers for that was on July 25th and 26th. Cow-wheat was rare near Parknasilla. In the Oberthür Collection purchased by the British Museum is a specimen of *M. athalia* labelled 'Kerry, W. Salvage' and Birchall records the species from Killarney. *Polyommatus coridon*, also recorded by Salvage from Kerry, did not turn up at Kenmare the only limestone area which I visited, and the Salvage series in the B.M. Coll. remains to puzzle the faunistic student.

Ireland still is so imperfectly explored that many more additions to its lepidopterous fauna may be expected. I did little night work on my two visits to Kerry and the weather was unpropitious, but I believe that two of the micros, determined by Mr. Stringer of the B.M., are not recorded in Kane's list. These are *Cerostoma costella*, Stögr. and *Endrosis lacteella*, Schiff. I cannot find any previous Irish record of *Chilo phragmitellus*, Hb., of which I took a worn specimen, now in the B.M.C. Another interesting capture was a female of *Epione vespertaria* (*parallellaria*) which was recorded by Kane as bred and taken by Dillon at Clonbrock, in Galway. Some of Dillon's records have been so severely criticised—and it must be admitted that some of them are, well, shall we say 'candidates for confirmation'—that the capture of *E. vespertaria* is the more gratifying.

The country in which I collected is, with the exception of a few small patches at Kenmare and Killarney, of one type. A thin layer of peaty soil or pure peat covers the rocks. On the mountain sides and in many parts of the low ground boulders are scattered profusely, and on much of the plain low, more or less, parallel ridges of rock thinly covered, if at all, with brushwood, heather, or gorse stretch down from the heights like ribs from a spine. The country was largely stripped of its woods by the extinct English settlers, who worked pockets of copper and used wood for fuel in the 17th and 18th centuries, but patches survived in some areas notably on the islands; during the nineteenth century the landowners

preserved the older forest remnants and planted extensively with beech, Scotch fir, larch and various exotic conifers and with evergreen shrubs and other ornamental plants some of which, *e.g.*, hydrangeas, fuchsia and rhododendron flourish in the moist equable climate. The Derryquin, Parknasilla and Renaferrera estates are well wooded with a mixture of old forest and new plantation, there is a considerable amount of old forest on the stony slopes of Askive hill above Parknasilla, and the islands of Garinish and Rosdohan bear a wonderful mixture of native and foreign trees and shrubs. The old woods are mixed, oak, birch and alder with holly, rowan, two or three species of *Salix* and blackthorn in abundance. Aspen and ash are much less common but apparently native. What strikes the stranger is the absence of 'earth' as distinguished from the black peaty humus over wide stretches of country. There is naturally little cultivation beyond patches of oats and potato gardens. The pasture fields are rough, often marshy; loose stone walls or turf banks take the place of hedges. I found no coastal sandhills save at Derrynane and Kenmare.

My list of captures follows: I have added some species taken by Major C. Bland near Sneem, two miles from Parknasilla, in July. Specimens marked with an asterisk are not recorded in Kane's Irish list.

RHOPALOCERA.

Pieris brassicae, L.—Fairly common in gardens, cabbage patches, etc., of large size but differing in no respect from normal British and Central European specimens. *P. rapae*, L.—The least common of the three whites. *P. napi*, L., ssp. *britannica*, Verity.—This Irish subspecies, named unfortunately on the *lucua a non lucendo* principle (since it does not occur in Great Britain), is more variable in its second brood than in the first. Very dark specimens occurred on Sherky Island, the ♂ having frequently an extra spot usually weakly indicated below the subapical, and the ♀ having heavily suffused forewings. Similar specimens occur elsewhere in Ireland. I have taken them on the Murrough of Wicklow m.viii. 1928, and near Clones in Co. Monaghan. (*Colias croceus*, Fourc.—I took this species for the first time in my life at Parknasilla in 1893. Not seen in 1928 in early August.) *Melitaea aurinia* ssp. *praeclara*, Kane.—Taken by Major Bland at Derrynane b.vii. 1929. I think that *praeclara* should be used instead of *hibernica* for the Irish subspecies of *aurinia*. *Hibernica*, Birchall, of which I have seen the types in the National Collection in Dublin is an extreme aberration with confluent and enlarged pale bands on the upperside of both wings which was formerly to be found among *praeclara* at Cromlyn, Westmeath, but became extinct according to Kane. Ssp. *scotica*, Robson—appears to occur individually to judge from my Tyone material, in Northern Ireland. In this connexion is not Fruhstorfer's name of *acedia* applied by him to the *aurinia* of Wales and western England posterior to *signifera*, Kane (*Lep. Ireland* p. 6) from Penarth? *Argynnis aglaia*, L.—I never found the headquarters of *A. aglaia* in this part of Kerry. Odd specimens were seen at Derrynane, Gleesk, Staigue Fort, on the islands near Parknasilla and in the Sneem river valley. The very few specimens taken are more like English examples than *scotica*, Watkins.

Argyronome (Dryas) paphia, L.—Very abundant in the Killarney Forests also all about Parknasilla wherever there was cover, in the Askive (Askaibh) Woods, Rossdohan, Garinish Island, etc. Seen at Derrynane. Irish *paphia* seem to me to differ pretty constantly from English specimens. *Aglais urticae*—Not very common in either year. *Vanessa io*—Abundant. *Pyrameis atalanta*—Not common in 1928, becoming abundant in late August, 1929. *P. cardui*—Seen in 1928. *Pararge megera*—One at Sneem taken by Major Bland. Local at Derrynane and apparently frequent at Macroom, Cork. My Irish specimens differ somewhat from my English series, but I have not enough material to say whether the difference is racial. *P. aegeria* ssp. *egerides*, Stgr. Sparingly in 1928, more frequent but not abundant in 1929. The ab. *pallida*, Tutt, occurred, but I do not think that the Irish race can be separated from English *egerides*. *Hipparchia semele*, L. ssp. ?—Abundant in 1928 but worn after the first three days of August. Curiously rare everywhere in 1929. The West Irish *semele*, with its extremely bright fulvous marking on the upperside and dark underside of the hindwings, differs greatly from the race of the Dublin and Wicklow sandhills. I hope to describe this race when I have finished with *jurtina*. It is emphatically not *aristaeus*, as Kane (*loc. cit.* p. 11) suggests, and seems to me to differ in important respects from *scota*, Verity, to which, however, it is most nearly allied. *Maniola (Epinephela) jurtina* ssp. *iernes*, Graves—Abundant. *Pyronia (E.) tithonus* ssp. *britanniae*, Verity.—Not uncommon in the wooded islands at Parknasilla, and elsewhere in the Sneem area, but generally on southward-facing slopes and near, or in cover. Frequent at Derrynane. Seen at Macroom 26 viii. 29. Here again there seem to be slight differences between the Irish and English examples, but I have not material enough yet to feel justified in separating them. The Irish *tithonus* is certainly closer by far to the British ssp., which incidentally occurs, perhaps as an individual form in Atlantic France (*cf.* specimens from Biarritz taken by Lister now in the Tring Coll.) than to nominotypical *tithonus*. *Aphantopus hyperantus*, L.—had been common but was badly worn in Killarney and on Kenmare Bay by early August. *Coenonympha pamphilus*, L.—Major Bland took a few worn specimens early in July. I saw no sign of a second Gen. I have specimens from Antrim and Donegal which agree with Verity's description of *scota* (*Ent. Rec.* 1916 p. 173). *Callophrys rubi*, L.—Seen by Major Bland in the spring. (*Lycaena*) *Rumicia phlaeas*, L.—A second Gen. of bright colour and large size appeared early in August and was generally frequent, occurring on some of the islands in abundance. *Polyommatus icarus* ssp. *clara*, Tutt. 2nd Gen. of the fine Irish ssp. began to appear early in August. It was generally rare in 1928, but in 1929 was fairly frequent especially at Kenmare and Derrynane. I take this opportunity of describing the 2nd Gen. of *clara* which can easily be distinguished from the 1st or from the single Gen. and from the 2nd Gen. of the English *icarus* ssp. *tutti*, Obthr.

Polyommatus icarus ssp. *clara*, Tutt f. temp. (gen. *secunda*) **postclara**, forma nova.

In both sexes. With more acuminate forewings and of lighter build than *clara*. The length from the centre of the thorax to the apex of the forewing averages exceeds 16·0mm. (maximum 17·5mm.)

against an average of over 18mm. in a series of the single brooded *clara* from Tyrone and of about 17·0mm. in a series from Malahide where there are two generations.

MALE.—*Upperside*. As a rule of brighter, less lilac blue than English *icarus* with somewhat broader termen. *Underside*. Of a lighter and purer ash grey than the 1st Gen. and also than the 2nd Gen. of ssp. *tutti*, and with more extensive white scaling around the submedian rows of black spots and especially in the apical and sub-marginal area, than in the English ssp.

FEMALE.—*Upperside*. All wings more or less suffused with various shades of blue in nearly all examples. Pale lightening in the apical area of the forewings and the submedial area of hindwings usually present, less markedly than in the 1st (or single) Gen. but more frequently and conspicuously than in the 2nd gen. of *tutti*. Sub-marginal bands of orange spots on both wings very strongly marked and bright in colour. *Underside*. Resembling *clara* but with rather less metallic blue-green scaling on the bases of the hindwings.

Type ♀ in my collection, allotype ♂ in my collection, both from Kenmare, Co. Kerry.

Described from 16 ♂ ♂ and 10 ♀ ♀ from S.W. Kerry, I.F.S., taken viii. 1928 and 1929, and 16 ♂ ♂ and 8 ♀ ♀ from various localities on the coast N. of Dublin, 16-19.viii.1928.

The handsome 2nd Gen. is readily distinguishable from that of *tutti*, Obthr., by the broad and brilliant orange submarginal marking of the upperside. Specimens with brown uppersides untouched with blue suffusion, which are apparently in the majority in the 2nd Gen. of the nominotypical (German) *icarus* and are frequent in some years in England, appear to be rare in Ireland. I have seen none myself, but Kane (*loc. cit.* p. 16) records one from Galway. With regard to the border between double-brooded and single-brooded *clara* in Ireland, I can certify that two broods occur in the following places. S.W. Kerry, 1st Gen. e.v., vi. (Major Bland); 2nd Gen. viii. Tramore, Waterford; 2nd Gen. m. viii. Clarina, near Limerick m. viii.; The Murrough of Wicklow, males only, 16.viii.; Rush, Malahide and the Bull Sands, N. of Dublin, m. viii. (P.P.G.). I expect the *icarus* ssp. *clara* of Clare and Galway will prove to be double-brooded. I saw no 'skippers' in Kerry. Indeed the only ones I have taken in Ireland at all are a pair of *N. tages* taken at Cratloe Wood, Clare.

LITHOSIIDAE.

Lithosia complana, L.—My only 'footman' taken at Parknasilla early in August, 1929, appears to be this species. *Spilosoma lutea*, Hfn. (*lubricipeda*, L.)—One in July, Sneem (Major Bland), and one worn, from Parknasilla. *S. menthastri*, Esp. (*lubricipeda*, Hmps.)—Strangely rare. *Hipocrita (Fuchelia) jacobaeae*, L.—Larvae very abundant.

NOCTUIDAE.

Rhyacia orbona, Hfn. (*comes*, Hb.)—Frequent. *R. triangulum*, Hfn.—One damaged specimen apparently of this species. *R. baja*, F.—frequent. *R. dahlia*, Hb.—One fine specimen in 1929 at Parknasilla. *R. brunnea*, Schiff.—Frequent. *T. icanthina*, Hb.—Abundant, but often

worn in early August, 1929, at Parknasilla. *Euroa exclamationis*, L.—Sneem (Major Bland). *Hyphilare lithargyria*, Esp.—A few. *Sideridis impura*, Hb.—In bad order, abundant. *Polia* (*Had.*) *oleracea*, L.—Killarney, July 26th, 1928, worn. *Parastichtis monoglypha*, Hfn.—Frequent. *Trigonophora meticulosa*, L.—A few. *Athetis alsines*, Br.—Frequent. *Hydroecia crinanensis*, Burr.—Frequent in wet fields in the afternoons, flying to bramble and scabious. *Phytometra* (*Plusia*) *chrysis*, L.—Killarney and Parknasilla. *P. gamma*, L.—A few in each year. *Abrostola triplasia*, L.—Killarney. *A. tripartita*.—Killarney and Parknasilla. *Rivula sericealis*, Scop.—Abundant, worn. *Prothymnia viridaria*, Cl.—A worn ♀ at Parknasilla, in mid-August, 1929. *Zanclognatha tarsipennalis*, Tr.—Killarney. *Hypena proboscidalis*, L.—Uncommon.

GEOMETRIDÆ.

Pseudoterpma pruinata, Hfn.—Widespread. *Acidalia immutata*, L.—Derrynane, b. viii. *Sterra* (*A.*) *biselata*, Hfn.—Frequent but usually worn. *Ortholitha mucronata*, Scop. (*plumbaria*, F.)—Sparingly. *O. chenopodiata*, L. (*limitata*, Scop.)—Only taken near Derrynane, m. viii.'29. *Acasis viretata*, Hb.—One fine specimen. *Calocalpe undulata*, L.—A couple in 1928. *Lygris populata*, L.—A few in 1928. *Cidaria ocellata*, L.—A few each year. *C. pectinataria*, Kn. (*viridaria*, F.)—One in 1928 at Parknasilla. *Epirrhoe galiata*, Schiff.—m. viii.'29, also near Dublin in the same period in 1928. *Mesolenca albicollata*, L.—July, Sneem (Major Bland). *Euphyia bilineata*, L.—Mostly worn and normal, had been common. *Hydriomena furcata*, Thnb., ssp. *sordidata*, F.—Variable and abundant, all more or less *sordidata*. *Dysstroma* (*C.*) *citratea*, L., with ab. *munctumnotata*, Haw.—locally frequent but over by August 20th. *D. ferrugata*, Cl., ab. *unidentaria*.—A single worn specimen at Parknasilla. *Eupithecia absinthiata*, Cl.—A few each year. *Chloroclystis coronata*, Hb.—Parknasilla and Derrynane, two specimens. *Gymnoscelis pumilata*, Hb.—Frequent. *Lomaspilis marginata*, L.—Had been abundant at Parknasilla. *Cabera pusaria*, L.—abundant. *C. exanthemata*, Scop.—Frequent. *Ellopija fasciaria*, L. (*prosapiaria*, L.)—A few each year. *Ouarapteryx sambucaria*, L.—Not rare. *Opisthograptis luteolata*, L.—Once at Parknasilla. *Epione vespertaria*, F. (*parallelaria*, Schiff.)—One female in August, 1929, confirming Dillon's record in Kane (p. 93). *Boarmia rhomboidaria*, Schiff. (*gemmaria*, Brahm.)—Not rare. *B. repandata*, L.—Frequent in cover. *B. bistortata*, Goeze.—Abundant in the Parknasilla grounds. *Selidosema plummaria*, Schiff. (*ericetaria*)—Here and there on heaths notably on Sherky Island.

CERURIDÆ.

Notodontia sicca.—A very fresh specimen at light in mid-August, 1929 at Parknasilla. *Lophopteryx camelina*, L.—A few at light.

LASIOCAMPIDÆ.

Lasiocampa quercus, L.—I took one fresh ♂ at Parknasilla, which seemed to be ssp. *callunae*. Others were seen flying wildly round.

SPHINGIDAE.

Macroglossum stellatarum, L.—Two seen.

ZYGAENIDAE.

Zygaena filipendulae, L.—Confined to a very small area at Parknasilla, whence it had disappeared in 1929, but not uncommon in both years on Sherky Island, and at Gleesk and Derrynane.

PYRALIDAE.

Aphomia sociella.—A single specimen each year. *Crambus tristellus*, F., *C. culmellus*, L., *C. pascuellus*, L. (*C. selasellus*, Hb., at Rush, and Dublin) *pascuellus* was the commonest of these, then *tristellus*. **Chilo phragmitellus*, Hb.—One near Parknasilla. *Nymphula nympheata*, L.—Common in all wet places. *Scoparia frequentella*, Stn.—Occasionally. *Sylepta ruralis*, Scop.—Killarney only. *Nomophila noctuella*, Schiff.—An invasion in 1928; hardly seen in 1929. *Evergestis straminealis*, Hb. *Pionea lutealis*, Hb., *P. prunalis*, Schiff.—both sparingly. *Pyrausta ostrinalis*, Hb., *P. purpuralis*, L.—Killarney. *Dioryctria* sp.? One early in August at Parknasilla last year.

PTEROPHORIDAE.

Platyptilia gonodactyla.—e.vii. 1928 Killarney. *P. monodactylus*, F.—frequent.

TORTRICIDAE.

Peronea logiana, Schiff.—Frequent. *P. heparana*, Schiff. *Eucanthis hamana*, L., *Argyroploce lacunana*, Dup.—Derrynane. *E. antiquana*, Hb.—Frequent. *Eucosma cana*, Haw. *Acroclita naevana*, Hb.

TINEIDAE (*sensu lato*).

**Cerostoma costella*, Stgr.—This is I think a new species for Ireland. **Endrosis lacteella*, Schiff.?—New for Ireland. *Depressaria subpropinquella*, Stn. *D. costosa*, Haw. *B. pseudopretella*, Stn.—Common near buildings. *Leucoptera spartifoliella*.—Abundant in gardens in Killarney Town, July 25th-26th, 1928.

HEPIALIDAE.

Hepialus fusconebulosa, de Geer (*velleda*, Hb.).—Taken in July near Sneem by Major Bland.

Classification.

Herbert Spencer's *Principles of Biology* is within reach of my seat and I sometimes take it down and read a chapter. The paragraph dealing with one point in the above subject might well be kept in mind by all of us. He writes, "While the classifications of botanists and zoologists have become more and more natural in their arrangements, there has grown up a certain artificiality in their abstract nomenclature. When aggregating the smallest group into larger groups, and those

into groups still larger, naturalists adopted certain general terms expressive of the successively more comprehensive divisions; and the habitual use of these terms, needful for purposes of convenience, has led to the tacit assumption that species, genera, orders, and classes, are assemblages of definite values—that every genus is the equivalent of every other genus, in respect of its degree of distinctness; and that orders are separated by lines of demarcation that are as broad in one place as another. Though this conviction is not a formulated one, yet the disputes continually arising among naturalists on the questions, whether such and such organisms are specifically or generically distinct, and whether this or that peculiarity is or is not of ordinal importance, imply that the conviction is entertained even where it is not avowed. And this is equally shown by the impossibility of obtaining any definition of the degree of difference, which warrants each further elevation in the hierarchy of classes.

“It is, indeed, a wholly gratuitous assumption that organisms admit of being placed in groups of equivalent values; and that these may be united into larger groups that are also of equivalent values; and so on. There is no *à priori* reason for expecting this; and there is no *à posteriori* evidence implying it, save that which begs the question—that which asserts one distinction to be generic and another to be ordinal, because it is assumed that such distinctions must be either generic or ordinal. The endeavour to thrust plants and animals into these definite partitions, is of the same nature as the endeavour to thrust them into a linear series. Not that it does violence to the facts in anything like the same degree; but still it does violence to the facts. Doubtless the making of divisions and sub-divisions, is extremely useful; or rather, it is absolutely necessary. Doubtless, too, in reducing the facts to something like order, they must be partially distorted. So long as the distorted form is not mistaken for the actual form, no harm results. But it is needful for us to remember, that while our successively subordinate groups have a certain general correspondence with the realities, they inevitably give to the realities a regularity which does not exist.”—Hy.J.T.

A definition of the Satyrid Genera; *Erebia*, *Callerebia*, *Paralasa* and *Erebomorpha*.

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

The separation of species into genera, is a matter on which opinions seem to differ more often than not; and those species generally included in the genera *Erebia* and *Callerebia* have been dealt with in a variety of ways by various authors, notwithstanding the fact that the European *Erebias* and their Asiatic relatives form such a perfectly natural group. Seitz states (*Macrolep.* Vol. I. p. 93) that modern authors are uniting *Erebia* and *Callerebia* as being too similar to maintain as separate genera; and he (or rather Eiffinger) includes *Paralasa* in *Erebia*. I suppose my inclination is to side with the “splitter” rather than the “lumper” in this matter, but I certainly cannot feel satisfied with generic divisions unless they can be clearly defined on a structural basis. Dr. Chapman in his work on the Genus *Erebia* (*Trans. Ent. Soc. Lond.* 1898) did not conclusively deal with the question of genera;

but he noted that the "sickle" in *Erebia* and neighbouring genera, might be taken as offering generic characters, and the clasp specific ones. This statement can only be held as partially correct, and I feel sure he did not intend it to be taken too literally. As a matter of fact, he seems to have been troubled by it a good deal himself, and in consequence of it he failed to recognise the great value of the features of the uncus for the purposes of specific differentiation. Now it is perfectly true that single characters of the genitalia do exhibit generic features, at times to such an extent that one can readily recognise a given genus by such a character alone, but even so, I have no doubt that a true generic definition can only be arrived at from a consideration of a number of characters. By this I do not mean that a generic definition cannot be based on the genitalia alone, for on the contrary I feel sure that it can, but the definition requires to be capable of being supported by the united features of the structure, which, were one to separate species on one character, would often prove not to be the case. To try and establish genera on a single feature is bound to lead to an unnecessary multiplication of genera, and in some cases to a failure to recognise how widely separated one genus may be from another. As an example I may refer to the generic revision of the species of *Epinephela* by Mr. P. A. H. Muschamp in this magazine in 1915. Here Mr. Muschamp takes Dr. Chapman's remark more or less literally, and sets out to divide the species on the characteristics of the uncus alone. He evidently was not too satisfied with the result, for we soon find him making references to other parts of the genitalia as well; and indeed, if one did not do so, it would not be possible to draw up a definition which would enable one to separate *narica*, *tithonus* or *lycaon* from *Erebia*, and the further one extended one's researches the more hopeless would the confusion become. In this paper, however, I am only concerned with clearing the position of the genus *Erebia*, and those species which have been erroneously included in it from time to time. All the same, from the little I have done, it seems that it would be possible, and of considerable use, to define the whole of the Satyrid genera on a similar basis; but if this were done it would probably necessitate the use of a slightly greater number of characters than I have employed, to ensure a correct representation of the very varied elements included in so wide a field of observation. I have included the genera *Oeneis* (as represented by *glacialis*, Moll. = *aello*, Esp.) and *Coenonympha*, in these notes; but, of the latter, I have only dissected a very few species, just a sufficient number to enable me to derive the fullest value from Mr. Muschamp's detailed paper on this genus (*Mittl. Ent. Zurich. Heft I. 1915*). A comparison of *Oeneis* was necessary, for Elwes' *Erebomorpha* (erected for *parmenio*) comes closer to *Oeneis* than any other genus.

After drawing up definitions for these genera, it became evident that, although a reader might appreciate that these genera were separable, yet he would scarcely grasp the real significance of the differences, or be able to visualise clearly how great these differences are in some cases. The latter is a very important point, recalling the fact that some present day writers would unite all the species of the four genera we are considering, in one genus. I have therefore tabulated my definitions in a diagrammatic manner, which will enable any reader to see at a glance the relationship between the various

genera. It is only necessary to follow down the lines of each genus, where the generic features of each character, as occurring in that genus, are marked by the presence of an asterisk. By a comparison of the position of the asterisks it is at once obvious at which points any two genera are alike, and where they differ. Thus, it will be seen that in *Erebia* and *Callerebia*, out of the eight selected characters, in only three do they coincide; *Callerebia* therefore shows only a similar number of points of contact with *Erebia* as *Coenonympha* does, and is further removed from *Erebia* than *Oeneis* is; the latter exhibiting four features in common with *Erebia*. It will be noticed that in character 4, none of the genera given develop the second feature described. This feature, however, is very marked in other Satyrid genera, so was included just to demonstrate that the diagram, as it stands, cannot be applied to all Satyrids, but would require adding to.

Paralasa comes nearest to *Erebia* but stands away from it in 3 and 8, the latter point especially being very distinctive, the horizontal development of the shoulder processes being peculiar to the genus. (Of course it may possibly occur in some of the other genera which I have not examined.) The position of *Erebomorpha* is very interesting, standing nearer to *Oeneis* than *Erebia* (a fact corroborated by the short antennae) though being very close to both: it differs from *Erebia* in 1 and 6, and from *Oeneis* only in 3. This, although probably unexpected by most people, fully justifies Elwes in taking *parmenio* out of *Erebia*. A very remarkable feature in both *Erebomorpha* and *Oeneis* is, that while the uncus is shorter than the tegumen in length, the two together are of greater length than the clasp. This combination is not what would be expected, the usual combination of these features being that shown by *Callerebia*.

In the selected characters, two of the names I have used require a word of explanation. First: the "brachia"; in this I am merely following Mr. Muschamp, who designated the lateral arms of the uncus in this very appropriate manner. Second: the "lateral lobes"; this term I have adopted for those side pieces, strongly developed in many Satyrid genera, which extend distally from each side of the saccus.

Some surprise may be felt that I have not made further use of the very remarkable formations exhibited by the brachia, but the specialisation of these structures cannot possibly be held to offer features of generic value, and if adopted would break the genus *Erebia* (*sens rest.*) into at least 4 genera, a proceeding for which there is no support to be found elsewhere.

The classification of the species of *Erebia*, *Callerebia*, *Paralasa* and *Erebomorpha* by my definitions, as tabulated, gives one a very natural grouping; the species of the four genera being easily recognised by their superficial facies, while other structural details corroborate the arrangement, which works out as follows.

Erebia, Dalm.:—This will include all the European species with the exception of *phegea*, Bkh. (= *afer*, Esp., which falls as a primary homonym to *P. afer*, Drury, *Ill. Nat. Hist.*, III. 1782), and those N. American and Asiatic species which agree superficially with the European ones. The only change is the removal of *phegea* to *Callerebia*, and this will scarcely surprise any student of the true *Erebia*s, for the superficial facies of *phegea* never really agreed with typical *Erebia*s. As to its position in *Callerebia*, it might not strike

the eye of a casual observer, yet it will be seen on comparison that the markings and the nature of the spots, with their large black centres and narrow, even rings of colour, show much greater affinity with *Callerebia* than with *Erebia*; as the formation of the forewings does also, though the hindwings are less typical of *Callerebia*, and in size *phegea* is considerably below the average. Still when one considers how far *phegea* has strayed, both east and west, from the original home of its kind in the Himalayas, it is not to be wondered at if the changed conditions have necessitated some modifications in the type. The genera *Oreina*, Westw., and *Melampias*, Hb., fall to *Erebia*; were they added to the diagram they would be seen to coincide with it at every point.

Erebomorpha, Elwes:—*parmenio*.

Paralasa, Moore:—*kalinda*, *mani*, *maracandica*, *hades*, *discalis*, *semenovi* and *shallada*.

The position of the last three I have not verified myself by dissection, but it seems fairly certain that they belong to *Paralasa*.

Callerebia, Butlr.:—The usual species; *annada*, *scanda*, *nirmala*, etc., etc., also *phegea*, and *pratorum* and *saricola*. The two last have been separated in the genus *Loxerebia*, Watkins; and although they form a distinctive group separable by certain characters of the genitalia (i.e., those of the clasp) yet were *Loxerebia* added to the diagram it would fall with *Callerebia* at every point.

I may here add, that the general features of the clasp (apart from the one given at No. 8) are so unstable as to be of no generic value, though very helpful for the natural groupment of the species within a genus: i.e., I have divided the species of *Erebia* into 13 groups on the characters of the clasp, which is helpful in the systematic treatment of the genus, but I need hardly add, as 13 separate genera would be merely absurd.

The position of *herse* is doubtful. I only know the genitalia of this species from Dr. Chapman's drawing of it (*Trans. Ent. Soc. Lond.* 1898, pl. 16, f. 60). It is always almost impossible to gather details of the formation of the aedeagus, penis-sheath, or lateral lobes from drawings, even such good ones as are given by Mr. Muschamp, in his paper on the *Coenonympha*, but in the case of Dr. Chapman's, as he does not give the entire armature, it is quite out of the question. The portion he does show, however, suggests that *herse* must stand quite apart from any of the genera under consideration.

The same may be said of *myops*: which Mr. Muschamp has placed in a separate genus: *Dubierebia*. Not having dissected this species, I can only say that, judging from Dr. Chapman's drawing again (*l.c.*, pl. 16, f. 56a) *myops* falls with *Coenonympha* in characters 1-4; and as the agreement of the features of 1 and 2, as seen in *Coenonympha*, is very unusual, and the character of the brachia (4) also unusual—though not quite so much so—it seems very probable that the remaining features 5-8 will agree with *Coenonympha* also, but one cannot say for certain.

In conclusion I may point out again that this grouping is corroborated by other characteristics, such as the shape of the hindwing in *Paralasa* differing from that of *Erebia*, and other superficial features; and I think it can be said to demonstrate quite conclusively that these four genera are fully worthy of separation.

SELECTED CHARACTERS.	GENERIC FEATURES.	EREBIA.	CALLEREBIA.	PARALASA.	EREBOMORPHIA.	OENIS.	COENONYMPHA.
I. Development of combined tegumen and uncus.	Together longer than clasp.		*		*	*	
	Together shorter than, or equal to clasp.	*		*			*
II. Development of uncus.	Longer than tegumen.		*				*
	Shorter than, or equal to tegumen.	*		*	*	*	
III. Formation of uncus.	Dorsal ridge straight or slightly convex.	*	*		*		*
	Dorsal ridge strongly convex.			*		*	
IV. Development of brachia	Parallel with uncus, dorsal edge flat or slightly concave.	*	*	*	*	*	
	Approximately parallel with uncus, dorsal edge deeply concave.						
	Directed obliquely to, & passing above uncus, dorsal edge flat.						*
V. Formation of aedeagus.	Straight or undulating.	*		*	*	*	*
	Bent centrally, almost in right angle.		*				
VI. Development of penis-sheath.	Strongly developed.	*		*			
	Weakly developed or nearly wanting.		*		*	*	*
VII. Development of lateral lobes of saccus.	Strongly developed.	*		*	*	*	
	Weakly developed.		*				
	Wanting.						*
VIII. Development of shoulder processes of clasp (when present).	Directed vertically.	*	*				
	Directed horizontally.			*			

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

(Continued from p. 85.)

The resemblance of some *britomartis* to *dictynna* is so great that, in the particular case of the small *erycina* collected with the former, I have two specimens I would not have been able to separate from it, without dissecting the genitalia, had it not been for the unfailing distinction afforded by the spot on the underside of the hindwings, just inside the dorsal margin, between the two anal nervures and before the tornus (anal angle): in *dictynna* it consists in a comparatively broad lozenge of russet scales, edged with black anteriorly and posteriorly; in the *athalia* group it is shrunk into a triangle, pointing inwards and containing only yellow scales, or it is shrunk still further into a single black streak. In *britomartis* it always keeps true to the *athalia* aspect, even in the most *dictynna*-like individuals. Assmann had actually observed this subtle feature and states that the spot is triangular and yellow, but "often filled with brownish at its tip, which is turned inward." I have two Asiatic specimens in which a few russet scales are visible near the tip, but I suppose in the nominotypical race of Breslau they may be more frequent and more abundant, correspondingly to those of the same colour in the marginal band; on the contrary, in race *aureliaeformis* of Piedmont they never exist and the marginal band is never reddish, as noted above. I observe that at the apex of the forewing there exists the homologous character: in *dictynna* the two rows of white spaces have two rows of black lunules between them, separated by a gray space, or occasionally the lunules blend into a little black bar, parallel to the nervures, and on the internervular fold whilst in the *athalia* group they are always blent into one thick lunule across the internervular space.

The considerable resemblance of some *britomartis* to *dictynna* makes it easy to understand how Wheeler, who had only one of Assmann's specimens (a female) for comparison, and no knowledge of the genitalia, attributed a form of the latter he had collected at Reazzino, between Bellinzona and Locarno, to *britomartis* (*Entomologist*, 1910 and 1911). Chapman subsequently found the genitalia to be identical with those of *dictynna* and named it var. *wheeleri* of the latter. Major Graves has very kindly presented me with some of Wheeler's specimens of both the earlier and the later emergence and I see the lozenge and the apical peculiarity of *dictynna*, as well as its general appearance on the underside, are, in fact, developed to their fullest extent in them all. I fully agree with Wheeler that the second emergence of smaller individuals is a second generation. At Vanzone, 700m., in the very alpine Anzasca valley, I found that the females of *athalia* began to emerge on July 14th and that a new emergence of both sexes appeared again from August 20th to September 3rd. Although the latter consisted only in a few individuals of small size, it shows that in the Alps the *Melitaea*, like other species, can grow up in a wonderfully short time, like their foodplants, in the very hot and damp spots of some valleys. It is well known that organisms, which have been exposed for a long time to cold, will react by an active display of

vitality and I have found that some species will produce in the Alpine valleys as many generations (three in the case, for instance of *napi*, *sinapis*, *machaon*) from June to the end of August, as they do in Tuscany from April to September. Wheeler observed at Reazzino an emergence of large *wheeleri* in June, one of normal *dictynna* in July and a third of small *wheeleri* in August. He thought this meant they were two species, but it seems to me there is another very simple explanation: the reduced, *athalia*-like, black pattern of *wheeleri* is produced when it has fed up at the larval stage, during the summer, on comparatively tough and dry plants, whereas the more melanic, normal, aspect of *dictynna* is the result of having fed, in the damp spring weather, on the succulent young plants then growing. Now, if the *dictynna* of Reazzino are divided in two groups, each of which has, in different years, alternately one or two generations, the three emergences and their different aspects are explained: the offspring of the July one has time to grow up during the rest of that summer and to hibernate at a late larval age, so that it emerges in June of the following year; this enables it to produce a second generation in August, of small size, like it is in all the *Melitaea*; the offspring of the latter, on account of the late season, enters into hibernation at an early larval age and does most of the feeding and growing in the following spring, so that the normal looking *dictynna* it turns into only emerge in July; thus the cycle of two years begins again. It will be convenient to name the small, and often very small, II. generation of August **postwheeleri**.

Before finishing with *britomartis* I must state that there can be no doubt Hormuzaki's *dictynnoides* from the Bukowina, Moldavia and Transylvania (*Iris*, 1898, pp. 1-13) is precisely the insect I have before me from Southern Siberia, and that his lengthy paper about it, with an accurate description of its variations and accounts of observations made on the field, is an excellent contribution to the knowledge of *britomartis*. As regards its distribution, that region lies between Suschkin's locality of Charkow and Assmann's of Breslau. Hormuzaki's theory that it is an ancient hybrid, which has become fixed as a subspecies and more abundant in that territory than *aurelia* and *athalia*, with which it is found flying, does not quite convince one. The dissection of the genitalia will, of course, prove definitely whether I am right in thinking they must be the same as those illustrated by Suschkin and Reverdin. Chapman gave them a look many years ago and thought they were like those of *aurelia*, but in those days this genus had not been worked out and the difference between it and *britomartis* may have escaped him, as it only consists in the small uncus. An important point to notice is that *dictynnoides* appears on the wing considerably earlier than *aurelia* and *athalia*, at the beginning of June and even at the end of May, and that this is exactly the time of *aureliaeformis* in the Venaria Park of Turin; here too *helvetica*, which is the representative of *athalia*, only emerges towards the middle of June. The name of *dictynnoides*, Hormuz., could thus be usefully employed for the individuals of *britomartis* with a *dictynna*-like look and for the races in which this form is prevalent.

There remains, however, to settle the position of the insect described by Bremer in 1861 under the name of *plotina* as a variety of *britomartis*, but which all subsequent authors, following Staudinger,

have treated as a distinct species peculiar to Asia. It is now easy to see that this was simply the result of their not having grasped the existence of *britomartis* as a species. Bremer's figure is excellent and unmistakably represents the form of the latter resembling *dictynna* most, such as those I possess from Sajan. If his cotypes were not from the Bureja Mts. and from lower Ussuria, whereas those of *dictynnoidea* are from Europe, one would have to conclude the latter name was a synonym of *plotina*, and, broadly speaking, no doubt, so it is, but it is quite possible that some racial difference may be detected and both the names found useful. Graeser has pointed out the peculiar rushing flight observed in no other *Melitaea*, except *asteria*, and Staudinger gives this feature as one of the best reasons for maintaining that *plotina* is a distinct species. Now we know how closely it is connected to *asteria* by race *septentrionalis* of the same species, this point of resemblance fits in well with the rest and adds to it a further proof of their close relationship. As Bremer's original figure is not available to most readers I must note that Seitz's of the underside of *plotina* on pl. 67 gives one, on the whole, a fair idea of it, except for the marked reddish yellow colour with which it is suffused and which should not exist; his description, on the contrary, is utterly inadequate and even misleading. Another statement which I think must be a mistake is Suschkin's: he professes to give one an illustration of the genitalia of *plotina*, but his figures and his description correspond to those of *niphona*, Butl., which Suschkin was not acquainted with; as he says he only had one specimen of *plotina* and it was from Ussuria, where *niphona* is abundant, it presumably was a small individual of the latter; there is quite enough resemblance between it and *britomartis* in general to explain the mistake. The average form of *britomartis*, which is not as extreme as *dictynnoidea*, but which has a very bold black pattern on the underside and the white or yellow spaces tending to break up in separate spots surrounded by thick black rings, decidedly points to the look of exerge *niphona*, whilst the more *aurelia*-like *britomartis*, with broader white spaces and a thinner pattern, point to the nominotypical exerge of *athalia*. This shows that the marked variations, occurring in *britomartis* still as individual ones, have subsequently become fixed by heredity in the two exerges of *athalia* and it again suggests that the latter has reached a further stage and acquired more stability, after completely casting the hereditary factors of the more extreme, ancestral, *dictynna* and *baicalensis* characters, still occasionally coming out in *britomartis*. The remnants of the russet band between the two marginal streaks, which we have seen are frequently present in *britomartis* and which never exist in *athalia*, are, together with the genitalia, the small size, and other features, an indication that the former has remained a stage nearer to *baicalensis* and *sindura* than the latter.

We are thus able to reconstruct the evolution of the *athalia* group in a way, which, to my mind, is satisfactory. When its *baicalensis*-like ancestors were pushed down into Asia from the Polar continent by the cold wave of the end of the Cretaceous, those which stood their ground on the outskirts of the ice-sheet turned into *asteria* and into *varia*, which constitute the culminating stage of the frigoripetal evolution of the true *Melitaea*, those which receded in the temperate zone retained more or less the aspect they had acquired in America under

similar climatic conditions and only changed their specific balance to *baicalensis* and *sindura*. When the cold zone shrunk northward again part of the ancestors which had not specialised to cold as highly as *varia* acclimatised themselves to the increasing heat by inverting their evolution to a caloripetal one and they became *parthenic*, acquiring or retaining a short uncus and a general appearance very similar to those which the following branches have developed to a more considerable extent. In the same way part of the branch which had produced *asteria* produced *aurelia*, which became fixed at an early stage, never developed an uncus and varies comparatively little, on the one hand, and the greater *britomartis* branch, which burst out into several variations, on the other: the principal one consisted in dividing into an exerge, which kept to the Pacific watershed and retained the broad white or yellow underside spaces and the thin black pattern of *asteria* even in the subtropical climate inhabited by *latefascia* and *coreae*, and another branch, which spread westward and, on the whole, changed aspect more, although it retained several ancestral features described above.

A most important discovery has just been made in Canada (small high valley, four miles west of Ptarmigan Valley, Banff, Alberta), where on July 28th, 1929, J. F. May, of Kelwood, has collected a single male of a *Melitaea* named *mayi* by Gunder, in the *Bulletin of the Brooklyn Entomological Society*, XXIV., p. 327 (December, 1929), pl. XXXI., fig. 6. He remarks that it comes extremely near to race *latefascia*, Fixs., as figured by Seitz, and thus to my *coreae*; his figure confirms it. This points to the fact that the extreme eastern race of *britomartis* has become distinct from its *baicalensis*-like American ancestors at a very early date, as compared with the rest of the *athalia* group, when they still inhabited the Polar Continent, so that *latefascia* was subsequently pushed down southward on both sides of the Pacific.

(To be continued.)

NOTES ON COLLECTING, etc.

DICHRORHAMPHA ALPESTRANA, HERR.-SCHÄFF., IN SOUTH HANTS.—I have long expected to turn up this rare and obscure little species in the Southampton district, but never until this year have I been able to devote much time to the search. I know of two localities where its food-plant *Achillea ptarmica* grows in considerable quantities and over a moderately large area. Both are open, marshy spots where a dense growth of grasses and sedges almost hides the sneezewort plants until the latter are well grown and almost in flower. In one of these localities on June 17th I took four specimens of *D. alpestrana* in half an hour from about five o'clock onwards. The following day I was able to visit the second locality, which is rather larger, in the afternoon. It was a very hot day, though fortunately a moderate breeze was blowing. Here, from two o'clock until half past five I caught and observed this insect more or less at leisure, taking a good series and a few more for a friend. The following evening I was on the ground at 5 p.m. with the object of finding out when the insect really ceased to fly and to rest where it could be seen. The following notes of the habits of this species were made on the spot.

It seems to fly very little at a time, but mostly in the hot afternoon sunshine. It is extremely hard to catch owing to its habit of flying low amongst the herbage, and of resting quite low down. In this respect I can fully endorse all that Mr. W. G. Sheldon notes in the *Entomologist*, Vol. LXIII. (1930) p. 138, for I failed to secure a fair percentage of those found at rest and damaged others. I found it quite impossible even with the utmost caution to box a specimen at rest, for the insect has the habit of jumping suddenly backwards at the least disturbance, after the manner of an Aegeriid, and of falling to the ground to be irretrievably lost in the rank herbage. It does not leave its foodplant at all; nearly all those seen at rest were actually on leaves of sneezewort, and the remainder were very near. I found it very unusual indeed to disturb a specimen and to make it fly, even in the hottest part of the afternoon. I quite failed to find any pairs, and discovered later to my amazement that I had captured only two males to at least fifty females (not all kept).

Most probably this insect occurs wherever its foodplant is at all common in the south of England; the chief difficulty appears to be to strike the right date for it. For this year and in this locality at all events, it has emerged about ten days before the first sneezewort flowers will appear, and the following insects were flying with it in the same spot: *Phalonia enicana*, Doubl., a common insect in South Hants, *Argyroploce lacunana*, Dup., just beginning, *Bractra lanceolata*, Hüb., and *Glyphipteryx thrasionella*, Scop., in countless myriads.—W. FASSNIDGE (M.A., F.E.S.).

CURRENT NOTES AND SHORT NOTICES.

Another number, no. 3, of the *Minen-Herbarium* arranged by Dr. M. Hering of Berlin has reached us from the publishers Messrs. Theodor Oswald Weigel of Leipzig. Necessarily somewhat lengthy periods must ensue between the issue of the parts as it is a task to collect these mines in sufficient number, at the proper time and in suitable condition for preservation in a herbarium. The present number contains specimens of the mines of 16 species of Microlepidoptera, 3 of Dipterous and 1 of Coleopterous mines. No microlepidopterist should be without this adjunct to his collection. Word pictures however correct and sufficient cannot convey the impressions of the actual mines. With such aids as this the student can get over the earlier stages of his work in shorter time and the sooner get to new and deeper studies and discoveries. The late Prof. Waters, whose loss we recently deplored, had an admirable collection of the mines of each species of leaf-mining micro-lepidoptera he had met with in the larval stage. The care and skill shown in the preparation of this work is what one would expect from the hand of Dr. Hering.

The *Proceedings of the 4th International Congress of Entomology*, Ithaca, 1928, has just been issued and contains an itinerary of the business transacted, the list of papers presented, names of the members with those actually present, and a glowing tribute to those institutions and individuals who worked so enthusiastically and successfully to make the Congress a real international function and the visit of the delegates a life's interlude of pleasure never to be forgotten. To Dr. Jordan of Tring and Dr. Horn of Berlin we are indebted for this able and interesting Report.

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EXCHANGES.

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

Duplicates.—S. *Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), *gothicina* forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (F'riv) type, *eroides*, *anteros*, *Melitaea trivialis*, *Melanargia larissa*, *Coenonympha oedipus*, leander.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

A copy of: Schrank, *Enumeratio Insectorum Austriae*. 4 plates; 1781. Leather binding (back repaired); recently catalogued at 30/-. This copy belonged to Stephens, and bears his autograph with the date 1821. Any fair offer accepted.—B. C. S. Warren, 14, Av. de l'Eglise Anglaise, Lausanne, Switzerland.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—C. Zacher, Erfurt, Weimar, Street 13, Germany.

CHANGE OF ADDRESS.—Kenneth J. Hayward, F.E.S., F.R.G.S., from English Club, Buenos Aires, to Estancia Santa Rosa, Patquia, Provincia La Rioja, F.C.C.N.A., Argentine Republic.

Comm. Wyndham Forbes, D.S.O., F.E.S., from Shillingston, Dorset, to Buckhorn Weston Rectory, Wincanton, Somerset.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 1st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. July 10th, 24th, August 14th, 28th, September 11th.—Hon. Secretary Stanley Edwards, 15, St. German's Place, Blackbeath, S.E.3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. Visitors admitted by ticket which may be obtained through Members or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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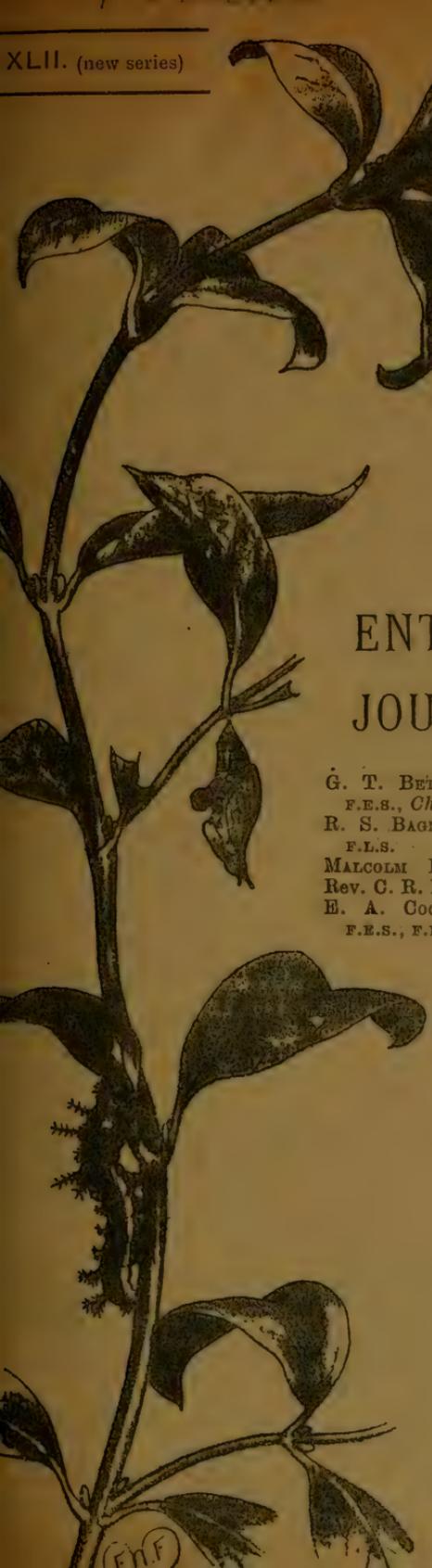
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MARSH AT THE HOEGNE BRIDGE, HOCKAI,
the home of *Brenthis apherape*.

A Butterfly Week in Belgium. (With plate.)

By Rev. G. WHEELER, M.A., F.E.S.

There are a few species that, without being rare, are so local that one's hopes of obtaining them without special knowledge are very slight; such a one is *Brenthis aphirape*, the space for which has stared blankly at me for years, so that it was with no common gratitude that I received information from Dr. E. Scott of a locality in which it could be obtained with certainty, and which I determined to visit in June last. I therefore planned a short expedition to south-east Belgium, starting with a few days at Virton and going thence to Spa. The journey to Virton by Calais and Lille is fairly direct, but unfortunately cannot be managed in the day, as there is no late train for the last few miles from Montmédy. There is a hotel there, just opposite the station where one can spend the night, but it is really better to stay at Mézières where one has to change, and where there is a hotel actually on the platform, as the train from Lille arrives there about 9 p.m., and one can continue the journey the following morning and arrive at Virton at the same time as if the night were passed at Montmédy. There is only one possible hotel at Virton, the Hôtel de la Renommée, and it is some distance from the station. It is however on the way to the two localities which had been recommended to me, the Vallée du Rabais and the Chapelle du Benlieu. Arriving at Virton about noon on June 10th, I tried the Vallée du Rabais in the afternoon, the result however was not very exciting, the only species seen being *Chrysophanus* (*Heodes*) *hippotoë*, *Cyaniris* (*Polyommatus*) *semiargus*, *P. icarus*, *Melitaea dictynna*, *Pieris rapae*, *Coenonympha pamphilus* and *Adopaea flava*. On the following morning I again visited the same place, the only additional species being *Argynnis aglaia* and *Hesperia malvae*.

In the afternoon I drove to the Chapelle de Benlieu, which is very difficult to find unguided. The route follows the Vallée du Rabais till just before there is marsh on both sides of the road, turning off then to the left, and rather more than a mile further on, just where a seat is placed, turning to the right over a narrow stream, the track being so overhung with branches that it looks impracticable for a car; my taxi, however, took it without hesitation, and in a few yards emerged at the edge of the valley, which continues for a mile or so, ending in the shrine that gives its name to the place. My special quest here was *Coenonympha hero*, a species I had never seen alive, but, alas! I was already too late, and one rather worn ♀ was all I saw. Butterflies however were in immense numbers; *Aporia crataegi* was probably the most numerous, but *Melitaea aurinia*, *M. dictynna* and *M. cinxia* and *Brenthis selene* were all abundant, though the first of these was getting somewhat passé. *Chrysophanus hippotoë* was in small numbers, ♂s only, and there were a few *Callophrys rubi* and *Euchloë cardamines*. *Erebia medusa* was by no means scarce but quite worn out, *Coenonympha pamphilus* and *Adopaea flava* were common, and *Brenthis ino* just beginning to appear. The following day I again visited the same spot, but a thunderstorm soon put an end to collecting; the same species were seen as on the previous day except *C. hero*; the ♂s of *B. ino* were now common and one *Issoria lathonia* was taken.

The 13th was taken up with the journey to Spa; it is not really

any great distance, but the trains are mostly slow, with three changes, at Marbehan, Jemelle and Liège, with an hour to wait at the second change which gives time to procure a modest lunch at the buffet. There is a great choice of hotels at Spa; some, the Britannique for instance, being very comfortable and on the "Grand Hôtel" scale; being alone however I contented myself with one of the modest hotels opposite the station; There are several of these, and I went to the "National," I was comfortable enough, though perhaps the "Terminus" is rather superior. As I knew that my hunting-ground could only be reached by train, the advantage of being close to the station was obvious. The following day, Saturday, was brilliant, and in company with Mr. and Mrs. Gilliat I started early for Hockai, a short distance along the line to Verviers. The happy hunting-ground is about half a mile away, turning to the right on leaving the station, and following a little path bordering the railway until a bridge crossing it is reached; this leads directly to the bridge over the Hoegne, just before which there appears on the right a large sloping expanse of marshy land, where butterflies abound. This was the locality for my special quarry, *Brenthis aphirape*, and here, sure enough, it was flying in countless numbers over the flowers of its food-plant, *Polygonum bistortum*. The further one advanced into the marsh the more abundant it became; I have never seen any other Brenthid in such profusion, not even *B. pales* in the Alps. *B. selene* was also very common, and *Melitaea aurinia*, generally very small and bright, was in fair numbers but beginning to be worn; *Chrysophanus (Heodes) hippothoe* was also abundant, but I could not see that it differed much from such specimens as one finds at Caux and other Swiss localities. *Erebia medusa* was also common, and generally in fairly good condition, specimens of both sexes of the ab. *eriades* (with three apical spots) were taken. *Coenonympha pamphilus* and *Argiades sylvanus* were the only other species of frequent occurrence, but a few *Pieris napi* were seen, and one or two *Gonepteryx rhamni*, in rags, were flying about, the latter easily mistakable on the wing for *Colias palaeno*, which also occurs here.

All day Sunday Spa was shut down by clouds as if in a box, and though Monday morning did not look propitious, the sun came out soon after our arrival at Hockai, and the same species occurred in the marsh as on Saturday, and I took also one *C. palaeno* there. After a time I crossed the bridge and went on for a considerable distance up the hill, and along the broad track on the level above. *Carterocephalus palaemon* was common here but mostly worn, and I also took a couple of *C. palaeno* two more specimens of which I caught the following day. This form is regarded as belonging to the race *europome*, Esp.; unfortunately I saw no females, which are more distinctive, and the males appear to me to be half way between this race and those taken in the Alps, both in appearance and habits. They are not so difficult to capture or so quick-flying as the Alpine form, but very different in this respect from the Hinterarten specimens, which will sometimes allow themselves to be taken off the scabious flowers with the finger and thumb; in size they differ little from the Alpine specimens, though, on the whole, slightly larger. No fresh species occurred on Tuesday which was my last day at Spa. The Hockai locality is also productive of *Brenthis arsilache* and *Coenonympha tiphon*, but neither of these

species were out during my visit; Mr. Gilliat, however, took a fine series of the former after I left, but the latter had not put in an appearance at the time of his departure.

There is a nice looking little hotel at the station at Hoekai, which would be a very convenient place from which to work the Hoegne marshes, and there is a still nicer looking one close to the previous station, at Sart, and the whole walk, (apparently about $2\frac{1}{2}$ kilometres by the road, and 5 by the river), looks as if it would well repay working.

**Melitaea wheeleri, Chap. (= aurelita, Frhst; and briantea, Turati);
and its 2nd gen. autumnalis, Turati (= postwheeleri, Vty.).**

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

Dr. Verity deals with this species in his interesting discussion of *M. britomartis* in the July number of this magazine. He, however, by some strange chance, seems to have overlooked Turati's work, published in 1919 which includes some notes on *wheeleri* (*briantea*) among other species. A few supplementary observations on the subject may therefore be of interest.

Dr. Verity deals with *wheeleri* as though it were confined to Reazzino, the locality where Mr. Wheeler first discovered it*. This of course is a mistake, which necessitates considerable qualification of some of Dr. Verity's remarks. Vorbrodt has recorded it from some other Swiss localities (in the Val Mesoco I think), and as already mentioned, Turati in his paper "Nuove forme di Lepidotteri" in the *Naturalista Siciliano* for 1919, records it from the lake of Alserio (just S. of the lake of Como), at the same time giving some most excellent photographs of it (l.c. pl. 2, figs. 19-24) which might have been done from Reazzino specimens. Turati then gave it the name of *dictynna* var. *briantea*; but at the end of the paper (p. 148) added a note calling attention to the fact that Fruhstorfer had already named specimens of this insect which were in the Polytechnic collection in Zurich, var. *aurelita*. These specimens had been taken by a cousin of Turati's in the same locality on the lake of Alserio. In the same paper Turati also describes and figures the small 2nd generation, which he named *autumnalis*. The latter of course stands in place of *postwheeleri*, Vrtty. though both Fruhstorfer's and Turati's names for the 1st gen. fall to Chapman's.

The question as to whether *wheeleri* is a good species or not, is a very interesting one; and there seems to be more ground for regarding it as a species than Dr. Verity's notes would lead one to think. The only reason for connecting it with *dictynna* lies in the fact that the genitalia are said to be identical. I will not discuss this point beyond pointing out that similarity is no absolute proof of identity, but one must remember that up to the present only a very few specimens of *wheeleri* have been dissected (? more than two by any one worker), and there is every possibility that when a larger number come to be examined some slight structural deviation may be recognised, which would pass unnoticed if only a few slides were available for comparison. This, I may add, has actually been the case with some species of *Hesperia* and *Erebia*, which were accepted by workers in the past as being identical; but which I have found, after the examination of a

considerable number, to show slight, but perfectly constant differences. (A very marked instance was the case of *H. carlinae* and *H. fritillum*, for large numbers of each had been examined, but owing to concentration on the points which most usually differed in other species the important parts in these got overlooked.)

The question of the two generations has long been established beyond all doubt. Vorbrodt records *wheeleri* in late April and July, and numerous other collectors have taken series which clearly prove the regular occurrence of the two generations. Vorbrodt's date of April is, however, a mistake for May, or must refer to a quite exceptional year, the normal period for the emergence of the species being probably about the middle of May. In 1928 on May 24th, it was only just beginning to emerge, in the course of the day I only found 4 absolutely fresh ♂s, and in the three following days only saw 3 more specimens, all ♂s.

Dr. Verity's argument for regarding *wheeleri* and *dictynna* as the result of varying feeding seasons of the larvae, does not quite fit all the facts of the case. *Dictynna* as a matter of fact, does not occur between the broods of *wheeleri*, but with and after the 1st. generation; usually emerging about ten days to a fortnight after the first *wheeleri* appear. The feeding periods therefore of the 1st. gen. of *wheeleri* and the only generation of *dictynna* are practically identical. Further, it seems likely that *wheeleri* will be found to occur in suitable localities throughout the district of the Italian Lakes, between the Val Mesoco in the north and Alserio in the south; so there is a possibility of its being found in a locality where *dictynna* does not occur, which must not be overlooked. Again, if *dictynna* under Reazzino conditions is held only to be able to produce *wheeleri* in the next generation, how is it that under almost identical conditions in other localities (such as the marsh land at the end of the lake of Geneva in the Rhone Valley) this rotation does not follow, and though *dictynna* is abundant *wheeleri* does not occur?

The identity of the two generations of *wheeleri* is so unmistakable that I cannot see how one can do other than suppose these generations produce each other in rotation; as the similar forms, large (early summer) and small (late summer) of *parthenie* and *berisalensis*. It is worth noting that *athalia* occurs in exactly corresponding manner, from late May to late July in the Rhone Valley on the same ground as *berisalensis*, with and after the 1st. gen. of the latter. Yet there can be no question as to these being two distinct species. All things considered, I fail to see how we can question the specific standing of *wheeleri*, which is as constant in producing two generations in every locality where it has been so far discovered, as *dictynna* is in its habit of only completing its life-cycle once in twelve months.

Turati did not mention in his paper if *dictynna* occurs on the same ground as *wheeleri* (*briantea*) in the Alserio locality; this is a point worth finding out, and no doubt Dr. Verity can easily get us the required information.

* I have also taken it at Mendrisio.—G.W.

Calobata calceata, Fall. (Micropezidae, Diptera), a species new to the British List.

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

On June 26th last when collecting in Windsor Forest I was struck by the curious appearance of a handsome fly with long legs which was walking about on sections of a large fallen beech tree. A closer examination showed that the Dipteron was present in small numbers, careering over the bark and butts of the tree. Being convinced that I had never seen this insect before, I endeavoured to catch some, but found it quite impossible to do so with a heavy coleopterist's sweeping net. The flies were very alert sidling about on the tips of their toes, standing high up, and looking not unlike small grass-hoppers. They flew off at the least alarm; but eventually Miss Kirk "laid two out," by striking them with a newspaper bat! These were taken to the British Museum and Miss Aubertin identified them as *Calobata calceata*, Fall., a species which had never been taken in Britain before.

On July 1st another visit was made to the same locality when the fly was found to be present in greater numbers. Armed with a small light fly-net, some twenty specimens were soon secured. I am indebted to Miss Aubertin for the following details:—"This insect is rather different in type from the seven species of *Calobata* already established as British, on account of the length and black coloration of the body, extreme length of the legs, and dark band on the wings.

According to the Palaearctic Catalogue (1905) there are eight species which are still unknown in Britain; four of these are described from Siberia, three from Germany, and one from Spain."

This makes the 28th species of insect I have taken in Windsor Forest new to Britain, of which 23 belong to the Coleoptera, two to Diptera, one to Siphonaptera, one to Hymenoptera, and one to the Aphididae.

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

(Continued from p. 111.)

Finally, the *athalia* branch sprung from the *baicalensis*-like ancestor, presumably, later, when the climate had again got warmer: it lends itself to a remark, which may have considerable importance in connection with general evolution and the origin of species. This is that it was thrown out at intervals from the *baicalensis*-like stock, so that the four branches have not sprung from a common *athalia* root. My reasons for believing this are the following: the nominotypical exerge has varied in a way exactly parallel to nominotypical *parthenie*, with whom it has spread to Europe by the northern route, in producing a rather long and sharp uncus and numerous deep barbs at the end of the terminal apophysis; exerge *niphona*, of subtropical and nearly subtropical climates, has produced the most highly characterised variation of the genitalia in the caloripetal direction by accentuating these *athalia* features still further and acquiring also much narrower dorsal and ven-

tral plates. On the contrary the genitalia of *helvetica*=*pseudathalia*, which inhabits the Western Central Zone and, as we will presently see, can only be considered the Central exerge of *athalia*, and *dejone*, which inhabits the extreme west and is unquestionably a distinct species, but which stands in the position of its Southern exerge, have genitalia which differ considerably less from those of the *baicalensis-sindura* group. In fact, *helvetica* only has a short, stumpy uncus in some individuals and *dejone* never has any; *helvetica* has longer and more slender lateral apophyses than *athalia*, with smaller and less numerous barbs, and *dejone* stands still further from it and resembles *baicalensis* still more in this respect; the underside pattern of the wings corresponds strikingly with what the genitalia show.

We are thus brought to the conclusion that the *baicalensis*-like ancestor threw out the *niphona* branch, possibly under a form similar to *plotina*, at an early date, very soon after *britomartis*; the group which spread into subtropical climates attained a very large size and developed the features of the species to their highest degree; that which kept further north and spread westward along the northern route did not become so large and did not develop as fully, according to the general rule I have pointed out in other papers and I will presently mention again; it has constituted the nominotypical exerge *athalia*. The two other branches, *helvetica* and *dejone*, must have been thrown out by *baicalensis*-like ancestors who never underwent the effects of the cold climates as much as those of the preceding, because they had withdrawn southward under the stress of the cold wave. They thus represent an intermediate grade between the greater transformation of the latter and the lesser ones of the groups which have remained *baicalensis* and *sindura* till today. In other words, these insects having kept to more constant temperate surroundings, have escaped more and more the necessity of extreme frigoripetal variation followed by a caloripetal one; although *sindura* has gone considerably far in the first direction, it has remained in the state of a high mountain species, showing it was the more catabolic branch of the group, less liable to adaptation and transformation than the parallel branches, which turned into the *athalia* group and thus acquired a new organic balance, which enabled them to spread westward in new surroundings and to face, in the case of *athalia* and *dejone*, even the hottest lowlands of the palaeartic region. We have just seen *dejone* presumably reached it by a comparatively short and slight transformation, whereas the *niphona* exerge of *athalia* has reached its giant size and subtropical constitution after a series of transformations, which has passed at first through a psychotropic stage, parallel to nominotypical *athalia*. There is no reason to think they are anything more than two very distinct exerges and the fact that they are entirely representative of each other is in favour of this conclusion, although it is not a proof. The change of aspect, at the present day, takes place in the southeast of Siberia, according to a rule followed by so many species that it can be called a general law, in the zone which from the Pacific coast stretches westward, between the 49° and the 52° lat., so that the central Amur, occurring further south is inhabited by some of the subtropical species and exerges, whereas its upper and lower portions are more strictly palaeartic, and which reaches as far as the Trans Baikal or the Altai, according to the species. This demarcation zone, evidently due to

climates, apparently holds good both for the genera and species which have spread from north to south, having originated in the Polar Continent and in America, so that their present variations are caloric-petal, and those which have spread in the opposite direction, their more or less direct ancestors being detectable amongst the tropical Asiatic species and their variations being frigoripetal. A striking example of the latter case is afforded by exerge *hippocrates*, Feld., whose ancestor is obviously *Papilio anthus*, L., of subtropical China and Japan, and which changes into exerge *machaon*, L., its first, hibernated, generation showing by its transitional features how it has taken place under the influence of cold.

In other cases the change of aspect is due to specific distinction, so that, for instance, *Parnassius nomion* and *bremeri* of the east are replaced by *apollo* of the west and *Pyrameis indica*, Hbst., is replaced by *atalanta*, L. Only, it must be noted that when the difference is specific there need not necessarily have been a direct transformation of one species into the other locally, in the region mentioned above. On the contrary, they often fly together there on the same grounds and they keep perfectly distinct, as has been observed (*Revue Russe d'Entomologie*, 1914) in *apollo* and *nomion* at Irkutsk; it is the only place where two branches, which have developed in different regions, have again come in contact with each other. The western branch, as I have described it in my paper on *M. didyma*, has undergone the effects of cold climates to a much higher degree during certain periods, owing to the fact the Han Hai sea made it impossible for it to escape further south, so that it has had to acquire more highly palaeartic constitutions and features. The eastern branch has been able to migrate southward into China, seeking the latitude which suited it best in different periods of climate. Many exerges and species have thus altered their constitutions considerably less there than further west and retained features which recall their subtropical ancestors, like *hippocrates*. In the climate of the present day constitutions of this sort only find the surroundings they require as far as the fertile Amur basin. This explanation does not, of course, apply to highly arctic genera, like the *Parnassius*, whose ancestors must all have been produced in a very cold climate and presumably in the great Polar continent, so that *apollo* and *nomion* must have acquired their specific characters under the stress of conditions we can scarcely hope to reconstruct in our mind. Possibly the common ancestor of *nomion* and *phoebus* (= *delius*) was a very ancient development of a *bremeri*-like species, which took place during the Cretaceous period in the Polar continent, as suggested by the fact it has spread also into America, where *nomion* and *phoebus* are still much more closely connected with each other than in Asia, and *apollo* was a more recent repetition of the same process, on similar lines, after the progenitor of *bremeri*, Br., had been pushed into southern Siberia by the cold period, which produced the great migration of the late Cretaceous and early Eocene. This theory accounts also for the fact that *bremeri* replaces *apollo* to the east of the Baikal even more strictly than *nomion*, as they are not known to occur together, each keeping to the regions they inhabited when *apollo* was less distinct and still a local western exerge of *bremeri* or rather of its progenitor, before the huge *sibirica* appeared as a result of the new specific balance.

We have seen that the Asiatic *Melitaea* must be regarded, in this respect, in the same light as the *Parnassius*. In the case of *athalia* Staudinger has pointed out (*Mém. Romanofl.*, VI, p. 186) that *exerge niphona* stretches to the north as far as the central Amur, whereas at the mouth of this river the species "fully agrees with European specimens." He also says that *ambigua*, Mén. is only an aberrating specimen of *athalia*. It seems to me there is nothing abnormal about it and that it is a female of the race of the lower Amur, whence it was originally described from Djai. As I have already mentioned, it also is perfectly similar to some of the females in my series from the Sajan mountains, so that a very constant race *ambigua*, Mén. = *kenteana*, Seitz = *tinica*, Frhst., seems to represent *athalia* all through the east at about the 50° and 52° lat. from the mouth of the Amur to the Irkutsk Government and from the lowlands to high altitudes. Individual variation, however, is remarkably broad in this race. Staudinger records a male from the Amur of the melanic aberration usually known as *navarina*, Selys, but which should be called, by right of priority, *cymothoë*, Bartoloni. Some of the females of my series from the Sajan mountains are so broadly covered by the black suffusion that they recall *asteria* in that respect and variation ranges to the opposite extreme figured by Ménétriés. Those very dark females agree with Frübstorfer's description of *tinica*, but some of my males are as dark, although most of them are considerably more so than Seitz's figure of *kenteana* and the pattern is never as thin as in many specimens from Paris and central Europe. The tone of the fulvous is in both sexes much duller, lighter and less warm. The underside strikes one particularly as being much duller and paler and its general tone, as well as the sharp and thin black streaks, fully justify the remark made both by Ménétriés in *ambigua* and by Frübstorfer in *tinica* that it recalls that of *dejone*. It is noteworthy that race *ambigua* just inhabits the same latitude as does the nominotypical race of *athalia* in Europe, and it certainly resembles it more than it does any other western one.

As stated by Staudinger, south of the limits I have described above, it is replaced by *exerge niphona*, Butl., of which *mandschurica*, Fixsen, is an absolute synonym, because the race of the continent and that of Japan are exactly alike. The name of *sutschana*, used by Reverdin in dealing with the genitalia, does not seem to have been published; it would have been a homonym of the *didyma* to which the same name had been given by Seitz, but Bang Haas has sent me the rest of the set of specimens from which Reverdin's had been drawn and I see they are *niphona* from Sutshanski Rudnik, to the West of Vladivostock, collected in July.

(To be concluded.)

Nomenclature. Errors III.

megaera.—Linnaeus wrote **megera**. *Sys. Nat.* ed. XII. 771 (1767). Another "r"; by Esper, *Schm. abb.* I. 101 (1777).

hyperanthus-hyperanthes.—Linnaeus wrote **hyperantus**. *Sys. Nat.* ed. X. 471 (1758). Another "r"; by Esper *l.c.* 78 (1777). The *hyperanthes* of the "Entomologists' List" (South), I have been unable to trace, and presume it must be a printer's error.

typhon-darus.—Rottemberg wrote **tiphon**. *Naturfor.* VI. 15 (1775). Haworth was responsible for the alteration of *i* to *y*. *Lep. Brit.* 16 (1803). The name *darus* was given by Fabricius in the addendum to his *Gen. Ins.* 259 (1777).

phloeas.—One frequently meets with this misspelling which unfortunately crept into the Entomologists's List (South) and hence it is continually being used in M.S. and labelling. Linnaeus wrote **phlaeas**, *Faun. Suec.* 285 (1761). I have not traced the origin of this error; all the older authors appear to have the correct spelling.

Newly Described Forms of British Lepidoptera.

1. *Agrotis tritici*, Lin., ab. *vinosa*, Schaw., *Zt. Ostr. Ent. Ver.* (1930) 9.—The normal light-brown ground colour of the forewings has become light wine-red. Mt. Ceppo, Corsica. (Race *falleri*, Schaw.)

2. *A. corticea*, Hb., *pallida*, Schaw. *l.c.*—Wholly pale brown, not yellow. Mt. d'Oro, Corsica. The Corsican race is *corsica*, Püng.

3. *Metachrostis perla* ab. *grisea*, Dufr., *Rev. Mens.* (1925) p. 33 corrected to ab. *grisescens*, Dufr. *Lambil.* (1930) p. 5. Ab. *grisea*, Vorbrt., *Schm. Schw.*, Sup. III., *Mitt. Schw. Ent. Gesel.* XII. p. 458 (1917).—In *grisescens* the markings are strongly emphasised and increased, the lines are black, etc., but in *grisea*, Vorbrt., the forewings are deep brown grey with an area of a light colour at the base of a spot which occurs at one third along the margin, etc.,

4. *Celerio euphorbiae*, L., subsp. *subiacensis*, Dnhl. *Mitt. Munch. Ent. Gesell.* XIX., 99 (1929).—Large, robust examples, strong red, especially the back portion of the thorax. The bands as a rule with smooth edges on the outside, only exceptionally toothed or indented, tending to be green. The pale portions are almost devoid of any sprinkling with dark atoms, although one not rarely finds a distinct covering of fine white hairs. Veins not apparent. Among the pale and rosy specimens one often observes an example wanting the strong black outer marginal line of the transverse band; ab. *atrolimbata*, Dnhl.

5. In the *Ent. Zeit.* March 22nd, two aberrations of *Colias croceus* (*edusa*) are described and figured, by E. W. Heinrich. (1) ab. *naieri* ♀, the spots in the marginal band f.w. reduced to two small ones. The black coloration of the hind-margin is carried widely along two thirds of the costa including the discoidal spots. All yellow is absent in the upperside of the hindwings. The underside of the forewing has a considerable amount of black streaking below the costa and extending inwards from the sub-marginal area. (2) ab. *pullata* ♀, the forewings are typical but the hindwings have the marginal band considerably intensified and increased in area with the usual spots completely effaced.

6. In the *Ent. Zeit.* of April 22nd is described and figured a new form of *Dicranura vinula* in which all the markings are suppressed up to a subbasal, narrow, dark transverse band; there are no dots on the hindwing margin. It is called *simplex* by its recorder Niepelt.

7. In the April *Lambill.* M. C. Cabeau describes and figures two new forms of *Brenthis selene*. 1. ab. *medionigrans* with a very large irregular median band on the forewings see pl. V., fig. 3. 2. ab. *ranescens* of a pale fawn colour, on the forewings the black antemarginal

dots are joined to the black submarginal chevrons, while most of the other usual black markings have disappeared. See pl. V., fig. 1. On the same plate (V.) four other aberrations of *B. selene* are figured ab. *transversa*, Tutt, ab. *halfantsi*, Cab., ab. *thalia*, Hb., ab. *thalia* Hb. (extreme form).

Notes on Some South African Lepidoptera.

By JOHN SNEYD TAYLOR, M.A., D.I.C.

(Entomologist, Union Department of Agriculture.)

The following notes were made during the course of the last two years at Barberton, in the Eastern Transvaal. In a few cases they supplement previous notes which appeared in the *Entomologist's Record* for October, 1927.

Cosmophila auragoides, Hbn. (*Noctuidae*).—The larva of this species feeds upon the foliage of cotton (*Gossypium*), sometimes causing considerable damage. The adult is on the wing during the day, as well as at night, and the eggs are deposited singly upon the leaves of the food-plant. The larval period varies from 15 to 18 days, and the pupal period from 11 to 12 days, during March. During the summer months both periods are, naturally, somewhat shorter. The Tachinid *Sericophoromyia marshalli*, Vill., has been obtained from the larva.

Tarache nitidula, F. (*Noctuidae*).—The larva feeds upon cotton leaves, and occasionally makes a small puncture in a boll. A gravid female, taken in the field, deposited 741 eggs over a period of seven days. Oviposition takes place at night, the eggs being laid singly. The incubation period varies during March, from 5 to 6 days, and the larval period during the same month, varies from 25 to 31 days. Pupation takes place in a tough cocoon on the surface of the soil. *T. nitidula* hibernates as a pupa; adults from over-wintering pupae emerge during October and November; the pupal period varying from 168 to 203 days.

Anomis sabulifera, Guen. (*Noctuidae*).—The larva has been found feeding upon cotton leaves. Pupation takes place in a loose cocoon in the soil, the adults emerging 13 to 15 days later, during March. A species of Tachinid has been obtained from the larva. *A. sabulifera* has previously been recorded as attacking cotton foliage in Nyassaland, and jute in India.

Eublemma brachyonia, Hmps. (*Noctuidae*).—The larva of this species has been observed feeding upon the bracts of cotton flowers, and has previously been recorded in Nyassaland as attacking the bolls. The larva pupates among the bracts, and the adult emerges, during March, after a pupal period of 20 days duration.

Cirphis leucosticha, Hmps. (*Noctuidae*).—The larva occurs commonly on the tassels (male flowers) of maize before the latter ripen and while partially protected by the sheathing leaves. It is usual to find several larvae feeding upon one tassel. Pupation takes place in the soil, the adult emerging 24 days later (October to December). Two species of *Tachinidae* and one species of *Sarcophagidae* have been obtained from the larva. *C. leucosticha* has previously been recorded as attacking sugar-cane and oats in S. Africa.

Sphingomorpha chlorea, Cram. (*Noctuidae*).—The adult is one of

the commonest fruit-sucking moths. A larva was found feeding upon the foliage of the morula tree (*Sclerocorya caffra*). Pupation took place on the bottom of a jar, the adult emerging after a period of 17 days (December).

Xanthorhoë exorista, Prof. (*Geometridae*).—The larvae attack the foliage of carrot, and sometimes occur in large numbers. Pupation takes place in the soil, the adults, during April, emerging two weeks later.

Nudaurelia (Antheraea) zambesina, Wkr. subsp. *ringleri*, Wichgrf. (*Saturniidae*).—The adults of this species appear towards the end of October, and the larvae, which are full-grown about the end of March, have been found feeding upon the foliage of plum. Pupation takes place in the soil, the pupal period occupying some seven months.

Lycaena boetica, L. (*Lycaenidae*).—The larva has been observed boring into, and feeding upon the contents of, pea-pods. The species has previously been recorded as attacking pigeon-peas in Nigeria, beans in Turkestan, and lucerne and peas in Europe.

Acknowledgments. I am much indebted to Prof. A. J. T. Janse, Messrs. H. K. Munro, and Hy. J. Turner for determining a number of the insects mentioned above.

SCIENTIFIC NOTES AND OBSERVATIONS.

“MARRIAGE FLIGHT” OF *ANDRAENA ARGENTATA*, SMITH.—On July 10th last at about 11 a.m., summer time, *Andraena argentata* was observed to be present in considerable numbers, on a level stretch of sand in Windsor Forest. The bees were flitting over the surface of the sand in every direction, some entering their burrows and coming out again in a few seconds, and all of them were in a considerable state of excitement. Little clusters of bees could be seen here and there rolling over in the sand, and on a closer inspection they were found to consist of four bees—when a male had seized a female, two other males pounced upon them and all four rolled over and over together in the sand until eventually two males broke away and flew off. This was observed over and over again with different groups, and the process was taking place all over this rather large sandy area. With ants one would describe this as a restricted marriage flight, as the bees never rose into the air, not flying above a foot from the ground, and when *in cop.* the pair crawled along on the ground.

I do not know if similar observations have been recorded before and shall be glad to hear of anything of the kind.—HORACE DONISTHORPE, (F.Z.S., F.E.S.), Putney. July 15th, 1930.

CURRENT NOTES AND SHORT NOTICES.

(Only just recently has the following information come to hand. It is useful to record the names of those present and interesting for reference in years to come.) The Verrall Supper was held at the Holborn Restaurant on January 14th 1930, Mr. H. Willoughby-Ellis in the Chair. The meeting was most successful and showed an advance in numbers on the previous years. The following were present;—

Adkin, B. W., Adkin, J. H., Adkin, R., Andrews, H. W., Ashby, E. B., Ashby, S. R., Audcent, H., Austen, Maj. E. E., Bagnall, R. S., Baldock, G. R., Balfour-Brown, F., Barnett, T. L., Bedford, E. J., Bedwell, E. C., Benson, R. B., Bessemer, H. D., Bethune-Baker, G. T., Blair, K. G., Blyth, S. F. P., Bostock, E. D., Bowhill, J. W., Bowman, R. T., Britten, H., Buckhurst, A. S., Burr, Dr. M., Bushby, L. C., Bushell, Capt. H. S., Cameron, Dr. M., Carpenter, Dr. G. D. H., Carr, Prof. J. W., Chrystal, Dr. E. N., Cockayne, Dr. E. A., Collin, J. E., Collins, J., Cope, Wilfred, Cox, L. G., Crabtree, B. H., Curtis, W. P., Daltry, W. H., Dicksee, A., Dixey, Dr. F. A., Dods, A. W., Donisthorpe, H., Doudney, S. P., Eastham, L., Eastwood, J. W., Edelsten, H. M., Edwards, F. W., Ellis, H. Willoughby, Eltringham, Dr. H., Fassnidge, W., Ford, L. T., Fox-Wilson, G., Frampton, Rev. R. E., Frowhawk, F. W., Fryer, J. C. F., Gabriel, A. G., Gilles, W. S., Gilliat, F., Goffe, E. R., Goodman, A. de B., Green, E. E., Griffin, F. J., Grosvenor, T. H. L., Hallett, H. M., Hamm, A. H., Harwood, B., Hawkins, C. N., Hayward, J. H., Hemming, Capt., Hodge, H., Hodgson, W. E. H., Hughes, A. W., Hughes, A. W. McK., Imms, Dr. A. D., Jackson, W. H., Jonstone, D. C., Jordan, Dr. K., Joy, Dr. Norman, Kettlewell, H. B. D., Labouchere, Col. F. A., Laing, F., Lamb, Dr. C. G., Lancaster, Dr., Leeds, H. A., Leivers, A. R., Leman, G. C., Levick, J., Liles, Maj. C. E., Lloyd, R. W., Lofthouse, T. A., Lucas, W. J., Madwar, S., Main, H., Mansbridge, W., Massee, A. M., Maulik, Prof. S., McCracken, C. J., Mera, A. W., Mera, A. L., Mera, F. G., Metcalf, Rev., Miles, H. W., Muir, Dr. F., Neave, Dr. S. A., Newman, L. W., Patton, Prof. W. S., Page, H. E., Pierce, F. N., Prideaux, R. M., Prout, L. B., Purefoy, E. B., Rait-Smith, W., Regan, Dr. Tate, Richards, O. W., Richardson, A. W., Riley, Capt. N. D., Robbins, J. C., Robinson, Capt. A., Salt, E., Saunt, J. W., Scharff, Dr. R. F., Scott, Dr. H., Sherborn, C. D., Smart, Dr. H. D., Smith, Dr. G. Herbert, Sperring, C. W., Stafford, A. E., Stowell, E. A. C., Step, E., Stringer, H., Talbot, G., Tams, W. H. T., Tarbat, Rev. J. E., Terzi, E., Thorpe, W. H., Tomlin, J. le B., Tonge, A. E., Tottenham, Rev. C. E., Turner, H. J., Wainwright, C. J., Walker, J. J., Ward, J. Davis, Waterston, Dr. J., West, Col. E. M., Wheeler, Rev. G., Whittingham, Rt. Rev. Dr., Wigglesworth, V. B., Wilding, R., Williams, B. S., Williams, H. B., Withers, Thomas, Womersley, H., Wood, H., Worms, C. G. M. de, Wyse, L. H. Bonaparte.—H.W.-E.

A meeting of the Entomological Club was held at Eastbourne on June 14th, 1930, Mr. Robert Adkin in the Chair. Members present in addition to the Chairman:—Mr. H. Donisthorpe, Professor E. B. Poulton, Mr. H. Willoughby-Ellis, Mr. James E. Collin and Mr. W. J. Kaye. Visitors present:—Dr. R. R. Armstrong, Dr. M. Burr, Dr. K. Jordan, Messrs. B. W. Adkin, R. A. Adkin, H. W. Andrews, E. C. Bedwell, K. G. Blair, F. W. Frobawk, Hugh Main, W. Rait-Smith, A. L. Rayward, E. Step, J. R. le B. Tomlin, A. E. Tonge, Hy. J. Turner, C. J. Wainwright. On Saturday, June 14th, the members and guests were received at the Grand Hotel by Mr. Robert Adkin where luncheon was provided in a private room, after which, in glorious weather, a most enjoyable walk on the Downs occupied the whole afternoon. On returning to the Grand Hotel the Club supper was held at 7.30 in a private room, during which Mr. J. E. Collin

exhibited two species of Diptera, new to the British list, *Microsania stigmatalis*, Zett. and *Pipunculus zugmayeriae*, Kow.

A very enjoyable evening was spent and those who could not remain for the week-end took the later trains home. Those who were able to stay were accommodated at the Grand Hotel and on Sunday morning a collecting trip to Whitefields Wood was organised. The weather was brilliantly fine and many interesting captures were made, of which the following is a summary.

RHOPALOCERA:—*Brenthis euphrosyne*, *Polyommatus icarus*, *Lycaenesthes argiolus*, *Nisoniades tages*, and *Limenitis sibilla* (pupa).

COLEOPTERA:—*Strangalia armata*, *Leptura livida*, *Gramoptera tabicolor* and *G. ruficornis*, *Saperda populnea*, *Dascillus cervinus*, *Telephorus literatus*, *Pyrochroa coccinea* and *Apoderus coryli*.

DIPTERA:—A large number of Diptera were taken, the most noteworthy being *Servillia lurida*, F., and *Odontomyia ornata*, Mg., the latter a large and conspicuous but uncommon Stratiomyiid. Professor Poulton took the first and Mr. Collin afterwards captured two more. This insect was only once seen alive by Mr. Verrall, and probably at the very same spot, on June 25th, 1876.

On the return to Eastbourne luncheon was served at the Grand Hotel after which the Company walked to Hodeslea and inspected the Chairman's gardens with much pleasure. During the afternoon Mrs. Adkin dispensed tea after which the members adjourned for the annual business meeting of the Club. At 7.30 the Chairman invited the guests to dinner at the Grand Hotel after which, a most entertaining entomological evening was spent. The meeting concluded on Monday morning and the members and guests dispersed. The weather throughout the week-end was brilliantly fine and the meeting was most successful and greatly enjoyed by everybody.—H.W.-E.

Owing to the unexpected death of Mrs. Joicey the activities so ably carried on at the Hill Museum, Witley, under the curatorship of Mr. G. Talbot, F.E.S., have been suddenly brought to a close by her executors and the able and experienced staff are anxious for their own future; at least three members of the staff are desirous of immediate engagement. It is nothing less than a disaster to entomology that a summary conclusion should come about and the resultant possible dispersal of the mass of new material got together from all parts of the world.. We hope for the best.

Heft 1 of *Iris*, for 1930 contains another of those local faunal lists, which have been a feature of the current literature of continental entomology for some years past. Herr K. T. Schuetze has brought the old list of Saxon Oberlausitz (*Iris* 1895-1901) up to date with an addition of 123 species with notes on the species already listed, making a total of 1,954 species. There is also an account of the *Agrotidae* in the Minussinsh region of East Siberia.

In the *Bull. Soc. Ent. Fr.* M. Barbey describes and illustrates (2pls.) a new species of pine-feeding Pyralid, *Diorgetria aulloi*, which attacks the shoots of *Abies pinsapo* in Andalusia. The accompanying letter-press gives an interesting general account of pine-feeding lepidoptera and details of the life-history of the present species.

In the *Int. Ent. Zeit.* for April 1st Dr. Bergmann has begun a summary of our knowledge of the melanistic and albinistic forms of Lepidoptera in the Thuringian District. It will contain 7 plates of

which the first depicts 6 forms of *Limenitis populi*, 3 of *Apatura iris*, 2 of *Erebia aethiops*, 1 of *Epinephele jurtina* and 2 of *Heodes virgaureae*. A further instalment of the supplement on economic entomology with a full complement of illustration is given.

Societas Ent. has a most interesting article on the curious association existing between the Strepsipteron, *Xenos vesparum* and its hymenopterous host, with several figures of details, particularly the antennal appendages.

The *Trans. Cardiff Naturalists' Society* vol. LXI. recently to hand, is as usual a very interesting contribution to local natural history. It is well edited, well-illustrated and a worthy continuation of the series. A record of some very good work in which our magazine is interested has been compiled by Mr. H. M. Hallett, "A contribution to the Entomological Fauna of Skomer Island," a collection of the results of visits by various members of the Society and of the special expedition organised by the National Museum of Wales in 1928. The Entomological Notes of the year are contributed by Messrs. Hallett and F. Norton.

The *Rep. of the Imp. Entomologist*, Pusa, 1928-9, is a short summary of very useful work done under the chief, T. Bainbrigge Fletcher, F.L.S., F.Z.S., etc. There are 4 plates, one in colour, illustrating the life-histories of two Sphingids, *Theretra alecto* and *T. clotho*, and the very curious larva of a Geometrid moth, *Heteromiza leucogonia*, discovered in 1918, but not reared and identified until 1928. These larvae are remarkable for their apparently irregularly placed large and compoundly branched spines and hairs simulating mossy growths. There are many items in the life-histories of all orders of insects adding to our knowledge of previously recorded imagines.

Rev. Russe d'Ent. pts. 3-4 (1929) of pp. 128 and many figures records a deal of work carried out in several insect orders; 12 articles deal with Coleoptera, 3 with Hemiptera, 2 with Diptera, 2 with Lepidoptera and 1 with Paraneuroptera. A new genus and four new species of *Tortricidae* are described, not *ad hoc* but abundantly comparative and with 22 figs. The biology of a species of *Hepialidae* from the Caucasus, *Phassus schamyl*, is investigated, with three figs. The greater proportion of the matter is in German and therefore is of much greater availability than if only in Russian.

REVIEWS AND NOTICES OF BOOKS.

Our colleague, Richard S. Bagnall, D.Sc., etc., continues steadily his study of the neglected Orders Thysanoptera, Anoplura, Mallophaga, etc. We have just received copies of seven papers recently published by him; two deal with Australian Thysanoptera, those species which make galls and those which are associated with the leaf-glands of the Acacia; a paper dealing with the classification of the Thysanoptera, divided into three suborders, Pseudostigmata (Polystigmata), Tubulifera and Terebrantia; four papers contributed to the *Vasculum* of the present year (1) the Anoplura (sucking lice) of Northumberland and Durham (2) the Ectoparasites of the otter and badger including a rare species new to Britain, *Trichodectes crassus*, the badger louse (3) Records

of some bird-lice, Mallophaga, including a large number of species new to the British fauna, and (4) "On Ecto-Parasites, Lice and Host Ancestry" in which Dr. Bagnall brings together all the facts and discusses what they indirectly teach us of the ancestry of mammals and birds. "One of the first things which strikes the mind of the student of bird lice is the handing down of a parasite, practically unchanged, from the common ancestors of the specifically or even generically different birds of to-day." A fascinating subject.—Hy.J.T.

SEITZ SUPPLEMENTARY VOLUMES.—Parts 11 and 12 of the *Supplementary* portion of *Seitz Palaearctic Macrolepidoptera* have recently come to hand. They contain the commencement of the volume dealing with the Bombyces. There are two plates of 172 figures of the *Zygaenidae* with 32 pages of the corresponding letterpress. In the genus *Zygaena* the species are considered on the basis of Dr. Burgeff's somewhat recent Catalogue, where 12 subgenera are established. This change of classification has made it essential to mention every species and form treated in the original work. Of nomenclature it is stated, "An indescribable chaos prevails in literature in regard to the denomination of aberrations. Names for intermediary gradations in the development of the markings of insects should therefore be excluded. For reasons of lucidity it has been necessary to leave out even a summary of the names of these excluded forms. In regard to the description of races, I am of opinion that one has often gone too far in this respect. Ways and means should be found of avoiding inundating nomenclature with denominations of minute and unimportant variations of the various strains among themselves. It should suffice to establish a larger main race, to describe the distinct variations from neighbouring main races and then to give same a subspecies name of its own. Should anyone desire a further division of such a subspecies, they can indicate the particulars, such as indication of locality, altitude, etc., below the name on the label." Rather than wait for the other collaborators to complete their sections for publication it was thought advisable to get on with the Heterocerous portions, that they might not be inordinately delayed. We might remind readers that the parts can be readily obtained from Messrs. Watkins and Doncaster, of the Strand, who are the agents in Great Britain.—Hy.J.T.

TRANSACTIONS OF THE ENTOMOLOGICAL SOCIETY OF HAMPSHIRE AND THE SOUTH OF ENGLAND.—This publication has now become a regular issue, and the Society by enlarging its sphere to "the South of England" has roped in a considerable number of new members: the membership is now 116. The volume consists of 100 pages with 7 plates and 6 text-figures. All detailed routine matter is omitted and the contents consist of some 9 papers, which have been read at the meetings. Fred. J. Killington has an admirable paper *Synopsis of British Neuroptera*, which will be useful far beyond the confines of the South of England; 6 of the plates and the text figures relate to this paper. Wm. Fassnidge contributes a preliminary *List of the Tortrices of Hampshire*, a nucleus for a complete and full List, in continuation of the List published in 1923-4 as a Supplement to this magazine. F. H. Haines gives a *List of the Tenthredinoidea of Dorset and the New*

Forest, as a preliminary compilation for the aid of a List of another section of the Hymenoptera of Hampshire. Truly the Society is keeping well in hand its main object, the recording of the insect fauna of Hampshire. We think the Society has taken the right line to omit publishing the routine of each meeting, when it would mean the omission or curtailment of such valuable papers and notes as we have given us in this capital production. We wish the Society every success.—Hy.J.T.

FIRST REPORT OF THE ETON COLLEGE NATURAL HISTORY SOCIETY.—In this pamphlet of 42 papers one has an interesting account of a very praiseworthy commencement in the training of young students in making observations of the processes of nature. The newly-formed Society has for its objects (1) Expeditions whenever possible for the observation and collection of the local fauna and flora. (2) Lectures, papers, etc., by masters, members and visitors. (3) The keeping of a Log Book of all observations. From the Report we read that the activity side of the Society's object was very successful and a considerable amount of material was obtained in all orders, but the Log-book contributions are "at present disappointing," and the editor urges members to send in "more photographs and subject matter which they may have collected on expeditions, and observations made at any other time." We would emphasise this and say that however complete an observation may be, unless it is recorded at once, it is only a matter of memory and becomes rapidly incomplete and incorrect in detail. The College possesses a museum which has recently been undergoing general "Spring-cleaning" and a mahogany insect cabinet has been presented to which contributions of specimens are desired. "Notes on the Lepidoptera of the Eton District" compiled by J. M. McC. Fisher from records sent in during 1928-9 is a very useful production. South's 3 vols. are the basis for nomenclature and arrangement; the best for the purpose and use of the Society. It is somewhat unfortunate that errors in spelling have crept into the scientific names, for it is most desirable that the young student should not have the necessity of "unlearning" later on. The errors are partly printer's, partly copyist's and partly "hand me down" errors (*megaera*, *egeria*, *phlocas*, *hyperanthus* in the last category). In the names of the butterflies alone there are nine errors? The following observation is given: "At Butts *Zygaena trifolii*, *Z. lonicerae* and *Z. ulipendulae* were all noticed paired with each other, it seemed almost indiscriminately. Whether this cross-breeding produces the varieties (*e.g.*, *basilis*) which are sometimes found there, I do not know." The ornithological records and observations are considerable and there are 3 plates. We can only say that the Report is an extremely good and useful record of a most successful effort to arouse and sustain the power of efficient, scientific observation among those who later in life may become naturalists of outstanding merit.—Hy.J.T.

[We should like to know if it be a fact that these three *Zygaenids* occur at the same time on the same ground.—Eds.]

We much regret to record the deaths of the following whose spare time interests were more or less centered on entomology: A. W. Mera, Earl Waldgrave, Prof. Selwyn Image and G. T. Lyle; the first three of whom were over 80 years of age. We hope to publish short notices in a later issue.

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P.
Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and
Manx), gothicina forms of gothica and selected unusual forms of incerta, *gracilis* and
munda.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—*Thais cerisyi*, *Polycommatus zephyrus* (Friv) type, *eroides*, *anteros*,
Melitaea trivialis, *Melanargia larissa*, *Coenonympha oedipus*, *leander*.

SIGNOR ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first
class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of
the World.

A copy of: *Schrank, Enumeratio Insectorum Austriae*. 4 plates; 1781. Leather
binding (back repaired); recently catalogued at 30/-. This copy belonged to Stephens,
and bears his autograph with the date 1821. Any fair offer accepted.—*B. C. S. Warren,
14, Av. de l'Eglise Anglaise, Lausanne, Switzerland.*

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of
British Isles.—*C. Zacher, Erfurt, Weimar, Street 13, Germany.*

CHANGE OF ADDRESS.—Kenneth J. Hayward, F.E.S., F.R.G.S., from English Club,
Buenos Aires, to Estancia Santa Rosa, Patquia, Provincia La Rioja. F.C.C.N.A., Argentine
Republic.

Comm. Wyndham Forbes, D.S.O., F.E.S., from Shillingston, Dorset, to Buckhorn
Weston Rectory, Wincanton, Somerset.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. October 1st.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
September 25th, October 9th, 23rd (Ann. Exhibition).—*Hon. Secretary Stanley Edwards,
15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the
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IMPORTANT

TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

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The Entomologist's Record and Journal of Variation.

(Vols. I-XXXVI.)

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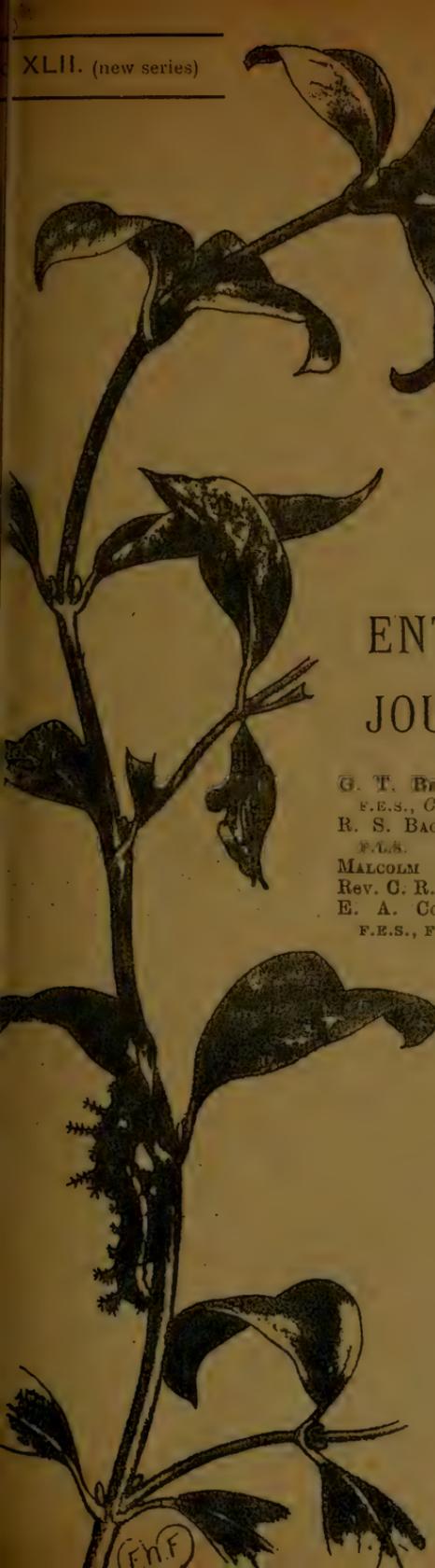
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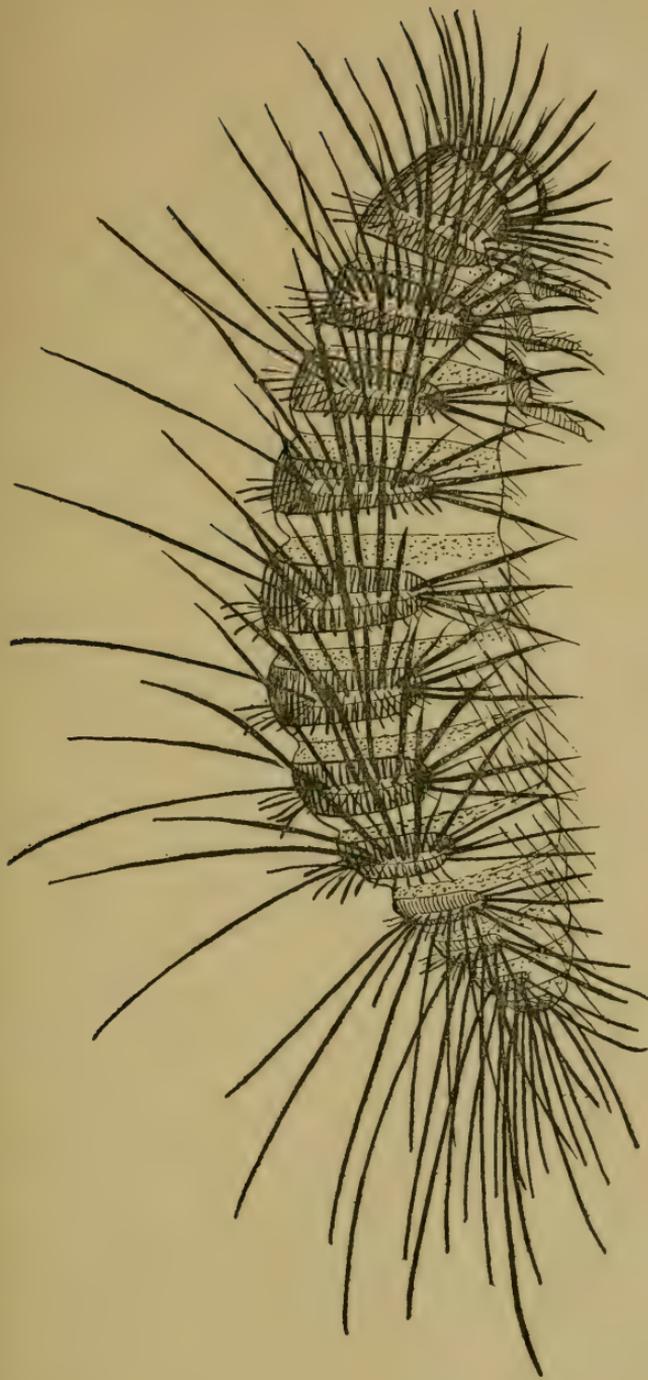
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del. Miss O. F. Tassart.

The Entomologist's Record.

The Larva of *Trinodes hirtus*, F. (Dermestidae, Col.). (With Plate.)

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

Having taken some nine examples of the larva of *Trinodes hirtus*, F., in Richmond Park in July, 1921, I asked Miss Tassart to make a drawing of this curious creature—which we now publish. It was our intention to rear some of these larvae, and to publish notes on their metamorphosis, together with the drawing. The larvae, however, all died during the winter; the plaster cell, in which they had been placed, being kept too damp, and the sketch was put away and forgotten.

Having frequently reared the imago from larvae taken in Windsor Forest during recent years, and having found the sketch again, it seems advisable, especially as there is not a good figure of this larva in existence, to publish this excellent and accurate drawing without further delay. The beetle may always be met with where it is known to occur, but it is undoubtedly a very local and rare insect in this country. It is found in, and about, the webs of spiders, under bark, chiefly of oak (though I have also taken it under loose bark of elm, and poplar), and I have taken it by brushing in hollow trees; and in cobwebs, and on the shelves and walls of deer pens. The larva, of course, occurs in similar positions and often in company with the larva of *Tiresias serra*, F.

The beetle was described by Fabricius in 1781, but the first mention of the larva is by Erichson in 1846, who gave a short description in 1853. Douglas, in 1859, gave a short description of the creature, and Chapuis et Candéze also gave a short description of a larva which had recently produced an example of the beetle. He said the larva pupated in the middle of May within the larval skin under the web of the spider. In 1868 Mulsant and Ray give a good and long description of the larva, but the figure they published is very poor, and, in fact, not a bit like the creature. Ganglbauer mentions what previous authors had to say, and records that he has also found it in the fine web of the house-spider *Tegenaria domestica*, L., and that it ran with great quickness over the web. Dollman, in 1912, records that he and Donisthorpe took the larva in Richmond Park and that it metamorphosed into a well-matured imago. Britten, in 1916, captured a larva on April 24th in Thame Park, Oxfordshire, which pupated on May 3rd, hatched May 13th, and emerged May 22nd.

In Windsor Forest Miss Kirk and I have found imagos in May, June, July and August, the larvae in May, June, July, August and September, and the pupa in May and June.

We find the best way to rear these larvae is to keep them separately in small glass topped boxes with a little damp (not too damp) cotton wool; and feed them on dead flies. Pupation takes place, as with *Tiresias* within the larval skin, and the imago remains *in situ* until mature. The larvae easiest to rear are those taken in May, as they generally hatch the same year—to give the dates of two of the imagos reared:—

a larva taken 4.v.24, pupated 12.v.24, hatched 28.v.24.

„ „ „ 28.ix.26, „ 7.v.27, „ 21.v.27.

As far as we are aware there are very few localities recorded for this beetle in Britain.

Stephens gives near Exeter (W. Spence); and Windsor. Fowler adds Richmond Park (Power); Fowler and Donisthorpe, Coddendam, Suffolk (Fox); and Britten, Thame Park, Oxon.

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APPENDIX.

This appears a convenient place to give a list of some other Coleopterous larvae which I have described, figured, or otherwise dealt with. Firstly my friend Mr. Blair is working at a paper on the Coleopterous larvae of the World; and secondly in a recent paper by A. W. Rymer Roberts ["A Key to the Principle Families of Coleoptera in the Larval Stage." *Bull. Ent. Research* **21** 57-72 (1930)]. In the Bibliography hardly any British authors are mentioned, and certainly none of the papers below are referred to.

1. "Paper as a Pabulum for the larva of *Tiresias serra*, F., with some notes on the larva and its Pupation." [The larva and pupation shortly described.] *Ent. Rec.* **9** 162 (1897).
2. "Description of the larva of *Quedius kraatzii*, Bris." [A full and careful description of the larva.] *Ent. Rec.* **11** 266 (1899).
3. "All that is known of *Metoecus paradoxus*, L." [Life-history, habits of larva, and young and old larvae briefly described.] *Trans. Leicester Lit. Phil. Soc.* **5** 183-86 (1899).
4. "The Life-History of *Clythra quadri-punctata*, L." [Full life-history; eggs, larvae, pupa, egg-case, and larval-cases, etc., described and figured.] *Trans. Ent. Soc. Lond.* **1902** 11-25 (with Coloured Plate).
5. "Coleoptera at Pamber Forest." [Description of the young larva, larval-cases, egg-cases and egg-laying of *Labidostomis tridentata*, L., described.] *Ent. Mo. Mag.* **39** 205 (1903).
6. "Notes on the Life-Histories of two supposed Ants' Nest Beetles." [*Labidostomis tridentata*, L.; eggs, egg-cases and egg-laying, and young larvae and larval cases described and figured. *Prionocyphon serraticornis*, Müll.: larva and pupa figured for the first time; the reference to their description given and bionomics dealt with.] *Ent. Rec.* **20** 108-10 (1908) (with plate).
7. "Myrmecophilous Notes for 1909." [Larva of *Cetonia flavicola*,

Hrbst. and the fact that it does not use its legs for walking but moves along on its back by means of the bristles on the dorsal surface first mentioned].

Ent. Rev. **21** 287-91 (1909).

8. "A note on *Cryptocephalus bipunctatus*, L., etc." [Notes on the egg-laying, larval-cases, etc., of various species, and references to the description of egg, larva and pupa of others given.]

Ent. Mo. Mag. **53** 128 (1917).

9. "The Myrmecophilous Lady-Bird *Coccinella distincta*, Fald., its Life-History and Association with Ants." [Complete life-history, eggs, larvae and pupa described and figured. "Donisthorpe has published the only complete history of any species [of Lady-bird]." Mrs. Merrit Hawkes. *Proc. Zool. Soc. Lond.* 1920 476.]

Ent. Rec. **31** 214-22 (1919) : **32** 1-3 (1920) (with two plates).

10. *Tiresias serra*, F., and its larva." [The observations on the larva for 86 years recapitulated; references to all descriptions and figures of the larva and pupa given; the use of the tail hairs explained.]

Ent. Mo. Mag. **56** 206 (1920).

11. "*Platyrhinus latirostis*, F., near Bristol; and a description of its larva (previously unknown)." [A careful and accurate description of the larva; with beautiful drawings by Miss Tassart.]

Ent. Rec. **32** 157 (1920).

12. Notes on the Myrmecophiles found with *Acanthomyops* (*Donisthorpea*) *brunneus*, Latr., in Britain." [The larva of *Euryusa sinuata*, Er., carefully described.]

Ent. Rec. **36** 133-39 (1924).

13. "The Bionomics of *Ludius ferrugineus*." [The rearing of the imago, habits and position of larva in pupation, etc., described.]

Proc. Ent. Soc. Lond. **2** 29 (1927).

14. "The Guests of British Ants." [Larvae of *Lomechusa strumosa*, F., *Dinarda dentata*, Gr., *Quedius brevis*, larva and pupa, figured, etc., etc.

London (1927).

Notes on the relationship between the Melitaeidi and particularly between those of the *athalia*, Rott., group.

By ROGER VERITY, M.D.

(Continued from p. 120.)

The next question there is to consider is that of the western group *athalia* in connection with the group of races which Reverdin has named *pseudathalia*, but which the Rule of Priority obliges one to call *helvetica*, Rühl. (*Soc. Entom.*, III., p. 133 (1888), because this peculiar race from Graubünden (Bergün) belongs to it and was the first which received a name. I possess it from Filisur and it corresponds with the "type" in the Rühl collection, now preserved in Florence at the *Stazione di Entomologia Agraria*. It is a very small and dark alpine race, with very white, silvery, spaces on the underside of the hindwings, especially in the female, which has a broad black suffusion covering the basal half of the wings on the upperside. Having found that the genitalia of that group are constantly different, to a marked degree, from those of the group of races which includes nominotypical *athalia*, Reverdin introduced it as a distinct species, though he made no mystery

of the serious doubts he had about it. In general, the more of these cases are discovered, as they lately have been, consisting in groups which are entirely representative of each other, one finishing exactly where the other begins, the less I can bring myself to believe they must always be regarded as equivalent to the true species, which spread together over the same territories, and are thus evidently so completely distinct that they do not interfere with each other. In the particular case of *athalia* and *helvetica*, Reverdin's strongest argument (*l.c.*, p. 29) is that *aureliaeformis* and *helvetica* fly together in the Venaria Park of Turin, because he was firmly convinced that the former was a race of nominotypical *athalia*. Had he been acquainted with Suschkin's experience, he would no doubt have come to a very different conclusion. We see that, according to what has been said above, *aureliaeformis* simply flies with *helvetica* at Turin as it does with nominotypical *athalia* in Russia and in Siberia, because it is a distinct species from both. Reverdin's second argument was that amongst several specimens of *athalia* received from Saint-Come, in the Gironde, one had *helvetica* genitalia, so that he concluded also there the two fly together and do not interbreed. It seems to me that the facts I have observed and described quite lately in this *Journal* in connection with the *aurinia* and with the *didyma* of that locality are strongly suggestive of another view also in the present species. We have seen that the Gironde is on the boundary between the range of the northern exerge of those two species and of many other Lepidoptera and the range of their Central exerge. In *aurinia* one finds at Saint-Come a mixture of *debilis* and of *provincialis* and of every grade of transition, showing that that race is a synexerge produced by interbreeding of the two; in *didyma* the first generation *garumna*, Vrtý., exhibits a mixture of the features of nominotypical *didyma* with those of the largest forms of the Central exerge and the second generation differs little from the former, so that the race is obviously a synexerge too. Is it not very natural that the very handsome race *vidivior*, Lhomme, of that locality should in the same way be the synexerge between the Northern nominotypical *athalia* and its Central exerge *helvetica*? To the naked eye this would not show, as in the preceding species, because there is no sharp and constant feature that distinguishes them, but if transitions were found in the genitalia, mixed with pure ones, this fact would be established. Reverdin does not say whether those he examined were all highly characterised or not. (As I am dealing with this race I propose giving the name of **postvidivior** to the second generation of August, which is distinguished by its much smaller size and duller tone of colour.) The facts, which puzzled him considerably and which he considered a serious objection to his theory of the specific distinctness of *athalia* and *helvetica*, were that a specimen from Isenfluh, in the Bernese Oberland, and all the specimens received from the Jura of the Soleure canton, near the frontier of the Bâle-Campagne canton, exhibited in their genitalia a mixture of the characters of the two. He remarked that those regions are precisely on the boundary between their two areas, so that one had every reason to believe those individuals were "hybrids." We can fortunately see these facts in a new light, as true hybrids in nature are so excessively rare that they may be said scarcely to exist and all the hybrid explanations of last century have been done away with. The Soleure

specimens were just what was needed to show clearly that *athalia* and *helvetica* are simply two exerges of the same species, which have produced, there, a synexerge, one can call race **synexergica** on the strength of its constant, or nearly constant, intermediate features. It will also be noted that their distributions exactly correspond to those of the Northern and of the Central exerge of many of the most broadspread species. Nevertheless this fact alone would have been no proof. There are plenty of examples of a distinct species being representative of another near ally, in one of the zones, which the latter does not reach. In this group *M. dejone*, Hüb., is the only one which represents it in the Southern Zone. At the present day it has only survived, in this zone, in the extreme western part, but it is clear that it must have spread there, presumably through Asia Minor and the Greco-Tunisian isthmus, as part of the general migration, which the distribution of a large number of species of all sorts suggests having occurred in exactly the same way from Eastern and Central Asia, where one picks up again their line of ancestry, notwithstanding the great distance that separates them. There is, for example, the remarkable case of exerge *coreana*, Tutt, a giant one, unlike any other race of *Lycacides* (*Plebeius*) *argus*, L., described from Corea, which I Sutshanski (Ussuria) in the subtropical parts of Amurland possess from and which is, on the contrary, so exactly similar to *bejavensis*, Chapm., of Bejar, in west central Spain, that they are hardly separable. One can only, in consequence, consider them as the surviving remnants of a southern exerge of that species. I have shown that *Anicia cramera* (Ersch.) Vrtty., of Spain is considerably similar, in the same way to *chinensis*, Murr. This gap in their distribution can be explained in that they migrated during the still considerably hot climate of the early Miocene and became thoroughly acclimatized to it, so that, when the temperature fell very much, at the end of that Epoch, they died out and, in this case, *dejone* was superseded by the flow of *helvetica*, which was better suited to the new climate in Asia Minor; *dejone* survived where it had reached the mild climate of the Atlantic coast region, which in those days spread far out to the warm currents of the Gulf stream, and so did the other organisms with the same sort of constitution*. The objection to this view that *dejone* cannot be very sensitive to such changes of climate because it inhabits some valleys of the Alps, can be done away with by remarking that about two millions of years must have elapsed since the time when we think it must have passed through Asia Minor, so that it can very well, since then, have developed in its more northern race a constitution it did not have and *berisali*, Rühl, is, no doubt, an exerge rather than a simple race, on this account. Examples of species of the extreme west having their nearest connections in Central Asia are, as I have said in connection with *M. desfontainii*, so numerous and varied and point so

* The variations of many broadspread species seem to point to the interesting conclusion that the first grade of the Palaearctic evolution is found in eastern Asia, where they resemble their nearest Asiatic and American allies most, the second grade is found in Morocco and in the Iberic peninsula, the third grade along the Central route, from Central Asia to its Mediterranean portion, the fourth consists in the Temperate exerge of the Northern Zone, from Southern Siberia to Central Europe, and the fifth consists in the Glacial exerge, now restricted to the high mountains of the latter region and to the Arctic region.

clearly to the same conclusion that one feels quite satisfied it is the correct one. In this *Journal* I have pointed out several, in my papers on *aurinia* and on *didyma*, but I must alter my view of *aetherie*, Hüb., as a western offshoot of *phoebe*; it is now obvious that it is a parallel branch and an early thermotropic, like *desfontainii* stands to *aurinia*; the resemblance of *aetherie* to *minerva* shows its early origin and its older aspect than that of *phoebe*. In the *Annales de la Société Entomologique de France*, XCVIII. (1929), pp. 340-355, I have endeavoured to reconstruct the descent of the *Anthocharidi*, amongst which it will be noticed that *Euchloë tagis*, Hüb., inhabits, now, exactly the same area as *dejone* and has its closest connections in *pulverata*, Chr., of Central Asia and, through it, in *orientalis*, Brem., of N.-E. Siberia, and *creusa*, Doubl. and Hew., which has spread, in this case, from Asia into North America. After the Glacial periods *M. dejone* spread, with *E. tagis*, from Andalusia, through Central Spain and France, to the Alps. It is the Africo-Iberic butterfly which has reached furthest east in this region, being found in the Upper Adige (South Tyrol), where I have myself collected it at Ponte all' Isarco (Waidbruck). As an effect of the comparatively cold and damp climate of the Valais, exerge *berisali* has acquired the same heavy black pattern as *athalia*, so that Staudinger actually took it to be a variety of the latter, but its genitalia have, in the short period it has inhabited the Alps, not changed in the least from what they were in Africa. *Melitaea athalia* and *dejone* are a good instance affording an explanation of the way one often finds two excessively similar species living together. It might have seemed a freak of nature, whereas we now see it is the consequence of past conditions, when a species has had to undergo extreme, opposite ones in different Epochs and in different regions; both the organic balances produced to survive these extreme conditions are often able to live also in intermediate ones and thus the two meet again in times and in localities where such intermediate conditions occur; as a rule they have also taken to different food-plants, so that they encroach in no way on one another. In this case such localities extend from the Castiles to the Valais and a few hot and dry Alpine valleys, where *dejone* has managed to slip, probably during some particularly warm post-glacial period. What has kept it from spreading more into Italy must have been the dampness of the Po basin, which was covered by marshes and then artificially cultivated. As I am dealing with this species I must mention it is one of the few in Europe whose second generation has not yet been described and named; it differs strikingly from the first by its much smaller size; in the male the expanse between the apices is 30 to 32mm. against 34 to 36 and the length of forewing is 17 against 21; in the female the expanse is 34 to 36 against 38 to 40 and the length of forewing 19 against 22. I call it **dejonella** from a series of specimens of August 8th, collected at St. Zacharie (Var).

As to *athalia*, its Central exerge *helvetica* has advanced in the opposite direction by the Aegeo-Piedmontese, or Northern Mediterranean, route and, through the south of France, as far as the Castiles and central Portugal, where it has developed into the gigantic race called *iberica* by Staudinger. This name, however, is a primary homonym of Oberthür's *aurinia* and it must be substituted; I propose that of **iberagigas**. Also the name of *caucasica*, Stdgr. (1871) must be replaced by **caucasogenita**, according to the same Rules, as it had

been used twice in this genus. Ribbe, in his Catalogue of the Lepidoptera of Andalusia, sustains most positively that *athalia* does not exist there and that Seitz's race *magna*, described from "the south of Spain," is the *dejone* collected by A. Bang-Haas. He concluded that Seitz's name is a synonym of *nevadensis*, Obth. I should say there may be a doubt in the sense that Seitz's figure represents a larger and more richly coloured insect than Oberthür's and it might belong to a different race of *dejone*, from the lowlands.

I find no record of the second generation of *athalia* in the Iberic Peninsula and as a rule it is, apparently, not produced, as in the case of *didyma* and other butterflies, in which it is, on the contrary, quite usual elsewhere in the south. Querci, however, collected an abundant one, from July 24th to August 20th, in the Serra da Estrela, m. 800 to 1000 (Central Portugal), where he had found an equally abundant first generation on the wing during mid-June, corresponding to *iberagigas*. The second generation is very much smaller: in the male the expanse between the apices is about 30mm. against 35 to 38 and the length of forewing 17 against 21; in the female the expanse is about 32 against 40 and the length of forewing 20 against 22, so that the impression one has is of an insect half the size of the first; the tone of fulvous is on an average lighter, the pattern slightly thinner and the basal black suffusion not as broad nor as deep in colour: II. gen. **iberanana**.

According to the remarks I have made and the conclusions I have come to, the *Melitaea* of the *athalia* group work out as follows in a tolerably natural and satisfactory order, from the earliest to the latest, on the main specific line and again in each specific group. (Compare with the Table. The races, which have not been dealt with particularly in this paper are not mentioned):—

<i>M. hoffmanni</i> , Behr.	forms and races <i>britomartis</i> ,
<i>M. sindura</i> , Moore.	Assm. and <i>dictynnoides</i> ,
<i>M. baicalensis</i> , Mén. = <i>arcesia</i> ,	Horm., in Europe.
<i>M. varia</i> , Meyer-Dür. Mén.	race <i>aureliaeformis</i> , Vrtv.
race <i>alataunica</i> , Stdgr.	<i>M. dejone</i> , H.-G.
<i>M.</i> , or <i>exerge</i> , <i>parthenie</i> , Bkh*.	<i>M. athalia</i> , Rott.
<i>M. asteria</i> , Freyer.	<i>exerge helvetica</i> , Rühl = <i>pseuda-</i>
<i>M. aurelia</i> , Nick.	<i>thalia</i> , Rev.
<i>M. britomartis</i> , Assm.	Various European races.
race or <i>exerge septentrionalis</i> ,	<i>exerge athalia</i> , Rott.
Vrtv. = <i>orientalis</i> , auct. nec.	race <i>ambigua</i> , Mén. = <i>kenteana</i> ,
Mén.	Seitz = <i>tinica</i> , Frhst.
form and race <i>latefascia</i> , Fixs.	and various European races.
form and race <i>coreae</i> , Vrtv.	<i>exerge nippona</i> , Butl. = <i>mand-</i>
forms and races <i>imitans</i> , Vrtv.,	<i>schurica</i> , Fixsen = <i>bathilda</i> ,
<i>plotina</i> , Brem. and <i>seminigra</i> ,	Frhst. = <i>sutschana</i> , Rev.
Seitz, in Asia.	
race <i>mayi</i> , Gund., in America.	

* The question as to whether there exists a specific distinction between *varia* and *parthenie* must remain open until it can be ascertained that they do not, or that they do, interbreed, possibly, by discovering a locality where they fly together. In the case of *didyma* and *ala* it can be considered proved by a series of specimens in the British Museum and by one from the Karagaitau in my possession; in both they can be readily separated on the strength of the thinner and neater underside black markings of *ala* and no transitional forms exist amongst them.

Description of the larvae of *Ceratocampa brisottii*, Bsdv.

Length 9-10cm.

Head deep olive green, with a few short whitish-brown setae, the face olive-brown, the maxillae black, the antennae dark brown. In colour dark grey with a greenish tinge, the abdominal segments, except the penultimate and anal, with a white marginal edge running from slightly below the lateral row of orange tubercles to the margin at two-thirds, and then turning upwards as a wider area, the segments having the appearance of carrying some white draping material.

The larva is characterised by the numerous light orange tubercles and horns, placed as follows.

A dorsal pair of tubercles, widely spaced on the centre of each abdominal segment, except the last two, in length about 1mm., slightly conical, with small projecting conical points, all black tipped, the tubercles slanting posteriorly. A lateral row of similar tubercles on every segment, of similar size but fewer branches. A marginal row on every segment, more spined than the lateral row, and setose. These arise from the lowest point of the white "edging." The head with a light greyish-pink patch dorsally, extending posteriorly over half the segment. On the forward fold dorsally a pair of forward pointing straight horns 3mm. long, three-quarters light orange, black tipped, branched as the tubercles above mentioned but the branches setose and not black tipped. Three tubercles on either flank placed on the forward fold, the dorsal tubercle on the light patch and smaller than the others, setose, in shape and colour resembling the remainder. Across the light patch two black longitudinal stripes within the horns and extending to the posterior fold. The light area with a small black dash at its edge, the lateral tubercle with a dark crescent above it.

The second thoracic segment with two forward pointed horns 17mm. in length, the lower 10mm. consisting of an elongated cone-shaped process 1.5mm. in diameter at its base and of the ground colour. From this projects a black-tipped light orange horn, branched, setose, similar in form to the tubercles. These horns are flanked by a dorsal, lateral, and marginal tubercle of the usual form. The third thoracic segment similar to the second but the horns slightly curved posteriorly, 19mm in length, of which the elongated cone of the ground colour is 11mm. and 2½mm. in diameter at its base.

The eighth abdominal segment with a large horn similar to those on the 2nd and 3rd thoracic segments, pointing backwards, the cone 10mm. in length, and in diameter at its base about 3mm. The black tipped orange projection to this horn 4mm. long and without setae. The ninth abdominal segment has three small dorsal tubercles similar to the others and in addition to those already mentioned.

The anal segment covered with small brownish conical warts, the larger ones black tipped, and some with short setae.

The spiracles black, enclosing a lighter dash and on a slightly pinkish ground.

On the forward portion of each segment a thin black line circling the body, the remainder of the segment with numerous black or dark blotches, spots, hairlines, etc. which are both very variable as also asymmetrical.

Above the white edging on the forward portion of each segment a dark olive shade.

Beneath deep olive green. The first two abdominal segments with a submarginal tubercle similar to the others, on the remaining segments a number of minute setose light orange warts, especially on the non-legbearing segments. The legs ringed with similar warts. The thoracic legs with black claws, the abdominal legs with a dark outer stripe and black claspers. The anal claspers black. Fairly common around Buenos Aires. The specimen described from peach.—KENNETH J. HAYWARD (F.E.S., F.R.G.S.). Bs. Aires. July 31st, 1930.

The Genus *Brenthis*, Hüb.

My attention has been called recently to the genus *Brenthis*, Hübner, and to the inclusion of various species, more or less incongruous, in that genus by many modern authors. Apropos of this question it may not be uninteresting, to say the least, to quote the opinions, whether we accept them or not, of the late W. H. Edwards, on the works of Hübner, expressed in the *Canadian Entomologist* in October, 1875. Edwards is discussing the curious racial phenomena in the species *Brenthis (Argynnis) myrina* and continues, 'But in passing we may as well look into the facts about this genus *Brenthis-Brenthis*, Hübner (*Scud. Syn. List.* 1875) and learn something about the manufacture of modern genera.

'The species *myrina* is closely like *euphrosyne* of Europe, and congeneric with it, no matter how *Argynnis* be split up. Hübner, in his *Verzeichniss*, amused himself with assorting the known butterflies into batches, or panels, as a child would sort his alleys and taws, by color, stripes and shape, putting blues into one lot, brown into another, one-striped into a third, two-striped into a fourth, regardless of characters which would be generic, that is, *which would indicate blood relationship or a common descent*. It is a very rare thing to find one of his batches,—which he called a coitus, meaning a batch or assemblage, and which is in no sense a genus, for the element of common descent does not enter into this whimsical system—co-extensive with a genus. It is by the merest chance if it is so. Nor does the coitus correspond with a natural group under a genus. At first sight it may sometimes seem to do so, the species being assorted in twos and threes, but it will be found that whether the coitus embraces two or twenty species, the butterflies under it are most likely such as belong to distinct genera, and sometimes so distinct that one hundred or two hundred pages of Kirby's Catalogue separate them. And an instance of this mis-assortment is found in the coitus *Brenthis*. Under this head are ranged five species, *viz.*, *hecate*, *dictynna*, *thore*, *daphne*, and *claudia*, the latter as much out of place in such company as a horse in a drove of asses. But the horse is dapple and the asses are dapple, each one has a tail and two ears, and behold a Hübnerian coitus! The definition of *Brenthis* is "the hind wings below gaily clouded, pale spotted," and it is arranged under the first family of the fifth stirps. This family is called *Recticulatae* and embraces two coitus only, *viz.*, *Phycodes*, under which our *tharos* comes, and *Brenthis*. The definition of the family is thus given :

"The wings above striped like grating; the hindwing below spotted with colored spots on a pale yellow ground, marked with eye-like spots." *Thore*, an European species very much like our *bellona*, and congeneric with it as *myrina* is with *euphrosyne*, is placed in *Brenthis*, along with *claudia* and these are separated from the batch which includes *myrina*, not merely by the limits of a coitus, but of a family even, in order to get them among the *Reticulatae* by the side of *tharos*. This next family the *Phalaratae*, is thus defined: "The wings differently spotted, the underside ornamented with pearl-colored spots." And the first coitus under it is *Argynnis*, the definition of which is: "the hindwings below variegated, spotted with shining white." Under this coitus comes *euphrosyne* and therefore *myrina*, included in this loose definition solely because it has white spots. Two more coitus are made, called *Issoria* and *Acidalia*, which include the larger species of *Argynnis* (not Hübner's), *lathonia*, *cybele*, *diana*, etc. Of these absurd divisions Mr. Edward Doubleday (Remarks on the genus *Argynnis*) says: "they are so unnatural that they can in no case be adopted."

But suppose these batches were not unnatural, but were co-extensive with genera, how comes *myrina*, which, as it agrees with *euphrosyne*, is placed by Hübner under *Argynnis*, filling in some little degree the requirements of that coitus, to be remanded to the coitus *Brenthis*, which belongs to another family even, placed alongside of *Phyciodes tharos*, and the requirements of which coitus does not fill at all? It is an unwarranted use of Hübner's name, applying it to what he expressly says it shall not be applied. It is taking one of his blue taws and dropping it among the striped ones, doing violence to all his notions of symmetrical arrangement. He would have rejected the blue taw with abhorrence. What does the word "*Brenthis*, Hb." mean, if not that the genus *Brenthis* was created by Hübner, and that his definition includes the species sought to be placed under it? If it has any other meaning I am ignorant of it, and if it does mean that it is false. This is a fair sample of the uses to which Hübner's absurd and worthless Catalogue has been put. Very few lepidopterists in this country [America] know anything of Hübner's books and most are disposed to accept in some degree the dicta of anyone who sets up to reform the nomenclature.

But if reform be needed, which is very questionable indeed, it is not to be brought about by lugging Hübner into the arena. To get back at this time of day to the *Verzeichniss*, is to go back to the balls, and tops, and games of school-boys.—H.J.T.

SCIENTIFIC NOTES AND OBSERVATIONS.

A STRANGE ABERRATION OF COLOUR IN THE LARVA OF *DICRANURA VINULA*.—The larva was bred from an egg found by Mr. T. R. Eagles at Enfield. In its penultimate instar all the usual brown markings were replaced by black. The fine black longitudinal striae, very dense at the outer part of the saddle, gradually became less numerous towards the dorsum and finally disappeared leaving the dorsal area green. In its last instar the head was of the usual brown colour, but the 'face' was pale yellow instead of red, and the prothoracic plate was pale green. All the usual red-brown or purplish markings were replaced

by blue-gray, near Ridgway's Cadet-gray. This was the only colour visible at the edges of the dorsal marking, but further inwards the striae became less numerous and showed the yellow-green ground colour, and the dorsum of the thorax and saddle was a clear yellow-green. The anal plate was very pale gray and the black edges showed with unusual clearness. The white line tinged with yellow separating the dorsal marking from the ground colour was normal. There was a gray spot surrounded by white above the second proleg, and the ventral markings of the last abdominal somites were present but gray. The ground colour above the spiracles was yellower than usual. The whips were red. I have seen no account of a similar form, which is probably a new or rare mutation.—E. A. COCKAYNE, (D.M., A.M., F.E.S.), 116, Westbourne Terrace, W.2.

MATING HABITS OF *ANDRENA ARGENTATA*, ETC.—With reference to the "marriage flight" of *A. argentata*, Smith, as observed by Mr. Donisthorpe in Windsor Forest: From my own experience such a flight as described would appear to be the normal mating habit of this little *Andrena*, if not of most other ground-burrowing solitary bees that colonise extensively—*i.e.*, in which the females form individual burrows close together, season after season, in a particular stretch of cliff or pathway.

The males always appear a day or two earlier than the bulk of the females (which in any case they seem greatly to outnumber), hence in a flourishing colony the scenes of rivalry are for a short time intense. In the case of *Colletes glutinans*, Cav. (*succincta*, L.) I have seen, at quite a moderate estimate, a score or more males struggling frantically for possession of a single female—the latter unfortunate, caught just as she left the nest, being completely covered by a host of her admirers. Practically all my males of *Andrena* have been obtained whilst actually flying or crawling near burrows—rarely when found otherwise are they in sufficiently good condition for study. In some few species, however, such as *A. albicans*, the females of which usually scatter their burrows singly over large areas of meadow land, both sexes appear largely to abandon the vicinity of the nesting holes (many of which are completely concealed by long grass) directly after emergence, and collect for meeting purposes about sheltered hedge-rows or bushes—the males often in countless thousands.—H. P. JONES (F.E.S.); Nat. Hist. Museum, Wollaton Hall, Nottingham.

NOTES ON COLLECTING, etc.

COLLECTING IN CANADA, THE STATES, ETC.—A picture post-card from Mr. Walter Dannatt illustrates a portion of the "Bright Angel Trail from near El Tovar Grand Canyon National Park, Arizona." He writes, "I am having the time of my life. I am returning through the United States having left my friends at Victoria, British Columbia. This canyon beats everything I have seen. It is 40 to 60 miles across, and never the same. To-day I have taken *Papilio philenor*, which when fresh is remarkably pretty, *P. zolicaon*, *Euptoieta claudii* and several "skippers." In Canada before crossing into the States, I took, *Limenitis arthemis*, and *L. lorquinii* with *Vanessa milberti*, *Pieris menapis*,

Colias eurhytheme, *Pieris rapae* and *P. napi*. I have also seen *P. troilus*. "Parks" in Canada are virgin forest land. I have been to the Yosemite valley, went through the famous 5000 year old Sequoia tree in a coach as one sees in the illustrations, camped in the Yosemite valley and sat around the camp fire under the Redwood trees. I want to get among the tropical diurnals so think of returning via *Bogota*, near where there is a *Morpho* farm."—WALTER DANNATT.

THE SEASON—Reports have reached us of the capture of various immigrant species this season. *Agrius (Herse) convolvuli* has appeared in the Isle of Wight, one collector taking three specimens. At Eastbourne several specimens have appeared and a pupa was turned up in a potato field, where the convolvulus was abundant. The wife of Lt. Col. Hemsley took a specimen of *Rhodometra sacraria* on September 7th on the coast near Lyminster. The assiduous collecting of the same collector has produced a *Leucania vitellina* on September 18th and *L. l-album* on September 21st both close to the same place. All who went to Royston this year, we hear, were greatly disappointed, except the one individual who went there after all had gone, and he did well he tells me. *Colias croceus* has turned up sparingly along the S. E. coast and one *helice* is reported. *Polygonia c-album* still continues to increase its area of occurrence. We have heard of a pupa occurring in the London surround. Mr. Fassnidge reports abundance of lepidoptera at Digne during August, so much so that he says he was unable to deal with his captures. General report has it that the season has been far from good this year but our readers report so little to us that we are unable to judge adequately on it.—Hy.J.T.

AGRIUS CONVULVULI, L. AT COVENTRY.—I was both surprised and pleased to have a specimen of the convolvulus hawk-moth, *A. convolvuli*, L. brought to me to name, that had been taken in the town, on Sept. 14th. Although this moth has been met with before in recent years it is considered a great rarity and worthy of recording.—J. W. SAUNT, (A.L.S.), "Epperstone," Bulls Head Lane, Coventry. Sept. 24th, 1930.

CURRENT NOTES AND SHORT NOTICES.

The Meeting of the South London Entomological Society to be held at their rooms on Thursday, October 23rd, will be devoted to the Annual Exhibition of all Orders, Varieties, and other interesting Objects of Natural History, and will commence at 6.30 p.m. All visitors and friends interested in Natural History will be cordially welcomed. Intending exhibitors may obtain a Form of application for space from Mr. Stanley Edwards, Hon. Sec., 15, St. German's Place, Blackheath, S.E. 3.

The *Can. Ent.* for March has an interesting account of a series of observations on the flight behaviour of Bumblebees (orientation), by T. H. Frison. He concludes with his views that "the homing of the true bumble-bees (*Bremus*) is best explained as being due to the associative memory, involving mainly visual perception and aided at closer distances by chemotropism" (odour). The latter he says is not as important as visual impressions in these bees.

In the *Ent. News* for April, A. C. Cole, Jr. of Columbus advocates

two methods of the preservation of lepidopterous larvae. 1. Injecting with the viscera removed. 2. Injecting with the viscera retained. There is a copy of the composite photograph taken of those who attended the Entomological Congress at Ithaca last year. J. D. Gunder contributes another article of the series on the Institutions of the U.S.A. "featuring" Lepidoptera; this one deals with the Cornell University, Ithaca, and includes a copy of a photograph of Dr. J. H. and Mrs. A. B. Comstock and also of Dr. W. T. M. Forbes, Messrs. Klots and Richards of the staff. Dr. Howard gives some interesting notes on three New Zealand Entomologists of fame during the last century. Messrs. Hutton, Brown and Maskell.

The *Int. Ent. Zt.* of April 22nd has an account of the breeding of *Lycaena alcon* with many observations on the egg and early stages with especial reference to the inter-relations of the larvae and ants. There are figures of the ova on the flower-buds of *Pneumonanthes*, and of the larva and pupa.

The *Zeit. Oesterr. Ent. Ver.* for April contains 4 plates and a number of text figures illustrating the articles recently appearing on the two *Dysstroma*, *D. truncata* and *D. citrata (russata)*. No less than 66 examples of the imago are figured and numerous illustrations of genitalia, venation, palpi, anal hooks, etc., are included.

The Annual volume *Boll. Lab. Zool. Gen. e. Agr.* of Portici, Italy, is, as usual, a very valuable record of useful investigation of insect economy carried on in the Institution during the past year. 320 small quarto pages with a wealth of text figures, and numerous plates are occupied by the thirteen memoirs, five of which Prof. Silvestri is the Author. Comte Emilio Turati gives a list of the Heterocera collected in Tripolitania by Dr. Romei and Signor Ederli some years ago, and notes on the species with descriptions of numerous new forms and species. There is one plate and seven text figures of the new species.

A remarkable and interesting autobiography of an entomological life has reached us from W. S. Blatchley, A.B., A.M., LL.D. of Indiana: *Blatchleyana*. It consists of a List of his published writings some 197 in number, a Chronology of his life annotated with personal notes and reminiscences, a List of the Species and Varieties of Coleoptera, Heteroptera and Orthoptera described by the author, with citation to the original descriptions, the location of the types, similar particulars as to the Families, Subfamilies, Tribes, Genera and Subgenera founded by him, and sundry items of personal references. Born in 1859, with a modicum of education he commenced peddling in 1877, and subsequently with praiseworthy persistence he went through the Indiana University. About 1884 he became interested in natural history and from that time gradually attained eminence in his study until in 1894 he was elected State Geologist of Indiana, a post which he held till 1910. There are two portraits, one of recent date and one at the age of 45. The main portion of the volume should prove of the utmost use for future workers in the orders mentioned.

The *London Naturalist* for 1929 to hand is a record of the doings of the several specialised branches of the London Natural History Society. The Reports of the year range from Archaeology to Ramblers, that on Entomology occupying one page to which must be added four and a half pages on Plant Galls by one of the Secretaries

H. J. Burkill, needless to say containing some very interesting and useful matter. Among the short papers printed are one by J. C. Robbins "A Dipterous Leaf-miner on *Cephalanthera grandiflora*," "A List of British Gall-Mites," by H. J. Burkill, "*Coeliodes cardui* (Col.) a garden pest," by M. Nibblett, and two further papers by the indefatigable Secretary, one on "British Butterflies in 1929" and another "Heterocera Notes in 1929." There is an interesting account of the founding of the North London N.H. Society by four small school boys in 1886 and its subsequent growth and expansion.

The *Bulletin des Institutions Royales d'Histoire Naturelle à Sophia*, Bulgaria, Vol. III., is a portly quarto volume of more than 250 pages and a large number of illustrations. Most of the matter published is in German and French, except (unfortunately for us) the second portion of the comprehensive article on the Lepidoptera by the very able Dr. Iw. Buresch and Dr. Tuleschkow, "Die horizontale Verbreitung der Schmetterlinge in Bulgarien." This occupies more than 100 pages and we feel assured is, and will be, of the utmost use to those countrymen of Dr. Buresch who are interested in the Lepidoptera. It deals in a most thorough manner with 165 species (*Thecla spini* to *Thyris fenestrella*). The previously published portion dealt with 109 species of Rhopalocera, occupying more than 100 pages of Vol. II. in 1929. A short article by L. Czerny records with notes the species of Diptera which have been met with on the snow and at high altitudes.

REVIEWS AND NOTICES OF BOOKS.

The results of Dr. Eltringham's investigations on the intricate and obscure organs and structures of insects are well known to most entomological students. In the *Histological and Illustrative Methods for Entomologists* published by the University Press, Oxford, Dr. Eltringham gives us a detailed account of the methods which he has proved so successful. As the author points out in the preface, "There is an enormous field for research in Insect Anatomy and Histology" for "Insects have proved themselves the most successful of all living creatures, and in the long process of their evolution have developed adaptations to almost every conceivable mode of life," and "It is therefore not surprising that their structure should often be complicated and even rather mysterious." Each worker develops his own particular methods of handling his subject and it is well that we should have the minutiae of the processes explained to us by one who has found them so successful as Dr. Eltringham has. The apparatus and its adaptation is fully described: the reagents and materials used are detailed as to their respective capabilities; the preparation of various structures for examination, including particularly genitalia, is described; and a considerable amount of matter is devoted to Section-cutting, Staining and other difficult processes, with especial attention to methods of dealing with chitin. The book closes with notes on making Drawings, Colouring Lantern-slides and Photographs, and making Models, and there are various necessary illustrations. This work is highly to be recommended as giving us the results of the personal experiences of one of the most successful of our scientific entomologists of the present generation. Mr. H. Britten of Manchester has contributed a chapter describing his very successful methods of mounting small insects whole.—Hr.J.T.

Two further parts of *Seitz Supplementary Volumes* to the Palaearctic Fauna are to hand. Part 13 deals with the genera *Melanargia*, *Oeneis*, *Satyrus* (*sensu lato*), *Pararge*, *Aphantopus*, *Epinephele* and *Coenonympha* (part). Including most of our common British Satyrids the part is particularly interesting and useful to entomologists of this country. The matter is quite up to date for we find that the 3 races of *Epinephele jurtina* recently described by our colleague Major Graves are fully considered. We would call attention to the very detailed article on *Melanargia galathea* of more than three large quarto pages, which no student of British butterflies should fail to read. The prior, correctly spelt, names are used—*aegeria*, *hyperantus*, *galathea*, *jurtina*, *megea*. The figures appertaining to this part have already been published. Part 14 contains the completion of the *Zygaena* species with one plate and the list of references to the original descriptions. This last is one of the outstanding utility features of the whole of Seitz volumes. This part is also indispensable to British entomologists dealing, as it does, in an exhaustive way with *jilipendulae*, *lonicerae*, and *trifolii*. *Stoechadis* is treated as a subspecies of *jilipendulae* from which "it is not easily differentiable." There is one plate of 82 figures, making in all over 220 coloured figures of the one genus, additional to the very large number already published in the main volume. In dealing with *galathea*, the compiler M. Gaede, takes the opportunity to protest strongly against the naming of Satyrids with redundancy, or deficiency, of eyespots and quotes the following from the late M. Aurivillius:—"It is a well known fact that the eyespots of Satyrids and other butterflies in which such spots occur are very variable. If therefore one wishes to establish and name aberrations according to the presence and relative developments of the eyespots in a species which normally has for instance 7 eyespots, then one can burden literature in every such species with hundreds of names. Whether science can benefit in this way is another question which can scarcely be answered in the affirmative and for the renown of lepidopterists it would be much better to seek to ascertain the limits and the causes of the aberrations."

OBITUARY.

Arthur Wm. Mera, F.E.S.

Arthur Wm. Mera of High Rd., Loughton, died July 21st, 1930, after an illness of 4 months, at the age of 81 years, which he attained a few days before his death. He was born at Hammersmith, educated at Godolphin School, and was connected with a London firm of Stock-brokers practically all his life, retiring in the year 1918. He was a keen collector throughout life, from the days of his youth, when he collected on Hammersmith Marshes and in Coombe Wood near Malden, Surrey. Up to the time of his illness, during the last 6 years of his life he went regularly twice weekly, all the year round, with an entomological friend, in Epping Forest in quest of anything of entomological interest. All his spare time and holidays he spent in the pursuit of his one and only hobby. He was in truth a field collector, who loved

the sport of collecting, as far as possible, the specimens destined for his cabinet. Among the localities in which he collected is almost every noted district in the eastern counties, Kent, Sussex, Surrey, New Forest, I. of Wight, Devonshire, Nth. Cornwall, Nth. Wales and Braemar, including a short trip many years ago to Killarney. By means of the "Exchange Basket" scheme in the early days of the '*Entomologist's Record*' his collection was enriched with many species, from more distant and varied localities. He also bred every season for the past 30 years or more, a varied selection of species, and at the time of his death had several species emerging or about to do so. He was of a quiet, kindly, and courteous disposition, ever ready to freely give information or assistance to any with whom he came in contact. Possibly he showed his greatest interest and practical field knowledge, in naming allied species which less experienced entomologists and beginners found difficulty in distinguishing, especially when the specimen was somewhat "worn."

He was successful in obtaining a hybrid *lapponaria* ♀ and *zonaria* ♂, and in taking a specimen of *Deiopeia pulchella*, on the East Coast. Deeply interested in Melanism he wrote in 1925 a pamphlet entitled "Increase in Melanism in the past Half Century." He was a member of the old Haggerston Society, frequently attended the meetings held at the old Aquarium, and also a member of the Sth. London and City of London Societies, and a past president of the latter. He was naturally well known to the older, as well as the present members of the two latter societies, as he was fairly regular in his attendance at their meetings. His last attendance in entomological circles was as a member of the "Verrall Supper Assn." which he attended at the Holborn Restaurant on January 14th, 1930, accompanied by his three sons; possibly a record event.—*Communicated by J.H.H.*

[Mera contributed much to the meetings of the City of London Entomological Society of which he was a member for so long a time, and of which he was President from 1905 to 1913 when the Society became the "London N. H. Socy." For some years he contributed "Notes on the Season," to the *Trans. City of Lond. Ent. and N. H. Socy.* which later he enlarged to "Current Entomological Topics."—*Hx.J.T.*]

Earl Waldegrave.

Earl Waldegrave who passed away this summer beyond the age of 80 was a man of many interests, one whose opportunities were great and who lent his aid to many undertakings of social importance. He was a politician of high rank, had taken active part in the Royal National Life-Boat Institution of which he had been chairman, he was an excellent shot having won numerous trophies at Bisley and elsewhere, he possessed an unrivalled collection of Walpole MSS., and in addition found time to know our British Lepidoptera. He not only received the magazine but read it, and not infrequently we had letters from him noting some point or other which he questioned, asking for information, or supplying an item of interest. Another of the old time gentlemen has gone from us.—*Hx.J.T.*

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

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), gothicina forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *mundana*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (Friv) type, *eroides*, *anteros*, *Melitaea trivialis*, *Melanargia larissa*, *Coenonympha oedipus*, *leander*.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

A copy of: Schrank, Enumeratio Insectorum Austriae. 4 plates; 1781. Leather binding (back repaired); recently catalogued at 30/-. This copy belonged to Stephens, and bears his autograph with the date 1821. Any fair offer accepted.—B. C. S. Warren, 14, Av. de l'Eglise Anglaise, Lausanne, Switzerland.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—C. Zacher, Erfurt, Weimar, Street 13, Germany.

CHANGE OF ADDRESS.—J. Cowley to Sidney Sussex College, Cambridge; Dr. H. S. Evans to Suva, Fiji; A. W. Pickard-Cambridge to The Grange, Eccleshall, Sheffield.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 15th, November 5th, 19th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. September 25th, October 23rd (Ann. Exhibition), November 13th, 27th.—Hon. Secretary, Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. Visitors admitted by ticket which may be obtained through Members or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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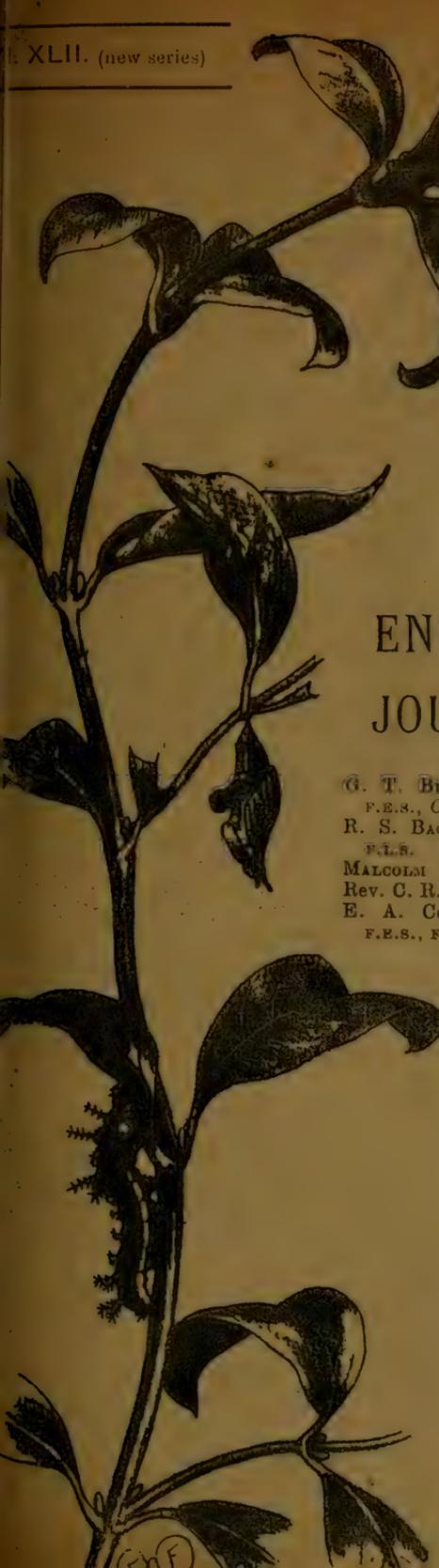
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Stray Notes on Erebiid species.

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

The fact that one or two correspondents seem to take interest in the notes that I have published on some *Erebias*, leads me to continue them; although they are, of necessity, so incomplete that I feel diffident about doing so.

I must begin with corrections. I am indebted to my friend Capt. A. F. Hemming, for drawing my attention to the following mistakes.

1. *E. eriphyle*, Frr.—I stated in the April number (p. 57) that *eriphyle*, Frr. would fall as a primary homonym to *eriphile*, Stoll: this I am glad to say, is not the case; it was merely an oversight on my part of the fact that Freyer placed all his *Erebias* in the genus *Hipparchia*, although he uses the prefix "*Papilio*" in each case in his descriptions. His generic divisions are, however, clearly intentional; and I understand are accepted as genera by the authorities. As *eriphile*, Stoll, is not an *Erebia*, Freyer's name stands.

2. In my notes on *pawloskii* and *theano*, in uniting them as co-specific, I retained the former as the specific name. *Theano* should of course have been used for it is much the older name of the two.

Some forms of *E. euryale*.

This must not be regarded even as a synopsis of a treatise on the variation of this interesting species, a complete account of which would fill several numbers of this magazine. I merely want to point out a few facts, not generally recognised, that may be a help to anyone interested in the species, and at the same time to distinguish the beautiful race inhabiting the Böhmerwald, which has so far been sunk as typical *euryale*.

To start with, the following points should be remembered:—(1) of all the named forms (excepting the type and *adyte*, Hb.) every one varies in such a manner that it passes imperceptibly into the race that it is closest to, and in consequence in certain localities it may be difficult to decide to which race the indigenous form belongs. The two races so united may, nevertheless, be markedly different in other localities. The type and *adyte* approach other races, but do not quite reach them.

(2) In all races, without exception, the ♀ is dimorphic; *i.e.* ♀s occur with either yellow or white markings on the underside of the hindwings. Attempts to distinguish races by this feature of the underside of the ♀s is therefore quite valueless.

(3) Most references to the name *isarica* in the literature of the species are entirely incorrect. Even the original description of this unfortunate name, is full of mistakes. When Heyne wrote it, there can be no doubt he did not know what typical *euryale* was: he was obviously comparing the Isergebirge race with *adyte*.

(4) References to *adyte*, must be taken with equal caution.

(5) Most writers have not taken the trouble to verify the facts concerning these names for themselves, but have only copied what previous systematists have written: they also usually ignore the best work that has been done, because it has mostly appeared in periodicals.

It is unfortunately true that the most recent writer on the *Erebias* has followed the ancient custom of unchecked statements, so that the

new *Supplement of Seitz* (so far as the *Erebias* are concerned) is only new in name. Goltz (to take examples from the species with which we are at present concerned) uses *isarica* to cover *clanis*, Frhst. and *tramelana*, Rev., and perpetuates the statement that type *eurysale* occurs in the Böhmerwald. It seems most regrettable that an expert should not take the trouble to verify his statements when writing for a standard work like Seitz, but indeed, the lack of fact derived from the comparison of specimens is only too striking throughout the work, and it is further emphasised by the most unfair, and totally misleading manner in which Frhstorfer's work is dealt with; while a disregard of the laws of nomenclature, and of most of the results derived from anatomical work in the past, combine to render the *Erebia* section of this new publication useless, alike to the student and collector.

It must not be thought that the above examples are my ground for these remarks, they are merely given as I intend dealing with these points in this article; but they are typical of the inaccuracy which pervades the whole treatment of the Genus.

Now, quite briefly, a few facts about *isarica*, *adyte* and the "typical *eurysale*" of the Böhmerwald.

(a) *Isarica*.—Heyne gave this name to the form occurring in the Isergebirge. As already stated, he evidently did not know what type *eurysale* was, for the characters in which his race is supposed to differ from *eurysale*, are typical of the latter; his description actually agreeing very well with Esper's. When, however, one compares it with a specimen of *adyte* from Switzerland (I will explain my use of the latter name further on) his points can at once be appreciated.

The actual fact is that the insect of the Isergebirge is *identical* with that of the Riesengebirge, i.e., it is *eurysale*. A fact nearly always overlooked is that, normally, the ♂ *eurysale* has no white pupils in the black spots on the upperside, though they are present on the underside. Esper states that the spots in the ♂ are blind, but have pupils in the ♀. The only point of difference then, which distinguishes some Isergebirge specimens from the type, is that among the ♀s a considerable number are without white pupils; and it is to these that the name *isarica* must apply, unless it is to be sunk as a synonym of *eurysale*. It may be said that Heyne does not mention the ♀ in his description, but remembering that his "typical *eurysale*" is *adyte*, it is obvious that the great, and quite striking difference, was to be seen in the ♂s and therefore was emphasised by him; and further that ♀s with white pupils are quite plentiful in the Isergebirge so that in this sex the want of the pupils was much less remarkable. In short we can only retain *isarica* as a ♀ form of the type, which occurs everywhere the type does; it has no claim to be applied to the ssp. *clanis* or *tramelana*.

(b) ssp. *adyte*, Hb.

It will not be necessary to say much about this name. It was correctly used by some of the old authors, and as so frequently happens, misused by later ones. Meyer Dür and Frey applied it correctly, to the usual high-level Swiss form of *eurysale*, that with the very prominent white pupils in the black spots on the upperside in both sexes, and to anyone who has made a careful study of the known forms of *eurysale* and *ligea* it will be entirely unquestionable that Hübner's figs. 759 and 760 represent this insect. Later on, in 1918, Reverdin published one

of his careful and cautious studies on this name, and though handicapped by insufficient material of the type race of *euryle*, his conclusions were in agreement with Meyer Dür and Frey. In the meantime Vorbrodt had given the name *helvetica* to the same insect. Goltz, without giving any reasons, asserts that the name *adyte* has been incorrectly applied to *helvetica*; and that *adyte* cannot be used as it is impossible to determine what it represents. As Hübner's figures are quite good ones, unless we are prepared to maintain that a name based on a figure is not valid, there is no ground for rejecting *adyte*. The ssp. *adyte* occurs from the Tyrol to the Mediterranean, and is quite one of the most distinct and easily recognised forms. It has been given other names in various localities, all of which fall. (i.e., *helvetica*, Vrbt.; *rusca*, Frhst.; and *etobyma*, Frhst.) Perhaps I should add that throughout the area of its distribution *adyte* is, of course, not the only form of the species which is found: for example, in Switzerland, there occur three other marked races beside *adyte*. The similarity in size between Hübner's figures and the small Scandinavian *ligea* subsp. *dovrensis*, has no doubt been the real source of the trouble connected with the name; but there is no real difficulty in distinguishing between specimens of this small *ligea* and the heavily-marked *adyte* with its very dark underside to the hindwings; and Hübner's figures differ from the one exactly as they agree with the other. As a matter of fact *dovrensis* shows the features of *ligea*, which is only natural, but it is superficially a little like *euryle*, and there would have been much more ground for uniting it with Esper's insect than with *adyte*.

(c) Now as to the alleged type race of the Böhmerwald. *Euryle* has a much greater distribution than is usually supposed to be the case, occurring in widely separated localities throughout the great chain of mountains that runs from the Isergebirge to the Transylvanian Alps. The brighter coloration in both sexes, and the more or less elliptical shape of the black spots; the fine marking of the underside of hindwing in the ♂, render it easily recognised and make it difficult to understand how it has been overlooked in the Carpathians. The mistaken identification of the Böhmerwald specimens is easier to understand; for in colour this race is nearer to the type than any other. It does not, however, attain to the brilliant, almost red-orange colour of the type, at its finest. (The most beautiful examples as regards colour that I have seen come from the Rehorngelände, but the colour of course fades with age just as the black of quite fresh *Erebias* turns to brown). The Böhmerwald race may be described as follows:—

race **böhmerwaldensis** nov.—A form transitional between *euryle* and *clanis*, Frhst. Both sexes approach *euryle* in the bright, more brown-orange colour of the bands, both upper and underside. The ♂ differs from *euryle* in the very irregular widths of the spots composing the bands on the forewings, which has the effect of producing a jagged and irregular inner edge to the band, which in *euryle* ♂ is an even curve. The black spots in this band are more or less elliptical, while on the hindwings they are decidedly stronger marked, on both upper and undersides than in *euryle* or *clanis*. There is a strong tendency to the development of 4 (or more) of these spots, on the forewings, and usually 4 on the hindwings too, in which the race resembles *euryle*. The underside of the hindwings in the ♂ is of the *clanis* type, very dark, with the marginal band slightly sprinkled

with silver-grey scales, the black spots prominent and just ringed with small rust-red rings which are sharply defined externally as in *clanis*, and rarely inclining to be diffused as in *eurysale*. Another marked feature in *böhmerwaldensis* is the absence (in both sexes) of the white pupils in the black spots on the *underside*. These pupils are sometimes very prominent in *clanis* and *eurysale*, nearly always slightly marked in the former, and frequently very pronounced in the latter, even in the case of the ♂s in which the spots are quite without them on the *upperside*. (Of course the ♂ *eurysale* is often without them too, but I have not seen a specimen of *böhmerwaldensis* in which they are clearly developed.) They are a more constant distinction in the ♀s (which are often very similar in the various races), for in both *eurysale* and *clanis* they are the rule, and often very large, but in *böhmerwaldensis* only occasionally present as minute points.

In size the ♂ *böhmerwaldensis* is larger than *eurysale*, being equal to the largest *clanis*; the ♂s of all three vary so much that there is no distinction in this respect; but on the average *eurysale* may be said to be the smallest. To summarise:—*böhmerwaldensis* differs from *eurysale* in: (1) the less bright colour of the bands both upper and underside; (2) the irregular inner edge of the band on the *upperside* of the forewings in the ♂; (3) the large size of the black spots on the hindwings and the sharp external outline of the red rings around these spots on the underside in the ♂s; (4) the absence of white pupils in the spots of the underside in the ♀s; and from *clanis* in: (1) the brighter coloration of the bands both upper and underside; (2) the more pronounced development of the black spots upper and underside; (3) the want of white pupils in the spots of the underside.

Like all races of the species, *böhmerwaldensis* varies extensively. I have seen specimens that could not be distinguished from *clanis*, and one or two very close to *eurysale*, but in spite of these examples, it would be quite incorrect to class this race as either of the others.

I am indebted to Herr J. Soffner of Trautenau, for the material which enabled me to recognise this new race.

Cartodere separanda, Reitt., a species of Coleoptera new to Britain.

By T. H. EDMONDS, F.E.S.

Elongate, depressed, entirely testaceous or ferruginous, coarsely and rugosely punctured. Size 1.3-1.8mm.

Head, elongate, coarsely and rather plainly punctured.

Antennae, with a three-jointed club.

Thorax, elongate, much narrower than elytra, strongly encised at the sides behind the middle with a transverse impression at the base.

Elytra, elongate oval with 6 rows of very strong punctures, the 5th interstice, only, strongly carinate, the dorsal surface when viewed sideways is rather depressed at the base then gradually raised, again shallowly depressed beyond the middle and suddenly raised to an abrupt hump before the apical declivity which is almost vertical.

Legs, moderately robust.

In July of this year I took, in the neighbourhood of Bovey Tracey, South Devon, in grass traps in the runs of the ant *A. fuliginosus*, many specimens of a *Cartodere* which seemed to me to differ from *elongata*. I sent some examples to Mr. Donisthorpe who forwarded them to Col. Deville for his opinion. Col. Deville says that they are undoubtedly *separanda*, Reitt., and he quotes the following from a table of the species of *Cartodere* given by J. M. Belon in *Revue d'Entomologie*, Caen. 16, 138, 1897:—

1. Coleoptera paulo ante apicatem declivitatem subrotundatum elevato gibbosa. Intervallum quartum basi tantum, quintum a medio saltem ad apice carinatum . . . *elongata*, Curt.
- 1¹. Coleoptera paulo anti apicatem declivitatem magis abruptum a fere verticalem in gibbum subdentiformem elevata. Solum intervallum quintum carinatum . . . *separanda*, Reitt.

This species strongly resembles *elongata* but in addition to the differences mentioned above the elytra seem to be proportionally rather narrower and longer, the legs are a little more slender and the punctuation of the head, especially beyond the eyes, is not so confluent as in *elongata*.

Since my captures Mr. Donisthorpe tells me that he has taken the species abundantly in bones put down as a trap in Windsor Forest.

In my experience *elongata* is generally taken singly usually in fungus, but from the above records *separanda* seems to be rather gregarious in its habits. It will probably be found to be mixed with *elongata* in British collections. Previously it seems to have been recorded only from southern Europe.

**According to the Rules of Nomenclature the name of
Argynnis adippe is of Rottemburg (nec L.), and that of
Melitaea dictynna, Esp., must be replaced by diamina, Lang.**

By ROGER VERITY, M.D.

Mr. Turner has very kindly looked up some data for me in this connection, and he had done it before the remark on "the wretched homonym rule of the Zoologists" was published at page 78 of the present volume, so that the Editors know this paper is not meant as a counteraction. I am glad, however, it affords me an occasion to point out at once that, far from increasing the necessary changes of names, the rule of "primary homonymy" does away with all unforeseeable changes of the future, which the splitting up of genera would bring about, if, each time species were separated generically, one were obliged to take up again the older names, which had been discarded because they were homonyms in the broader genus. In some cases this rule may bring about some unnecessary changes, from a practical point of view, but these little sacrifices must be made in order to attain a uniform result and the sooner all set to work according to discipline, the sooner revisions will be done away with and final stability established. It is comforting to note that the rule of primary homonymy preserves several familiar names of butterflies, which the authors of the beginning of this century had found it necessary to alter according to the rule of

priority. They had discovered that in quite a number of cases an older name existed than the one in use. What had done it was that the very earliest zoologists had discarded the former when all the butterflies belonged to the single genus *Papilio* or a little later, when it had only been split into very few genera, because at that time those names were homonyms of others within the same genus. The application of the rule of priority, now the genera are very much more restricted and numerous, would have obliged one to alter, for instance, *Erebia aethiops*, Esp., to *medea*, Schiff., and in the *Lycaenidi*: *agestis*, Schiff., or *astrarche*, Berg., to *medon*, Hufn., *bellargus*, Rott., to *thetis*, Rott., *baton*, Berg., to *hylas*, Schiff., and *argyrognomon*, Berg., to *idas*, L. All these older names, however, were homonyms in the single genus *Papilio*, to which they belonged when they were erected, each having already previously being used in it for another species. The rule of primary homonymy thus comes in and condemns them never to be used again, avoiding all the changes which would have been necessary if they had been subsequently revived in the later genera. These results are so satisfactory and so numerous that, if the rule cuts the other way, now and then, and leads to a change of name, we can well make these sacrifices to it.

As to the particular case of *cydippe* and *adippe*, which has suggested the remarks of our Editors, it is a little problem of its own. It is many years I have been puzzling over it and I have dealt with it in the *Linnean Society's Journal—Zoology* of 1913, p. 128, and in the *Bull. Soc. Ent. France*, 1929, p. 277, but it is only now I have struck a solution, which I believe is the correct one and which is a happy one, as it preserves the name in use since a century and a half and it is at the same time strictly in keeping with the International Rules of Nomenclature. In those two papers I have pointed out that Linnaeus has never distinguished and evidently never even seen the species, which is attributed to him under the names of *cydippe* or *adippe*. The specimen he has left, labelled in his own handwriting "*cydippe*," is a female of *niobe* with a very complete set of silver spots on the underside, exactly agreeing in number and in position with those he describes at length, showing that it was the very specimen he had before him. He gives no other distinguishing feature and he himself adds it might simply be the other sex of *niobe*, described by him as having no silver spots. His name of *cydippe* is thus nothing more than the first one ever given to an individual form of a butterfly and, accordingly, neither it nor that of *adippe*, with which Linnaeus substituted it later, when he discovered he had already used it for an oriental species (a *Cethosia* of our times), have, nowadays, any status, because the modern International Rules do not recognise individual forms. The result is that the name *adippe* was perfectly available for any species or subspecies, as though it had never appeared in the literature of the lepidoptera, and when in 1775 Rottenburg and Schiffermüller really detected the existence of the near ally of *niobe* as a distinct species and used the name of *adippe* for it, it is they who erected this name for the first time and are the real authors of it, Rottenburg having precedence over Schiffermüller, according to Prout's suggestion in cases of this sort, as I will presently mention again.

One can thus go on using the name of *adippe* and all one need do is to change its author from Linnaeus to Rottenburg. The latter in his

original description in *Der Naturforscher*, VI., p. 12, distinguishes it specifically from *niobe* chiefly on the strength of "its underside ground-colour being more yellow and the black veins and transverse streaks entirely lacking," adding that one can perceive perfectly it is, in general looks, different from *niobe*, although it is difficult to put the differences in words. This is very much the impression most of us have in the case of some races of these species. Rottemburg's words, few as they are, fix the nominotypical form very exactly as the one in which the underside pattern is extremely reduced, the yellow ground-colour being broadly uncovered. It is the one figured by Bergstrasser from the County of Hanau under the name of *phryxa*, which, according to the view I have just given, is an exact synonym of *adippe*, Rott. This form is quite racial in some localities and presumably in the drier ones: the fulvous of the upperside is of a light tinge and the black spots of small size. The name of *baiwarica*, Spuler, thus holds good for the race with the underside broadly suffused with russet, chiefly found in the Tyrol and in the eastern Alps generally, and that of *vulgoadippe*, Vrtý., *Bull. Soc. Ent France*, 1929, p. 279, for the race with the underside exhibiting broad patches of russet and of green in about equal quantities, which I have described from the New Forest, in England, but which is the prevalent one from Sweden to the Pyrenees and to Austria: it is of a richer tone of colour also on the upperside and the black spotting is broader than in the nominotypical form. The latter's original locality can be considered Berlin, as Rottemburg was dealing with Hufnagel's List of butterflies of this locality, when describing it, but it is found as an individual form and as a local race all over the area of *vulgoadippe*.

The other nomenclatorial question I must deal with does not afford as happy a solution as the preceding one, because there seems to be no way of avoiding the sacrifice of the well known name of *Melitaea dictynna*, Esp. to the Rule of primary homonymy.

The name of *dictynna* was first used in the genus *Papilio* of those days by Schiffermüller. Its validity is unquestionable in the first place because it is accompanied by a description ("The orange coloured butterfly, posteriorly eyed on the underside") and then because it has always been admitted that Schiffermüller's very old book must be regarded as a case of its own and his names considered valid even in some particular cases in which he actually gave no description at all, such as that of *Melitaea trivialis*. What has led to this is that Fabricius in 1784 took a journey to Vienna to study Schiffermüller's "types" and drew out short, but very exact and clear descriptions of all these insects. Subsequently Toussaint von Charpentier did the same and quoted, in most cases, the figures of Hübner which represent those species; he was followed by Zincken, surnamed Sommer, by Treitschke, by Fischer and by others, who all established Schiffermüller's species most exactly, so that there would be no sense in discarding some of his names now as "nomina nuda." Nevertheless his *dictynna* falls specifically as a synonym of *Argynnis ino*, Rott., described in 1775 and thus having the right of priority, according to Prout's ingenious suggestion that all names published during that year should have precedence over Schiffermüller's and all those published in 1776 should fall before his, owing to a few copies, one of which is in my possession, bearing a woodcut titlepage with the title of: "*Ankündigung eines systematischen*

Werks von den Schmett. der Wienergegend," and the date of 1775, instead of the usual one of 1776. The name of *dictynna*, Schiff. thus has a status and, although it is an absolute synonym of *ino*, Rott., because the latter's original figure exactly represents the individual form which is prevalent at Vienna, with rather a broad black marginal band on the upperside and a purple suffusion of a deep tinge on the underside, it does away with the possibility of using Esper's homonym, erected under the same generic name of *Papilio*.

Looking over Ochseneimer's very complete old bibliographical references I find that Lang furnishes us since 1782-89 with the substitute of *DIAMINA*, in his *Verzeichniss seiner Schmetterlinge*, p. 44. This has been entirely neglected by Kirby, by Staudinger and in all the synonymic lists I have consulted. Lang gives no description, but simply gives, after the name, the reference: "Ernst., pl. LXII., fig. 31 bis. *Le Damier sixième Espèce*." Ernst., on the other hand, gave no name, but referred to Esper, p. 382, *i.e.*, to *dictynna* Esp. (1777). The result is that Lang names Ernst's description and in consequence actually renames Esper's *dictynna* of 1777, of which he possessed examples from near Augsburg. As Esper's name must fall, owing to its being a primary homonym, Lang's substitute is just what one requires and it has the advantage of applying to the same noninotypical race, so that nothing else need be altered.

Description of the larva of *Specropia* sp.nov.

By CAPT. K. J. HAYWARD, F.E.S., F.R.G.S.

Length 34 mm.

Head and thoracic plate black, the latter with a white dividing line dorsally and the head with short white hairs.

Body black and, with the exception of a band low down laterally and the dorsal portion of the 11th segment, is closely covered with small irregular yellow spots. The black lateral area bordered above with a light yellow line. Tubercles khaki and very prominent. Beneath dark honey brown with traces of the yellow spotting.

The tubercles are as follows.—

First thoracic with supra- and sub-spiracular and a lateral. Second and third thoracics with a ring of five on the forward part of the segment and subspiraculars iv. and v. and a small lateral. Abdominals one to six with anterior and posterior trapezoidals, supra-, post-, and sub-, spiraculars, and a lateral, whilst on the segments 1 and 2 there is a marginal very low down and almost in line with the legs. Segment seven the same but without the postspiracular, there being both subspiraculars iv. and v. Segment eight the same as seven, and nine with the anterior and posterior trapezoidals, a subspiracular and a lateral. The lateral tubercles are small and whitish and the marginal very small and yellowish khaki.

Specimens of the larva in spirit sent to the B.M. Nat. Hist. under No. 7040 and the bred imagines under No. 7019. The pupae and cocoons under No. 7041.

Larvae pupated the 23rd of February, emerging March the 13th.

Larva on *Smilax asumptionis*, A.D. (*Liliaceae*), locally known as "Zarza blanca."

Larvae are gregarious inasmuch that during the heat of the day they lie along the plant stem in a cluster, scattering to feed.

Pupa in a tough irregularly shaped brown cocoon that has the appearance of bark. Very frequently pupates among the branches of tall weeds where it is quite conspicuous. Pupating on the bark of trees it is almost impossible to discover.

Described from a large number of larvae found on the forest edge at Villa Ana, Argentina, on February 21st, 1926.

“Evidence that Bombi seeking their nest are guided by the recognition of local features.”

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

On August 13th, 1930, I discovered a nest of *Bombus lapidarius*, L., in Windsor Forest. The entrance to the nest, a small hole in the ground, was situated close to a heavy, large fallen bough. Wishing to dig up the nest, I moved the bough, using a branch that was sticking out of it as a pivot on which to raise it up and turn it over. The entrance to the nest was now about two feet behind the bough instead of an inch in front of it as in its original position. The homing bees were now unable to find their nest; they all flew over the entrance, hovering over and alighting just the other side of the bough where the entrance would have been if the bough were in its original position. They kept hunting about, flying up and down, and always returning to the same spot, but never found the entrance to their nest until the bough was swung back to its former situation. I also found that even the pulling up of some long grass near the entrance interfered with their power to find their way home.

This experiment shows that the insects depended on sight, and sight alone, in finding the nest, and it implies previous locality study, and exact memory of impressions received. The nest was eventually dug up; four queens were present and some 30 to 50 workers. The following other creatures were found amongst the comb and in the nest:—

Several species of Dipterous larvae, a number of mites, the small Dipteron *Dohrniphora rostralis*, Schmitz, ♀. (Edwards tells me there are only two specimens, ♂♂, in the British Collection of Diptera in the British Museum); five examples of the moles' nest beetle *Quedius talparum*, Dev., one dead *Antherophagus nigricornis*, F., one live *A. pallens*, Ol., and a number of *Antherophagus* larvae, *Cryptophagus* larvae and *C. setulosus*, Stm., in some numbers.

Newly Described Forms of British species of Lepidoptera.

Coscinia cribrum, L. subsp. *splendida*, Dnbl., Mitt. Münch. Ent. Gesell. XIX. 100.—Completely markingless. Mostly of large size, even the black dots at the ends of the veins present in ab. *candida*, Cyr. and in *punctigera*, Fr. are completely wanting. Abruzzi. In ab. *pseudofasciata* the black dots, chiefly those of the cross lines are extended to long streaks both along and between the veins. Rhineland.

Callimorpha dominula, L. subsp. *majellica*, Dnbl., L.c. 101.—The forewings are normal. This is a constant local race belonging to the *persona*, Hb. group. The marginal spots on the hindwing much more

reduced to a marking which narrows to a wide almost uniform black margin, with no streaks towards the base, and the yellow disc is not crossed by blackmarked veining.

Dasychira facelina, L. ab. *nigrotecta*, Dnhl., l.c.—Forewings wholly black, hindwings black grey, cell spot only slightly expressed; fringes a little paler. Lorch-am-Rhein.

Lasiocampa trifolii, Esp. *sammitica*, Dnhl., l.c.—Very small mountain form. 34-39mm. The grey very coarse scaling is usually so developed that it covers the marking of the band of the hindwing; the ground is paler grey very uniform, the outer area of the forewing somewhat brighter and the band not strongly developed. The female is uniform grey-yellow, the band wide, very obsolescent. Majella.

Drepana binaria, Hfn. ab. *obtecta*, Dnhl. l.c.—The darkest of the more dusky forms, a deep brown dominating the blue tone. The spots on the forewing scarcely visible, the band the same. Monti Albini, Sabini, etc.

ditto, ab. *cultrarioides*, Dnhl.—Forewing strongly violet grey dusted, but the hindwing only the wide middle band, while the base and outer area is yellow-brown. The central band on the forewing is recognisable, but only slightly tinted. Roman Campagna.

Stauropus fagi, L. ab. *illustris*, Dnhl. l.c.—Forewing brightened with plentiful yellow powdering. Central area less strongly powdered. All the markings clear, especially the antimarginal black row of spots. Hindwing in the upper portion tinted with whitish yellow. The general ground colour tends more to yellow than to grey. Near Leipzig.

New Forms of European Rhopalocera.

Carcharodus lavatera subsp. *tauricus*, Rev. (or new species). *Bull. Soc. Lep. Gen.* (1929) VI. 89, pl. II., figs 1-2. (1929). Mt. Athos, St. André.

Melanargia lachesis ab. *gaillardi*, Rev., l.c. p. 90, pl. II. figs. 3-4. Pont du Gard.

Hesperia carthami race *lucasi*, Rev. l.c. p. 91. pl. II. figs. 5-6. Benon Charente.

Apatura ilia ab. *interfracta*, Cabeau. *Lamb.* XXX. 18, pl. III. fig. 2 (1930).

Parnassius mnemosyne subsp. *sulmonensis*, Dnhl. *Mitt. Münch. Ent Gesell.* XIX. 97 (1929) Italy. subsp. *velinensis*, Dnhl. l.c.

Anthocharis euphenoides, St. subsp. *italorum*, Dnhl. l.c. p. 98.

Erebia stygne, Och. subsp. *paradisi*, Dnhl. l.c.

Epinephile lycaon, Rott. subsp. *oronama*, Dnhl. l.c. p. 99.

C. hippophaës, Esp. ab. *obscurata*, Dnhl. l.c. p. 100.

NOTES ON COLLECTING, etc.

P. BOREALIS IN WALES.—I took *Pelophila borealis* under stones by the side of Tal-y-llyn on September 15th this year. I took two specimens but should have taken more probably as I only worked a small area and not very carefully. As far as I am aware this species has not been recorded from England or Wales before.—S. O. TAYLOR.

COLIAS CROCEUS (EDUSA) AT CHICHESTER.—*Colias croceus* occurred in this locality sparingly the last week of August and beginning of September.—JOSEPH ANDERSON, Chichester.

POLYGONIA (GRAPTA) C-ALBUM, AT CHICHESTER.—A specimen of this butterfly was seen by Mr. Bridle here on August 25th flying in his garden and another on October 20th was taken in their garden by Mrs. Humphry, our neighbour. At this period the weather was chilly, and heavy rain occurred on this date.—ID.

[This species has also been reported from Bookham and Cheam, the latter locality being the nearest to London record.—HY. J. T.]

STRANGALIA AURULENTA IN CORNWALL.—I do not know whether this species has been recorded from this county, but it will no doubt be of interest to record the capture by myself of two females in my garden here—the first, a fine large one, on July 5th last at 7.30 a.m. (summer time) on a young turkey oak $3\frac{1}{2}$ feet in height; the other, rather smaller, on a seedling broom about the same height at the same time on July 22nd. The nearest conifers of any size are in private grounds about a $\frac{1}{4}$ of a mile away and I have not seen the species previously except near Bovey Tracey some years ago.—C. NICHOLSON, (F.L.S.), “Nansgwitwick,” Tresillian, Cornwall. September 30th, 1930.

SCIENTIFIC NOTES AND OBSERVATIONS.

AGRIUS CONVULVULI IN CORNWALL.—On the 20th inst. a practically perfect living specimen of this species was brought to me by the young son of a neighbour, who found it on some linen she had brought in from the garden—not the first large Sphingid that has shown a predilection for resting on the family washing, according to Tutt's “British Lepidoptera”! Thinking it would be interesting to see when it took wing I removed it from the glass jam-jar, in which it reposed on some leaves, and placed it on one of the rough posts of the verandah. Beyond giving the forepart of its body an upward heave when disturbed (and subsequently when touched) it did not resent being moved and when placed on the post it remained for some little time with its head and thorax raised on its anterior legs, giving it an alert appearance. Gradually it settled down and in the course of some fifteen minutes it was closely pressed to the post throughout its length and as the post was about 5 inches in diameter and oak the protective resemblance was very good. Just before 8 p.m., I went to look at it and found its wings raised at an angle of about 45° to the post and quivering in the way usual with moths when about to take their first flight. Whilst waiting for it to take wing I saw through the glass roof of the verandah what at first I took to be one of the bats which fly up and down its length at dusk and pick off the flies from the inside of the roof, the woodwork of which is painted white. It hovered a little and then came inside and I realised that it was another *convulvuli* visiting the flowers of an evergreen honeysuckle growing up the next post. It flew so slowly that it was easy to catch, and whilst I was engaged with it the “captive” launched forth and went up to the roof where it buzzed about against the glass and was equally easy to secure. When I first saw the second moth I wondered

whether it was a case of "sembling," but on examining the "captive" I could see no sign that it was calling and indeed its long evenly tapering body suggested that it was a male. I have, unfortunately, no tobacco-plants or other likely attractions, except possibly some "red-hot poker" (*Kniphofia*) and *Phygellius capensis*, both plants with long tubular flowers and plenty of nectar suitable for the visits of Sphingids but neither at all fragrant by day or night and neither visited by insects, except an odd fly or two, so far as I have been able to observe. So abundant is the nectar in the *Phygellius*, in fact, that it rains down on one's hand if a flowering branch be lightly jerked or shaken. Can anyone say what moths visit these plants in their native country, Africa? As the mouth of the flower in each species is about a quarter of an inch in diameter fairly large noctuids with long probosces could reach the nectar by crawling into the mouth a little way.—IBID.

Since writing the above I have seen a third specimen which was caught in a small back garden in Truro on September 16th, and a fourth captured at the end of August on the cliff edge near Newquay and was sent to me to name at the end of September.—IBID, October 28th, 1930.

CURRENT NOTES AND SHORT NOTICES.

Two meetings of the Entomological Club were held at Oxford on July 12th, Professor E. B. Poulton in the chair, and on July 13th, Dr. Harry Eltringham in the chair.

Members present in addition to the Chairmen. Mr. Robert Adkin, Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis and Mr. James E. Collin. *Visitors present.* Dr. A. Avinoff, Dr. G. D. Hale Carpenter, Dr. F. A. Dixey, Dr. Karl Jordan, Mr. E. Bolton King, Dr. W. A. Lamborn, Sir G. A. K. Marshall, Mr. W. H. T. Tams, Com. James J. Walker, Mr. C. J. Wainwright. Some of the recent research work and the collections of the Department were on view and afforded much pleasure and occupied the whole afternoon during which tea was dispensed by Mrs. Poulton assisted by friends. The following exhibits attracted special attention:—(1) The Lepidoptera collected by Dr. Dixey when in South Africa in 1929. (2) A collection of British Coleoptera taken by Mr. H. Donisthorpe in Windsor Forest consisting of 1225 species. An adjournment of the members and guests was made soon after 5 o'clock to Jesus College where apartments were provided for their comfort and the company reassembled at Jesus College at 8 o'clock when dinner was served, Professor E. B. Poulton, F.R.S., being in the chair. A very enjoyable evening was spent during which Mr. Donisthorpe showed twenty specimens of *Calobata calceata*, Falln., a species of Diptera new to Britain taken by him in Windsor Forest on June 26th and July 1st, 1930, and made the following remarks:—

"On June 26th last when collecting in Windsor Forest several specimens of a curious looking fly were observed 'sideling' over a large felled beech tree. As I had never seen it before two specimens

were secured. On taking them to the British Museum Miss Aubertin named them *Calobata calceata*, Falln., a species which they did not possess in the British Collection and was of the opinion that it had not been taken in Britain before. On referring to Mr. Collin he stated they were new to the British list. On visiting the same locality again on July 1st the fly was found to be present in some numbers and twenty specimens were soon caught. The fly careers over the surface of the tree on the tips of its toes and looks rather like a small grass-hopper."

Mr. Donisthorpe pointed out that this made the twenty-eighth species of insects he had taken in Windsor new to Britain, consisting of 23 Coleoptera, 2 Diptera, 1 Braconid, 1 Aphid, and 1 Flea.

On Sunday, July 13th, some of the visitors availed themselves of another visit to the Hope Department and others visited various places in the neighbourhood. Luncheon was provided at Jesus College, and in the afternoon an entomological excursion was made to Bagley Wood in motor cars. The weather was fine and warm and a large number of butterflies were on the wing including:—*Dryas paphia*, *Argynnis cydippe*, *Brenthis selene*, *Epinephele tithonus*, *E. jurtina*, *Aphantopus hyperantus*, *Limenitis sibylla*, etc. and Dr. Avinoff by a dexterous 'coup de chapeau' captured a fine specimen of *Trochilium apiformis*. Amongst many coleoptera, *Hylesinus fraxini*, Pz. was found in an ash tree with its parasites *Cheirotachys colon*, L. and *Eurytoma ischioxanthus*, Retz. Several species of *Cionus* were found on the same plant of *Scrophularia* and a number of *Phyllobius argentatus*, L. were found enveloped in the copious web of a very small spider. A number of Diptera were taken, amongst which Mr. Collin captured the Anthomyiid, *Hydrotava cyrtoneurina*, Zett. Tea was provided at 5 o'clock in the Keeper's Lodge, and after a further ramble in the wood the return journey was made at 6 o'clock. The guests again assembled at Jesus College at 8 o'clock where dinner was served, Dr. Harry Eltringham in the chair, and another very pleasant evening was spent. The meetings were most successful and interesting and were greatly enjoyed. On Monday July 14th the guests departed to their various destinations.—H.W E.

No. 1 of volume IV. of the *Bulletin of the Hill Museum* was already in the press on the decease of Mrs. Joicey. It has just been distributed to subscribers and the volume of plates which were also in hand will, we understand, follow shortly. Fortunately the "Revision of the Genus *Phyciodes*" by Arthur Hall has been completed in this number as the Supplement. There is an obituary of the late T. A. Barns, the collector traveller who had added such a mass of material to the Museum from Central Africa. It was tragic and untimely that, after risking his life in the wild for so many years he should be killed by a taxicab in Chicago. L. B. Prout contributes an article on the *Geometridae* of Angola and also one on the *Geometridae* of Hainan. The greater portion is taken up with the conclusion of the Monograph of the Saturnians of the Hill Museum by Prof. E. L. Bouvier dealing with about 230 species and forms, many of them new or little known. The author's classification is somewhat on novel lines and will no doubt be well tested by subsequent workers. We sincerely hope that circumstances may arise to secure the future of this useful effort to make the wonderful material in the Hill Museum available for world-wide reference.

The *Ann. Soc. ent. France* pts. 3-4 (1930) contains the 7th instal-

ment of the "*Cucurliionidae* Gallo-Rhenans" by M. A. Hustache, of nearly 200 pp. with over 60 figs. This important memoir on the coleopterous fauna of France was commenced in the *Ann.* in 1923. The author in dealing with the genus *Smicronyx*, Schönh., of which all the species are attached to species of the parasitic plants *Cuscuta* and *Orobanche*, treats of some six species and several subspecies. We have three species in Britain and one subspecies *championonis*, Fowl., of *S. reichi*, which last apparently does not occur in France.

Dr. Peterson of Reval has contributed to the *Stett. Ent. Zeit.* XCI. (1930), a very comprehensive article on the Leaf-mining genus *Nepticula*, illustrated with 3 plates of figures of genitalia and 16 text-figures. The text comprises discussions on the number of generations, the colour of the cocoons, the food of the larvae, the characters useful in determination of the different groups and species, the groups in the genus, descriptions of the genitalia of each species, a bibliography, etc., etc. A most useful summary on modern lines of study, which supplements the early work done by Zeller and Frey on this genus. The author goes further and considers the bearing of the facts brought out in his studies of the *Lithocolletis* and the *Nepticula* on the species problem.

The *Int. Ent. Zeit.* for May 8th contains an account of the capture and breeding of *Hydrilla palustris*, and also a long investigation of the diseases of larvae with illustrations of a dozen microscopic preparations.

The *Ent. Zeit.* for May 22nd contains the first part of a list of the Lepidoptera of Müchlhausen-in-Thur, an account of the *Saturnia* (*pavonia*, *pyri*, etc.) hybrids, and figures of the aberrations of *Morpho aega*.

Number 1, Vol. VI. of *Eos* contains an account of the *Scolia* (Hym.) of the Spanish Peninsula and an account of the *Halticinae* (Col.) in the collection of Motschoulsky with a coloured plate of 12 figures.

In the May number of *Lamb.* p. 70, there is an article on Nomenclature well worth reading for the information it gives on the status of the *Verz.* of Schiffermüller and Denis. The same number also has as a supplement, pl. VI., another of the beautiful photographic plates, this time depicting 6 aberrations of *Brenthis ino*.

The *Mitt. Deutsch. Ent. Gesell.* for May, contains an article on the synonymy of the genus of Bees, *Halictus*, Latr.

Through the kindness of our correspondent Capt. K. J. Hayward, we have received a *Catalogue of the Lepidoptera of the Argentine* by Pablo Kohler. It is very useful as a preliminary list and when put into shape with skilled revision, which we understand is taking place, it should become a valuable work of reference for future students.

The current no. of *Eos*, vol. VI. no. 2, contains an article on "Corsican Trichoptera, by Martin E. Mosley, F.E.S., a "List of Corsican Ephemeroptera and Neuroptera," by Dr. D. E. Kimmins, F.E.S.; an article on brachypterous Diptera (Empidae); another on "New species of Collembola inhabiting caves"; and one on Chalcids. The papers are adequately and well illustrated.

During June or July the *Ent. Zeit.* has been publishing a comprehensive article by Dr. Heydeman on *Ematurga atomaria*. He places the local races into four groups, (1) subsp. *zetterstedtaria*, Scandinavia,

N. and Central Russia; (2) subsp. *minuta*, Gt. Britain, Holland, N.W. Germany; (3) subsp. *atomaria*, N. France and Central Europe; (4) subsp. *transalpinaria*, Spain, N. Italy. The article is abundantly illustrated.

The South London Entomologist Society had a very successful Annual Exhibition and Conversazione on October 23rd; some 200 members and friends were present and a large number of exhibits were on view during the evening. A considerable portion of the Lister Collection of Lepidoptera was shewn in addition to the aberrations of the year from many parts of the South of England. A notable feature was the number of smaller boxes with a few choice aberrations or rare species that were shown. This Society, which holds meetings twice a month throughout the year, deserves the support of all entomologists in the London area. For many years the membership remained at about 150, whereas now it seems almost stationary again at about 250.

If possible, during the coming year, we hope to have notes on various localities within easy reach of the metropolis, where a few hours could be profitably spent in the study of entomology. We would ask our correspondents to help us with this. Even the long-famed West Wickham has still possibilities, for we saw a recently made collection from this locality at the South London Exhibition on October 23rd, which was by no means a mean representation of its old reputation.

REVIEWS AND NOTICES OF BOOKS.

Some while ago we reviewed the already issued volumes of *Novitates Macrolepidopterologicae*, a Catalogue of the newly-described Palearctic Macrolepidoptera either omitted from, or described subsequently to the publication of, Seitz four large volumes. We have just received volume V. of this most necessary adjunct to those working at, or interested in, the Palearctic Lepidoptera. The present volume contains some 60 pages of the names of newly noted forms with the detailed reference to author, publication, volume, page, figure (if any), date, locality, and, what is also most useful, the volume and page of Seitz to which the reference is made. The record is now brought up to the end of the year 1929. In addition, we have a most valuable compilation particularly for all active collectors on the Continent, consisting of about 150 pages of a Bibliography of the Faunistic Literature of the Palearctic Region. For France 10 pages, divided into departments. Switzerland 8 pages, divided into areas. Finland a page and a half. Norway and Sweden, 4 pages. Italy, 8 pages, and so on. Of course a complete list of the literature of this area would mean a much lengthier business, but sufficient titles and references are here given upon which a systematic working entomologist can base his collecting for a very long time, by when he will have sufficient experience to supplement his own requirements without much trouble. The chief of the modern references are given and the more reliable of the older faunistic works are included. The firm of Dr. O. Staudinger and O. Bang-Haas of Dresden-Blasewitz are to be congratulated on their enterprise in continuing this work annually and we hope that they will get the support they deserve.—Hv.J.T.


BITUARY.
E. A. Atmore, F.E.S. (1855-1930).

E. A. Atmore was born seventy-five years ago at King's Lynn in Norfolk and spent his life in that town as a pharmacist. In early and middle life he was an enthusiastic botanist and entomologist, and gave considerable time and trouble to the investigation of the flora and insect fauna of Norfolk. The results of his work were published in the *Trans. of the Norfolk and Norwich Naturalists' Society*. In the early days of the *Ent. Record* he occasionally sent records for publication, but many items from his pen appeared in its pages extracted the "Note-books of the Exchange Baskets" of which opportunity for increasing his knowledge of local forms, he eagerly took advantage. He early became interested in the Micro-lepidoptera and corresponded with the many collectors of Stainton's time, who were equally interested in the "smaller fry." For many years past he had done little collecting and gave up his membership of various societies and ceased to support the magazines. Recognising the work he had done in the past the Norfolk Society made him an hon. life-member and the Entomological Society of London, a Special Life Fellow.—Hy.J.T.

Selwyn Image, M.A., F.E.S., (1849-1930).

Although not an entomologist in the common meaning of the term Selwyn Image was one who saw the inner beauty of the lives of the small creatures we ordinary mortals collect. He was born, so to speak, in the cradle of Entomology for his father was one of the early members of the Entomological Society. Devoting his life to art with both pen and pencil, he became the associate of many men notable in literature and art.

He was a charming and attractive personality and it was a pleasure to receive his kindly greeting at the meetings of the Entomological Society of which up to a while ago he was a regular attendant. One cherishes his letters not only for the beauty of the inimitable penmanship, but for the charm of the expression in words. In 1910 he became Slade Professor of Art at Oxford, succeeding Ruskin. Fellows of the Entomological Society will always have the memory of him before them in the beautiful seal he designed and which is reproduced on the cover of the Transactions each year. Another fine gentleman of the olden time has passed.—Hy.J.T.

G. T. Lyle, F.E.S., (1873-1930).

An earnest and persistent student of field-work in natural history has passed away in the comparatively early death of G. T. Lyle. About 1890 he entered the service of the bank at Devises and at different times resided at Bath, Lymington, Brockenhurst, Cambridge, Wallington, Halifax and back to Brockenhurst to spend the last few months after his resignation from continued ill health. His most useful work was the investigation of the life-histories of parasites on the invertebrate fauna of this country and his notes on the British *Braconidae* are continuous for the last 20 years. He was a member of numerous natural history societies and had correspondents in all parts of Britain. We have lost a trusty worker and investigator in the more obscure and difficult orders comprised under the term entomology.—Hy.J.T.

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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should
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Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED, Hants records of Corixidae (Hemiptera).—*H. P.
Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and
Manx), gothicina forms of gothica and selected unusual forms of incerta, *gracilis* and
munda.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—*Thais cerisyi*, *Polyommatus zephyrus* (Friv) type, *eroides*, *anteros*,
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CHANGE OF ADDRESS.—*J. Cowley* to Sidney Sussex College, Cambridge; *Dr. H. S.
Evans* to Suva, Fiji; *A. W. Pickard*—Cambridge to The Grange, Eccleshall, Sheffield.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. November 19th, December 3rd.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
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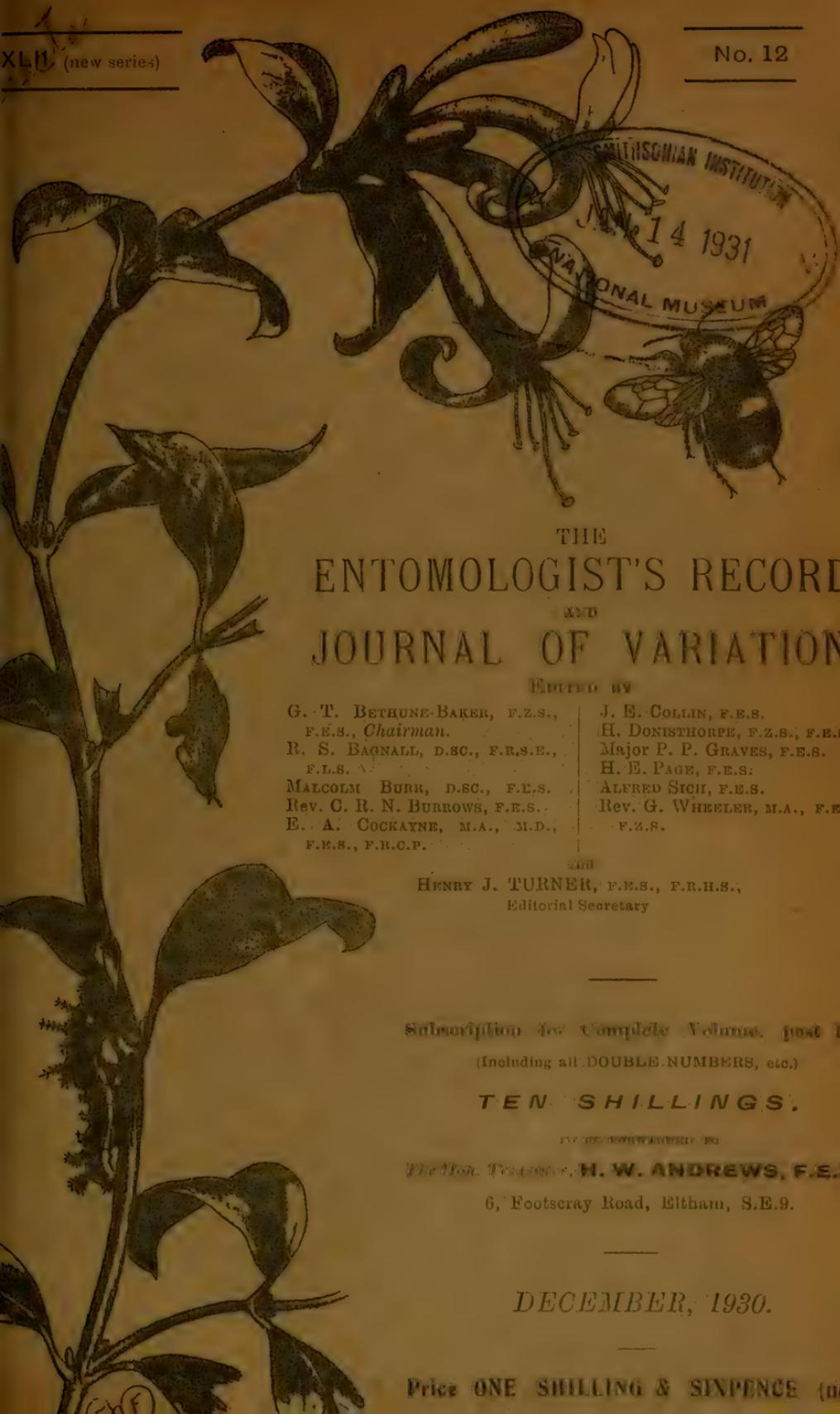
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Notes on *Heliothis peltigera*, Schiff.

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

In view of the numbers of larvae of this species that were seen in 1927 in Southern Bavaria, where they stripped the deadly nightshade and henbane of their leaves, and the great migration of imagines observed in many parts of the Continent in 1928 it is not surprising that parts of the South coast of England received successive swarms of immigrants in the latter year.

I first saw larvae on July 21st at Sandwich on a strip of sand carpeted with *Ononis* and patches of sea convulvulus, but not one of the eighty found was on the *Ononis*. They were all on the convulvulus, most of them resting inside the flowers and the others sitting on the under-side of the petals, many of which had been severely ravaged. Almost all the larvae that had reached the last instar were pale green with pink markings, which match the pink stripes running from the bases of the white petals. On my second visit to Sandwich a fortnight later I was surprised to find that the convulvulus was over and only found one larva, a pink and green one, on *Ononis*.

A day or two after I had made the welcome discovery at Sandwich, I received a dark green larva from Mr. Edwin Sharp for identification and he told me in his letter that similar larvae were abundant on the Crumbles at Eastbourne feeding on *Senecio viscosus*. They were also found in immense numbers on the same species of ragwort at Dungeness. At this date almost all the larvae at Eastbourne and Dungeness were light or dark green without any pink markings. On August 8th Mr. H. B. Williams sent me five dozen larvae from the Crumbles and only one had pink on it. The *Senecio* was still very green and leafy.

On September 15th owing to my failure with the first lots of larvae I went to Eastbourne for the day and took home seventy-six more all in their last skin. The first place where I came across them was a shingle bank close to the sea. Here the plants were growing singly and were dwarfed and nearly prone with many of their leaves dead or dying, coloured brown or tinged with yellow or pink, and the majority of the big larvae on them were marked with pink, and some had broad pink bands on every segment. Later on I found big clumps of *Senecio*, but nearly all the larvae feeding on them were plain green ones.

Another visit to the places, where the big masses of *Senecio* grew, was made on September 22nd, and led to the discovery of more than a hundred larvae in the last instar and amongst them were a considerable number with pink markings and four marked with brown. Most of these were on plants that had been devastated by other larvae of *peltigera* earlier in the year and many of their leaves were pink, yellow, or brown. Most of the larvae on the flourishing green plants were, as before, entirely green.

The evidence derived from these observations in the field seems to me to show that the colour of the larva is determined, at least in part, by the environment. Early larvae on *Convolvulus soldanella* with its pink striped petals were nearly all pink, whereas those on the green *Senecio* at the same date were nearly all green, but later on, when some of the plants of *Senecio* had withered leaves, pink larvae were not

uncommon on them, and this was most noticeable on the scattered stunted plants on which leaves tinted with yellow, pink, and brown were most numerous. Even late in the season the flourishing green plants still had very few pink-banded larvae on them.

The larvae of *Chariclea umbra* are very often cannibals in captivity, and knowing this I feared that those of *peltigera* might behave in the same way, but nothing of the kind happened. On September 22nd however I saw a big pink larva eating a small green one on a large leafy plant of *Senecio viscosus* on the Crumbles. Scarcity of food could not account for this action, but it may have been due to thirst.

Ononis has been the usual food-plant of *peltigera* in its years of plenty in South Devon and Cornwall, and on this occasion most of the larvae found at Brighton and in the Cuckmere Valley were on *Ononis*. Nearly all the moths at Eastbourne and Dungeness chose *Senecio viscosus*, and though two other species of *Senecio* grow freely on the Crumbles I failed to find a larva on either, even where they were growing close to plants of *viscosus*, tenanted by numbers of larvae of *peltigera*. At Sandwich *Convolvulus soldanella* was the chosen plant, though *Ononis* was much commoner and the convolvulus does not appear to have been recorded previously as a food-plant. Larvae seemed very unwilling to change to another food. Those found on sea convolvulus did badly on bindweed, and those found on *Senecio viscosus* refused to eat ragwort. The only satisfactory substitute was the common marigold, *Calendula*, the flowers and buds of which were eaten with relish. The unwillingness to change their food is remarkable, because larvae have been found wild on many plants belonging to very different families.

I will now deal with the methods used in breeding the moths. The larvae from Sandwich and those sent by Mr. Williams from Eastbourne were allowed to pupate in a light soil slightly damped, and were dug up when no imagines appeared at the expected time. All the larvae had pupated but were dead and mouldy. Others like Mr. Kettlewell had the same unfortunate experience. My later larvae were allowed to pupate in quite dry Calais sand. Into this they disappeared very quickly and spun big oblong cocoons of silk and sand grains from one to six inches below the surface, but the cocoons were too flimsy to remain unbroken when they were dug up. My first sixteen larvae produced sixteen pupae, but some of the later ones died in their cocoons, and of the last lot to go down about a third failed to pupate. Also the later the larva the longer it took to pupate, the earlier ones pupating in nine days or less and the later ones taking fourteen days or even more. Mr. H. Worsley Wood had equally good results by using dry shingle instead of dry sand. Finding that none of my moths were going to emerge in 1928 I decided to force some and placed the pupae on dry lint in a glass-topped tin on the kitchen mantelpiece. Here they were exposed to great heat during part of the day and even at night the temperature remained high. The imagines emerged sooner than I had expected and being very lively in the heat the first ten were spoilt. I then forced two more batches in succession, but removed the pupae to a cool dark place as soon as the colour of the wings showed through the pupal skin, and bred about sixty moths. As those forced were all light coloured I decided to keep some pupae through the winter, and bred no more after the beginning of December.

I left a number undisturbed in their cocoons in the sand and dug up the rest placing the naked pupae on dry lint in glass-topped tins. Both lots were kept in an unheated room and owing to the bitterly cold winter they must have been exposed to slight frost. The thirty-one pupae left undisturbed all died, but with two exceptions those dug up and placed in tins survived, and, still kept in the same tins, produced imagines over a very long period. Thirteen emerged in July, the dates being the 2nd, 3rd (2), 6th, 14th, 18th (2), 22nd (3), and 23rd (3); five in August, the 15th, 16th, 17th, 20th, and 29th; four in September, the 1st (3), and 3rd, and the last emerged on October 22nd. None tried to pass another winter as a pupa. Ten successfully resisted the extremely hot weather of July 14th to 21st, but nine of them developed afterwards in the cool climate of East Aberdeenshire, and the tenth in the still colder weather of late October. All these were kept throughout in an unheated room.

The next point I will touch upon is the colour of the imagines. Many of those bred in 1928 by Mr. Robert Adkin, Mr. H. B. Williams, and others from larvae taken in July and early August were very dark brown, and the only moth I bred without forcing in 1928 was very dusky. It was from a larva that escaped and pupated behind a piece of furniture, which may account for a large gap in both the fore and hindwing of the right side. Taken as a whole those forced in the late autumn are much lighter than those bred naturally in 1929. Nearly all the forced ones have a pale creamy ground colour, in some uniform all over and in others a little darker towards the inner margin. The only well-defined markings are the dots on the costa, the reniform and the submarginal band, and the submarginal band itself is paler than in the majority of the 1929 moths. The hindwings have a pure white or very light grey ground with a very black outer band in which the white mark near the margin shows very clearly. The underside too is very white with distinct black markings. I have been unable to match the ground colour of the forewings very satisfactorily with Ridgway's colours, but I think his pale ochreous buff to warm buff gives a fair idea of the range of variation.

Those bred naturally in 1929 had for the most part a much browner ground colour with a distinct deepening of tint between the cell and the inner margin; tawny olive to wood brown in Ridgway gives an idea of the colour. Quite apart from the ground colour the other markings are on the whole much more distinct, especially the line running obliquely from the reniform to the inner margin and that from the basal spot on the costa to the inner margin. The submarginal band is also much darker and more uniformly of the same rich brown. The basal part of the hindwing and the underside are greyish, and in the two darkest are very dark grey, and the light mark in the outer band is indistinct or obliterated. The two that emerged last and developed in the coldest weather are much the darkest being of a very rich brown near Ridgway's Verona brown. One of the palest is very prettily variegated with a light ground near tawny olive but with all the markings very distinct and with a dark edge to the submarginal band both internally and externally.

Though taken individually some specimens bred naturally differ little from some forced ones, the two rows show a very great difference,

and there are none amongst the 1929 moths, to match a number of very white forced ones, and none amongst the forced ones to match many of the darker ones or to show any approach whatever to the two darkest ones of the 1929 moths. I have therefore very little doubt that the light ground and reduced markings were the direct result of heat applied to the pupae, and since the two very dark ones developed during the coldest period in 1929 I have little doubt that their dark colour was the result of cold applied to the pupae. I regard much of the variation of *peltigera* as a climatic phase.

I will finish with a few words about the fate of the immigrants. I was at Dungeness from July 19th to 21st, 1929, and in several places saw beds of *Senecio viscosus*, but there wasn't a larva of *peltigera* to be found. I am told that on the Crumbles too, where they had been so abundant the year before, there were none. All the pupae must have perished in the unusually severe frosts that occurred during the winter.

Some Notes on Microlepidoptera in South Hants in 1930.

By Wm. FASSNIDGE, M.A., F.E.S.

Among the Tortrices, for which only casual records existed for Hampshire, were two species which are probably common and widely distributed throughout the county. They are *Pammene regiana*, Zell. and *Phalonia alismana*, Rag., for both of which a persistent search was made in the early months of the year. *P. regiana* was found in the stage of hibernating larvae in cocoons under loose bark on every large sycamore tree that was examined for miles around Southampton, including one that stands within less than a hundred yards of my house. Usually the cocoons, both empty and full, were found in numbers and the moths emerged freely enough without being forced, but straggled on over a considerable period. The larvae of *P. alismana* in stems of *Alisma plantago* could at first be found only in very small numbers, though they were present in every locality where the plant could be found. At last however, a large patch of the plant was found in the basin of the old canal at Swathling, and from these dried stems a large number of moths were forced out during January and February and set up before the outdoor season began. This winter was the alternating period for *Synanthedon flaviventris*, Stgr., in this district, and it was very pleasant to note that the species shows no signs whatever of diminished numbers in spite of the patient search of which it has been the object. The foodplant is so very abundant and the tenanted gall in many cases so very insignificant, that it does not seem possible that the species can ever be much affected by overcollecting. As has been the case in previous years, a very large percentage of the larvae had been pecked out by birds, and of the untouched mines found a great many produced hymenopterous parasites. Many new localities have been found for the species, including several in the Isle of Wight, so that it can be stated that in the larval stage the insect is widely distributed and fairly common.

The abundance of *Fucosma quadrana*, Hüb., has already been mentioned in this magazine (*antea* p. 93), but it was strange to find how excessively abundant the larvae were later in the year. They were

full-fed at the end of June, when the conspicuous traces of their feeding could be seen in almost every basal leaf of every plant of goldenrod in the wood. They were present literally in thousands. Another insect, whose larvae were equally abundant this year, was *Phycita spissicella*, Fb. On June 1st they were mostly well grown and could be beaten out of the oaks by twenty and thirty at a time. The trees were in many cases almost completely defoliated and these larvae, among those of other species, had been forced to feed on hazel and birch and low plants that grew beneath. My experience with these larvae has always been that very few of them are reared and so it proved again this year. During the first few days of June *Tortrix rusticana*, Tr. was to be found in fair numbers on the edges of the deeper forest bogs, among the clumps of bog myrtle, and the whitish form of the female was as frequently taken in the late afternoon as the less conspicuous male. A Tortrix, that I had long thought must surely occur among the whortleberry in our local woods, was *Eucosma vacciniana*, Zell., and on June 4th I struck it in the greatest profusion a few miles from Southampton where the foodplant grows in huge clumps under the pines. The moth could easily be disturbed in the late afternoon, and though difficult to see on the wing owing to its small size, a good series was taken in a few minutes. The species was later found to be present in two other local woods and also near Matley Passage. *Olysia ambiguella*, Hübn., occurs in three localities near Southampton, but only a very few were seen this year, beaten out by day. On June 11th I spent the afternoon at Beaulieu Road, beating out Tortrices from Scots pine between the station and Lyndhurst. I captured in this way a short series of *Laspeyresia coniferana*, Ratz., a few *Eucosma rubiginosana*, H.-S. and a fairly long series of what I thought was *Laspeyresia cosmophorana*, Tr. When these latter insects came off the setting boards it seemed possible to separate them into two groups. One group clearly consisted of *L. cosmophorana* in good condition, but the other group, which consisted of insects more or less worn, appeared to be distinct from that species though very closely allied to it. My friend Mr. H. C. Huggins was the first to detect the difference and very kindly undertook to look the matter up and to publish the results later if they should prove of interest, as we hope.

In mid-June I had the good fortune to find three localities for *Hemimene alpestrana*, H.-S. and published a few notes on the habits of the species (*antea* p. 111). It should be added to these notes that males were not in fact nearly so scarce as my first experience seemed to indicate, and that the insect remained on the wing in good condition for an extraordinary length of time, namely from June 17th till July 17th at least. On the latter date, at about 3 p.m., while helping Mr. H. C. Huggins to find and capture a series, I found a pair *in cop.* sitting low down among the herbage on a leaf of *Achillea ptarmica*. We endeavoured to box them using the utmost care, but without success, for they jumped backward and disappeared among the herbage. When a few minutes later we succeeded in smoking them out they had separated. On the same afternoon a worn specimen of *Spatalistic bifasciana*, Hübn., was beaten out from oak and captured.

Several visits were paid during June and July to the New Forest, with the special object of working the bogs both large and small. *Bactra furfurana*, Haw. was common again this season in its restricted

locality, and again further search failed to yield it elsewhere in the near neighbourhood. Very dark, peaty brown, almost unicolorous forms of *Hydrocampa nymphaea*, L. were not rare, and a similar dark form of *Schoenobius forficellus*, Thnb. occurred, with transitions, almost as frequently as more typical forms. How long will it be before some entomologist desirous of immortality bestows names on all these major and minor forms of our British Microlepidoptera, and saddles our already overburdened nomenclature with hundreds of new names? Everywhere in the wet parts of the Forest the sundew grows in profusion, but *Trichoptilus paludum*, Zell. does not seem to be found everywhere with its foodplant. Probably there are scores of places where it occurs, but for the benefit of visitors to Beaulieu Road I will mention the fact that it may be taken quite near the Hotel in the small gully and along the edges of the bog on the Lyndhurst side of the line and about a hundred yards from it. It is not so common there as it is on some of the wetter Dorset heaths, but given a warm still evening in June, July, or August, there is every chance of taking a short series.

Being particularly interested in the Phycitids I made a special journey to the locality in the New Forest where *Eurhodope suavella*, Zinck, and *E. marmorea*, Haw. occur together, in order to test the truth of the statement seen somewhere that larvae of *E. marmorea*, can be beaten out while those of *E. suavella* can not. The result of the test gave me six *E. marmorea* to one *E. saurella* and enabled me to complete a series of the former, in spite of the fact that the thorn bushes beaten were very stunted and difficult to get at. On July 6th a friend and I set out to try for *Dioryctria abietella*, Fb. on a patch of last year's burnt pines near Matley Passage, and between us we caught sixteen. The species was really fairly common here for on subsequent days others were caught and a series of chosen specimens kept. Although this insect is well known to be very fond of resting on the higher twigs of such bare burnt pines, there seems to be no evidence whatever that it has any connection with them in its early stages, and I should be very pleased to hear from anyone who has bred it from larvae feeding in anything other than cones or shoots of living Scots pine, or some closely allied species of pine. Towards the end of July I had the good fortune to find a "pinguis" tree, that is to say an ash showing plentiful signs of the frass thrown out by larvae of *Euzophera pinguis*, Haw. One larva was dug out of the bark but no moths were found, probably because I left England on July 30th and that they had not then begun to emerge. I also beat out from elm hedges at Swaythling two specimens of *Salebria formosa*, Haw., an insect very rarely seen in nature. Later on in the year, in September, the larvae of this species were to be found very sparingly under the typical scanty web on elm-leaves in the same locality.

These same thick elm hedges had already in previous years yielded fair numbers of *Peronea* var. *scabrana*, Steph., but I had never seen the white first brood of this species, *P. boscana*, Fb. Several attempts were made to beat the larvae but without success. However, on July 9th, a very warm evening, I succeeded in netting seven specimens of *P. boscana*, all from one very short and very thick stretch of hedge. The next evening was unfavourable, but the beating tray was used and six specimens obtained, of which five were picked off the beater.

Thirteen other specimens in all were taken by Mr. H. C. Huggins and myself, nearly all being boxed off the beater. Clearly *P. boscana* can be beaten only on very favourable warm evenings. It frequents the very darkest and thickest part of the hedge and seems least sluggish in the late evening.

At the end of July some attention was paid to various conifers, and on a fence near Chilworth were found *Evetria purdeyi*, Durr., which seems to be increasing in South Hampshire, and also a fair series of *Eucosma ratzeburghiana*, Ratz. One specimen of *Eucosma rufimitrana*, H.-S. was beaten out from silver fir at Farley Mount, one of the trees blown down in the great storm earlier in the year. I spent the Summer Vacation in France, and have done nothing worthy of mention since my return.

New Forms of British species of Lepidoptera.

(*Larentia sociata*, Brk.) = *Epirrhoë alternata*, Müll. ab. *effusa*, Müller. *Zeit. Oestr. Ent. Ver.* p. 94. pl. XII. fig. 4 (1930). No. 10. It has the middle white band much extended outwards, with the hindwings similarly aberrant.

(*Larentia immanata*, Haw.) = *Dysstroma citrata*, L. ab. *alba-effusa*, Müller.—*l.c.*, pl. XII. f. 1. It has the discal area much suffused with white scaling, much of the darker marking being lightly expressed.

Ditto ab. *grisea-suffusa*, Müller.—*l.c.* pl. XII. f. 2. It has all the lighter area suffused with scattered blackish scaling, giving a general grey appearance with more emphasised markings.

(*Larentia silaceata*, Hb.) = *Euphyia silaceata*, Schiff. ab. *effusa*, Müller.—*l.c.* pl. XII. f. 3. An abnormally marked example, bred from the egg. The usual dark wide central band is wanting, there being only remains of it on the inner margin; on the outer side there remains an irregular narrow dark band divided by light vein streaks into wedges; a dark wedge of the band remains also on the costa.

CURRENT NOTES AND SHORT NOTICES.

The following Fellows have been nominated by the present Council as Officers and Council of the Entomological Society of London for the ensuing year:—*President*: H. Eltringham, M.A., D.Sc., F.R.S. *Treasurer*: Captain A. F. Hemming, C.B.E. *Secretary*: S. A. Neave, M.A., D.Sc. *Other Members of Council*:—H. W. Andrews, Capt. E. Bagwell-Purefoy, F.Z.S., E. C. Bedwell, K. G. Blair, B.Sc., G. H. Carpenter, D.Sc., M.R.I.A., H. St. J. K. Donisthorpe, F.Z.S., F. W. Edwards, M.A., Major R. W. G. Hingston, M.C., A. D. Imms, M.A., D.Sc., F.R.S., K. Jordan, Ph.D., F. Muir, W. Rait-Smith, O. W. Richards, M.A., H. Willoughby Ellis, F.Z.S.

To the current *Ent. News.*, November, 1930, J. D. Gander contributes his eighteenth article on the N. American Institutions featuring Entomology. This time describing the Museums of Cuba, at Havana and Santiago de Cuba, with three plates. Incidentally the writer includes a short autobiography of Orazio Querci, whom we all know as the great collector entomologist of S. European Rhopalocera

and who, for the past ten months has been collecting and observing in all parts of Cuba. The whole article is quite worth perusal. One of the plates reproduces a portrait group including the three generations of the Querci family all of whom are expert collectors.

On page 298 of the same number A. B. Klots discusses the "Naming of Individual Variants in Lepidoptera."

In the *Irish Nat. Jr.* for November, there are records of the occurrence of numerous specimens of *Herse convolvuli*; considerably over 30 around Cork and several in or near Belfast. The *Scottish Nat.* also records this species from many localities, even as far as the Island of Skye and the Outer Hebrides.

Ins. Börse, no. 42, November, 1930, contains a portrait of the well-known collector Carl Ribbe who has reached his 70th year.

In the *Int. Ent. Zt.*, November 8th, there is an account of *Scodionia fagaria (belgiaria)* and of its variation. The accompanying plate figures typical examples with the light form *albidaria*, Stdgr., and the dark form subsp. *favillacearia*, Hb., ♂ ♀ and underside of each.

From the Italian National Society of Sugar Producers we have received a very well produced separate entitled *Insects injurious to the Sugar-beet* by C. Menozzi. There are 25 large illustrations of the damage done by insects and four coloured plates of the chief culprits. Of each species the life-history is given, its geographical distribution, its method of attack, its natural enemies considered and the remedies in use or suggested, with numerical data. A large amount of useful information has been compressed into 100 quarto pages.

The *Ent News* for October has 3 plates illustrating J. D. Gunder's paper on the Bishop Museum, Honolulu, one of which illustrates ten species of indigenous Lepidoptera including the only two species of Rhopalocera, *Vanessa tammeana* and *Lycæna (?) blackburni*. What a fine volume the articles on American Entomological Institutions will make when completed and put together.

REVIEWS AND NOTICES OF BOOKS.

Two further parts of the *Supplement to Seitz Palaearctic Macrolepidoptera* have just come to hand. They consist of 48 pages and contain the completion of the additions to the *Satyridae* with the usual list of references to the original descriptions, and a considerable portion of the account of the *Nymphalidae*, the figures referring to which have already appeared for the most part. We trust that the parts will not appear too rapidly in succession, so that the unfortunate omission to collate the text and figures on the plates may not occur in future, and the printing of a comparatively long list of corrections of such as in the *Satyridae* may be avoided.

It has been necessary to keep the text as near as possible to the views expressed in Vol. I. on the classification, yet references are continually made to the advanced views. For instance the acknowledgement of the sub-division of the species *Epinephele lycæon* into three species "is not practicable for the present work, as there is no classification of the sub-races, so that some would have to be distributed

haphazard over the various species." In exactly the same position is the case of *Brenthis pales*, which has been divided by some authors into three separate species or subspecies, *pales*, *arsilache* and *isis*. At present since all the vast number of forms named up to now have been ascribed to *pales* alone, it would be impossible to summarily share them between the three. In spite of the genitalia of *arsilache* being said to be exactly like that of *pales*, we are strongly in agreement with the suggestion in Vol. I. that there are two distinct species. We are against making too great a fetish of the genitalia any more than of the venation. The two "behave differently and may therefore perhaps be separate species" says the text. In 1914 at the margin of a little lake lying in the depths of the forest between Campfer and St. Moritz Bad in the Engadine for many days running we found *arsilache* and *pales*, but never flying together, never in the same circumstances. On the verge of the trees and in the open parts of the forest we found *pales* in plenty but never near the water. On the other hand *arsilache* was scarce but always at the edge of the water frequenting the dark flowers of *Comarum palustre*, growing in the water. Never once did we find the two flying together. While *pales* flew higher, say the average of 5 feet from the ground and could easily be seen, *arsilache* flew just above the swampy ground and was difficult to see. The shape, marking, size, and general facies of *arsilache* suggest specific difference. The late Mr. Jones of Eltham had previously had exactly the same experience at the same spot.

Another question that the compiler found very difficult was that of dealing with "races." Where there was no individual "type," there cannot be a type of a race. One can have the type of a subspecies, but in dealing with a race, *i.e.*, a subspecies in the making, in which only a small proportion of divergent forms occur, a demonstration of that race can be made only by a long series from the locale of the race. Such series, as the compiler says, "are only available in these private collections which are not open to everyone." Students of Seitz must not expect decisions in these cases but they have the races introduced by name and with the admirable custom of the work there are the full references to author, work, volume, page, date and illustration (if given) so that he may make his own decision as to the grade value of the name introduced.

In the *Nymphalidae*, dealing with *Aglais urticae*, the names given by Raynor to the (1) ground colour (2) referring to the forewings (3) apical markings (4) costal margin (5) the spotting, are given with the note, "As the definition of the colours differs individually these names have only a very conditional value, even if they eventually may have a claim to priority."

The comment on the *wheeleri* form of *dictynna* is "*wheeleri*, Chap. very close to *vernetensis*, double-brooded in the Tessin. And that is the description!"—HY.J.T.

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EXCHANGES.

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

Duplicates.—*S. Andrenaeiformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
House, Francis Street, Chesham, Bucks.*

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and
Manx), gothicina forms of gothica and selected unusual forms of *incerta*, *gracilis* and
munda.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first
class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of
the World.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of
British Isles.—*C. Zacher, Erfurt, Weimar, Street 13, Germany.*

CHANGE OF ADDRESS.—*J. Cowley to Sidney Sussex College, Cambridge; Dr. H. S.
Evans to Suva, Fiji; A. W. Pickard-Cambridge to The Grange, Eccleshall, Sheffield.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. January 8th, 22nd.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
January 4th, 14th.—*Hon. Secretary, Stanley Edwards, 15, St. German's Place,
Blackheath, S.E.3.*

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the
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In his later writing on the Russian Noctuae, Eversmann *Bull. Mosc.* 182 (1855) says this small *Nonagria* varies much in its colour without distinction of sex; and that there are numerous individuals that so much resemble *fulva*, Hb., or *fluxa*, Hb. that one is tempted to unite them into a single species. Guenée, too, had his doubts for he ascribed *fluxa*, Hb., to *fulva* with a query.

Guen. queried *hellmanni* as a true *Nonagria* and H.-S. (in lit. subsequent to 1852) suggested **Tapinostola*, Led.; he had used *Leucania*, in his description (1845).

Even now some authors do not accept the dictum of Hampson and Warren, although none have attempted to refute their decision.

Tutt *Brit. Noct.* I. 43 (1891): *Barr. Lep. Br. Is.* V. 108, pl. 198 (1899): *Stdgr. Cat.* IIed. 107 (1901): *Splr. Schm. Eur.* I. 220, pl. 42, 22 (1906): *South Moths Br. Is.* I. 301, pl. 146 (1907): *Hamps. Lep. Phal.*, IX. 287 (1910): *Warr.-Seitz. Pal. Noct.* III. 236, pl. 49f (1911): *Culot Noct. et G.* I(2). 26, p. 42, f. 11 (1913).

Tutt says that Guenée's var. A. is "undoubtedly the type of *hellmanni*." This is so, but with *fluxa*, Hb., 413, a bright red form as the original type, *hellmanni*, the grey form, must be treated as a subspecies, or race, of *fluxa*.

The figures of H.-S., Hb., and Freyer are as follow:

Hb. 413. *fluxa*.

Freyer. 429. *hellmanni*.

Her.-S. 42. *hellmanni* ♂. 336. *extrema* ♂ = *fluxa* ab.

335. *fluxa* ♀. 338. *hellmanni* ♂ = *hellmanni* (ab. of).

339. *hellmanni* ♀ = *saturata* (ab. of).

Stdgr., *Cat.* IIed. (1901), does not alter his diagnoses from the *Cat.* Ied. (1871).

He gives H.-S. fig. 42 as his *saturata* and also H.-S. fig. 336 (*extrema*) as his *saturata* in *Cat.* IIed. (1901). There must be errors here, for the two figures have nothing in common nor do either agree with his description.

Freyer's fig. is not good, as he had only a worn example from Kindermann before him, fig. 429. It is a dark dull grey with 2 suppressed transverse lines in the outer area. There is no trace of red.

H.-S. fig. 42 ♂ is almost a copy of Freyer's fig. 429, has no trace of red and cannot be allotted to *saturata*, Stdgr. H.-S. fig. 338 ♂ is a bad figure, too large, has a light grey fascia right across the wing in the submarginal area, it is grey but not at all uniform as are figs. 42 and Freyer's fig. 429. He compares his ♂ to *T. cruda*. H.-S. fig. 339 ♀ is a dull rufous form very uniform except for a slightly dusky cloud from the middle of the base to about midway along the fore-wing. This I should call an aberrant *saturata*, Stdgr.

H.-S. fig. 336 is called *extrema*, of which he says "the colour is pale seal-red, darkest in the central area" [probably too much emphasised into a band in the fig.]. It is just as in the most distinct examples of *hellmanni*. He thinks that it is Hübner's fig. 413 *fluxa*. Hübner's fig. is a brighter red without the central shade, in fact an

*I possess Herr.-Schaff's copy of Guenée's *Noct.*, which contains his pencil notes, it appears there that he accepted Lederer's genus *Tapinostola*.

emphasised red *saturata* of Stdgr. H.-S. fig. 336, is certainly not *extrema*.

Of the variation of the subsp. *hellmanni*, Barrett, *l.c.* V. 108, says "But little variable, though the reddish tinge is often replaced by more dusky-brown or smoky shading, and this shows itself more especially upon the nervures beyond the middle and the adjacent costal margin, which sometimes is quite densely shaded; in other instances the second line toward the dorsal margin is thrown into view by a more distinct white edging."

The variations here given are very conflicting and one wonders whether the authors had the species *flava-hellmanni* or some other species.

The forms to be discussed are:—

flava, Hb. *Samm. Noct.* 413 (1808).

junci, Bdv. *Gen. Ind. Meth.* 134 (1840).

subsp. *hellmanni*, Evers. *Bull. Mosc.* 548 (1843).

f. *saturata*, Stdgr. *Cat. Hled.* 107 (1871).

ab. *nigropicta*, Huene *Stett. ent. Zt.* 157 (1901).

ab. *expressata*, Krul. *Rev. Russ. Ent.* VII. 11 (1907).

ab. *pulverosa*, Warr.-Seitz. *Pal. Noct.* III. 236 (1911).

Tutt dealt with *hellmanni*, Evers., the grey form, and ab. *saturata*, Stdgr. the dark reddish form.

Even early there was much uncertainty and confusion between the species now differentiated as *flava*, *fulva* and *extrema* with their various local forms. We find that Treitschke says, V. (2) 313, (1825) "It is undoubtedly a slip of the pen, which led Ochsenheimer in his systematic sketch, IV. 82, to treat Hübner's *fulva*, fig. 496 as the female to the wholly dissimilar *extrema*, Hb. As this sketch was made ten years ago, only about four examples of *extrema* and a few *flava* were to be found in Vienna. Now, when by examples sent from many places all the chief collections are furnished with the two species, yet, *fulva* is always an unknown creature to us, since all that were sent to and received by us as that species, are females of our present *flava*. Doubtless Ochsenheimer wished to unite *fulva* and *flava*, but the notes concerning them got mixed. This surmise was confirmed by this, that he considered a male *fulva* should be the female of *extrema*. But Hübner has given a female of *fulva* and Mazzola had at that time a single male of *flava* in his collection. I know of about twenty specimens of *flava* of both sexes and I think I am not mistaken when I determine every deep red form a female of *flava*, which always has a more compressed body and a more obtuse apex of wing than the male. De Villers, II, 270, also mentioned a *fulva* from France. His short description passes equally for this species, with the exception of the black antennae, which is found neither in the male *flava*, nor in the specimens of *fulva* known to me."

Subsequently Treit., *l.c.* Vol. X(2), 94 (1835), says that he has received an example of *fulva* from Hamburg, which agrees exactly with Hübner's figure of it and also with the insect he (Treit.) had described as *flava*.

flava, Hb., *Samml. Noct.* 413 (1808) : *Treit. Schm.* V. 2, 314 (1825).

FIG.—Hb. *l.c.*

ORIG. DESCRIP.—“It is the size of *strigilis*. Head and collar are reddish white, the latter somewhat darker bordered, like the thorax and the forewings. Almost all examples differ from one another in coloration, either pale red, or red-brown, even bullrush-colour. The abdomen is mostly of reddish suffusion on a grey ground, in the males it is extended, with red anal tuft. The antennae are pale brown, finely toothed, in the female usually paler, thread-like.

“The forewings have about the shape, the general appearance and size of *extrema*, with the thorax similar in ground colour, the veins showing blackish lengthways and with one or two rows of small obsolescent blackish streaks in the usual position of the reniform stigma. The outer margin has a shade from the base which dies out towards the middle of the wing. The fringes are brownish, reddish, or whitish, somewhat paler than the ground colour. One notices, although rarely, the trace of a white spot at the end of the blackish suffused principal vein in the middle of the wing.”

“The hind-wings are ashy-grey, paler towards the base. The fringes whitish, sometimes showing reddish.

“The whole underside is whitish, with strong veins, greyish powdered and the trace of a central spot and row of streaks on the fore-wings. It is like the upperside subject to strong variation.”

junci, Bdv., *Gen. Ind. Meth.* 134 (1840).

ORIG. DESCRIP.—“*Statura N. extrema* illiusque affinis et minor : alae anticae pallide stramineae, nervo medio infuscato, maculae reniformi obsoleta, albida : alae posticae nigricantes.” Germ. occid.

Duponchel *Cat. Meth.* (1844) makes no comment on this name, but Guenée says, *Noct.* V. 105 (1852). “A species upon which I can say nothing personally. The only specimen which exists in the collection of Boisduval being almost devoid of scales.”

ab. *nigropicta*, Huene, *Stett. ent. Zt.* 157 (1901).

ORIG. DESCRIP.—“The form *nigropicta*, which is already met with under this name, differs from our *flava* by two perfectly black transverse lines on the forewings, of which the posterior is also found in many specimens of the typical form indicated by stronger or feebler black streaks on the veins. Both these transverse lines of the forewings arise in the middle of the inner margin, near to one another, often even together at a point. The first fairly straight to $\frac{1}{3}$ along the costa, only on vein 1 and at the middle vein making a slight bend, while the other, sending outwards tooth-like streaks along the veins in a broad bow convex outwards about the position of the reniform stigma, and from here bending strongly inwards, reaches the costa at $\frac{2}{3}$ from the base.”

In Berge-Rebel (1909) p. 224 this form is identified as the ab. *transversa*, Stdgr., a form of the next species, *fulva*.

ab. *expressata*, Krul., *Rev. Russe Ent.* VII. 11 (1907).

ORIG. DESCRIP.—This is in Russian and quoted in *Soc. Ent.* XXIII 11 (1908).

“The forewings with much emphasised black transverse lines.

Occurs not too rarely with the typical form (especially in the var. *saturata*, Stdgr.)" Eastern Russia (Wiatka and Kasan).

Rebel *Berge Schm-buch*. 224 (1910) says, "Forewings with distinct black transverse lines."

Warr.-Seitz *l.c.* and Hampson *l.c.* consider it to be typical *flava*. But typical *flava* is devoid of such lines.

ab. *pulverosa*, Warr.-Seitz *Pal. Noct.* 236 (1911).

FIG.—Warr. *l.c.* 49f.

ORIG. DESCRIP.—"Has the grey dusting very strong, the dots of outer line obsolete, and the veins dark."

The forms may be summarised:—

Almost devoid of scales.

Grey, Freyer 429.

Very strongly powdered with grey dots. Warr. 49f.

Bullrush colour, pale red, red-brown. Hb. 413.

Dark red, H.-S. 339 as *hellmanni*.

2 black transverse lines.

These 2 lines much emphasised.

junci.
hellmanni.
pulverosa.
flava.
saturata.
nigropicta.
expressata.

Tapinostola, Led. (1855) [*Nonagria*, Ochs. (1816-25): *Leucania*, Ochs. (1816-25): *Caradrina*, Ochs. (1816-25) Meyr.: *Arenostola*, Hamp. (1910)] *fulva*, Hb. (1818) = *pygmina*, Haw. (1809).

The more correct recent determination of the dates of Hb. has given the name of Haworth the precedence, so that *pygmina*, Haw. (1909), supplants *fulva*, Hb. (1818). This was announced by Hamp. *Lep. Phal.* (1910).

Warr.-Seitz, 1911, confirms this identification of *fulva*, Hb., with the prior name *pygmina*, Haw., and treats as synonyms of the type (1) *flava*, Dup. (nec Hb.); (2) *extrema*, H.-S. (nec Hb.); (3) *hellmanni*, H.-S. (nec Hb.), fig. 339 (nec Ev.).

In *Brit. Noct.* I. 45, Tutt gave the orig. descrip. of *pygmina*, Haw., as of var. e., noting that "it was treated as the type by all our British authors," Haworth, Stephens, Wood, etc. Thus the *fulva* of Hüb. is treated now as a form of *pygmina*.

Tutt *Ent.* XXI. 221 (1888): *Brit. Noct.* I. 45 (1891): Barrett *Lep. Br. Is.* V. 103, pl. 197 (1899): *Stdgr. Cat.* IIIed. 190 (1901): Spuler *Schm. Eur.* I. 220, pl. 42 (1906): *South M. B. Is.* I. 300, pl. 145 (1907): Hamp. *Lep. Phal.* IX. 288 (1910): Warr.-Seitz *Noct.* III. 236, pl. 49, f.g. (1911): *Culot N. & G.* II(2). 26, pl. 42 (1913).

The older authors seem to have got inextricably mixed in their assessments of the three variable species *hellmanni*, *pygmina* (*fulva*) and *extrema* (*concolor*?) and this state of affairs still seems to exist.

Stephens had only two or three specimens of *pygmina*, *pallida* and *neurica* (nec Hb.) but plenty of *flava*. He called each of the four a species.

Freyer considers Treit. in error to unite *fulva* and *flava*, of which he apparently had only the former, knowing the latter by Hübner's figure alone.

Hüb. fig. 496 is larger than our average British examples, and much redder than any I have seen.

Gn. says⁴ that Hüb.'s figure of *fulva* is very exaggerated in colour.

H.-S. (1845) notes that the ♂ is often larger than the ♀, and has larger pointed forewings and an anal tuft with diverging hairs, while in the ♀ they converge.

H.-S. fig. 339 is assuredly ♂ *fulva* with the cloud from the base, and fig. 337 is the *concolor* form of *fulva* and neither is *hellmanni* as labelled.

Dup. (1827) has a good figure, uniformly pale ochreous with the transverse row of dots; it may be classed as a *pallida* with the transverse row of dots.

Stdgr. (1901) considers H.-S. 335 (*flava* ♀) as *fulva*; also Freyer 501 (*fulva*) as *flava*; also H.-S. 332-3 (*extrema*) as *flava*; also H.-S. 339 (*hellmanni* ♀) as *flava*; that the *concolor*, Tutt, is not the *concolor*, Gn.

In 1888 Tutt, *K.M.M.* XXV., 52, most thoroughly discussed the form *concolor* and the conclusions were definitely that *concolor*, Gn. was not *extrema*, Hb., but that it was a local pale form of *fulva*, of which he (Tutt) had taken a short series at Deal.

In the absence of aught to the contrary since Tutt wrote, we might assume that the *concolor* of Tutt is the *concolor* of Gn. *Noct.* I. 102 (1852), which latter example came from England only.

Of H.-S. fig. 337, which is labelled "*extrema*," Doubleday states "was probably taken from one of my specimens," of *concolor*.

But in the *Ent. Rec.* 1893, pl. C., Tutt figured the *concolor*, Gn. (*extrema*, Hb.?), and the *concolor* var. of *fulva* (*pygmina*). The former is larger and of different build to the latter. And in the Appendix to his *Brit. Noct.* Vol. IV. p. 96, he changed his opinion. He there discusses the situation at great length, finally coming to the decision *fulva*, Hb. (red form), and Tutt's var. *concolor* (white form) are of one species, while *concolor*, Gn., and *extrema*, Hb. (?) are another species.

In spite of the various opinions and assertions of previous authors, Culot, *N. & G.* II.(2) 26, treats *flava* as a form of *fulva*, and the form *nigropicta*, Huene, as = *transversa*. Stdgr., as a form of *fulva*, and supports his action by stating that "*fulva* lives in eastern Europe and Siberia, but yet comes much further south and above all, under the name *flava*, it is found in Switzerland and France, and even in Spain and Sicily."

In 1928 Meyr. still maintains the name *fulva* (not even mentioning *pygmina* as a synonym) and calls it a *Caradrina*. In this latter connection Pierce, *Gen. Brit. Noct.* 1909, gives no hint of such generic relationship, and this his figures confirm.

In discussing the Variation Barrett, *l.c.* V., 102 says, "There is great variation in the ground colour, but the more generally distributed form is that which has the forewings pale drab. In the fens of Norfolk, where the insect is plentiful, there is great variation towards dusky red of various degrees, and also in some degree towards brown, also in another direction towards the increase of the dark clouding upon the medium nervure, with corresponding darkening of the costal area; a comparatively rare form in this district is of a dull purplish-drab, deeply shaded with smoky-brown, and having very dark hind-

wings. Another form found in Scotland, has the forewings dark purple-red with the nervures hardly darker, but the hindwings very dark smoky brown; it is also smaller than ordinary specimens, and with it are females tinged with the same red colour, but also, everywhere, are the ordinary paler and whitish-drab forms. In Ireland the males are said to vary almost to brick-red."

The forms and names to be considered are:—

pygmina, Haw., *Lep. Brit.* 176 (1809), fig. Wood's *Ind.* 371.

subsp. *fulva*, Hb., *Saml. Eur. Noct.* fig. 496 (1818).

[[*flava*, *Tr. Schn.*, V(2). 313 (1825)] *Culot.* II(2) pl. 42.

ab. *pallida*, Steph., *Ill.* III. 77 (1829), fig. Seitz. pl. 49.

ab. *neurica*, Steph., *l.c.*, 78 (1829).

[*extrema*, H.-S., *Sys. Bearb.* II. figs. 332-3 (1844)].

[*hellmanni*, H.-S., *l.c.*, figs. 337 and 339 (1844)].

ab. *concolor*, Tutt, *Ent.* XXI. 222 (1888), fig. *Ent. Rec.* pl. C. vol. IV.

ab. *ochracea*, Tutt, *B. N. I.* 45 (1891), fig. Seitz. pl. 49.

ab. *ochracea-suffusa*, Tutt, *l.c.*

ab. *punicea*, Tutt, *l.c.*, fig. Seitz. pl. 49.

ab. *punicea-suffusa*, Tutt, *l.c.*

ab. *transversa*, Stdgr., *IIIed.* 190 (1901)

[ab. *nigropicta*, Huene, *Stett. et. Zeit.* 157 (1901)].

ab. *fasciata*, Warr.-Seitz, *Pal. Noct.* III. 236 (1911).

race *africana*, Obthr., *Lép. Comp.* XVI. 26, pl. 491, 40, 49-51 (1918).

Tutt deals with (1) *pygmina*, the type as a var. (2) *fulva*, the very red form. (3) *flava*, which is the species known for long as *hellmanni*. (4) *pallida*, the pale ochreous form. (5) *neurica*, the deep brown-red form. (6) *concolor*, the whitish form. (7) *ochracea*, the yellow ochreous form. (8) *ochracea-suffusa*, with longitudinal shades. (9) *punicea*, the pale pinkish-grey form. (10) *punicea-suffusa*, with longitudinal shades.

Tutt's *concolor* were taken at Deal with typical *pygmina* and differ from the *concolor* taken in the fens as shown in pl. C. *Ent. Rec.* Vol. IV. The latter area was most probably the source of the specimens in the Doubleday collection, those described by Guenée and that figured by Herrich-Schäffer, which are the species *concolor* = *extrema*, Hb.

Warren agrees that the *concolor*, Gn., is the *extrema*, Hb. (Seitz, III. 236).

Hampson considers the *extrema* of H.-S. f. 337, as the *concolor* of Tutt (nec. Gn.), and hence substitutes *extrema*, H.S., as the prior of *concolor*, Tutt, as a form of *pygmina*.

ab. *transversa*, Stdgr. *IIIed.*, 190 (1901).

ORIG. DESCRIP.—“Al. ant. obscure rufo-griseis, vel rufescentibus, lineis duabus transversis distinctissimis nigricantibus (♂ condita?).” Esthonia.

Hamp. *Cat. Lep. Ph.* IX. 288 (1910) “Forewing browner, the ante- and post-medial lines dark and entire.”

Seitz says “is distinguished by having the inner and outer lines complete and fully marked across the forewing which is dark grey.” p. 236.

Rebel in *Berge*, 9ed. 224, 1909, identifies Huene's *nigropicta* of *fluxa* as the *transversa*, Stdg., of *fulva* no doubt as a result of his retaining *fluxa* as a form of *fulva* and not of the previous species *hellmanni*.

Culot says "The variety *nigropicta* inhabits Esthonia; its forewings are of a more or less greyish red brown, crossed by two blackish lines." He put it as a var. of *fulva*.

ab. *fasciata*, Warr.-Seitz, *Pal. Noct.* III. 236 (1911) = ab. 1. Hamps. *Lep. Ph.* IX.

ORIG. DESCRIP.—"From Algeria: also has the lines entire and dentate, with the median fascia strong, but the ground colour pale ochreous instead of grey."

race *africana*, Obthr., *Lép. Comp.* XVI. 26 (1918).

FIGS.—*l.c.* pl. 491, figs. 40, 49-51.

ORIG. DESCRIP.—"Varies in the ground of the forewings above, which is rather reddish ochre than yellow ochre with the median shade generally less marked. The hindwings are always white, while in England, Germany and France they are very brown." Algeria.

NOTE:—The following tabulation may not be quite uninteresting and will serve to show how difficult a problem is the differentiation of of the next two (?) species and the allocation of the various named forms (or names) to these species.

Tutt, (1891): *fulva*, Hb., var. *concolor*, Tutt, (Gn.?): *concolor*, Gn.: *extrema*, Hb., = *bondii*, Knaggs.

Tutt, (1893): *concolor*, Gn., =? *extrema*, Hb.: *morrisii*, Dale = *bondii*, Knaggs, =? *extrema*, Hb.

Meyrick (1895): *concolor*, Gn., =? *extrema*, Hb.: *bondii*, Knaggs, = *morrisii*, Dale.

Barrett (1899): *concolor*, Gn. = *extrema*, Stdgr. Cat.: *bondii*, Knaggs = *morrisii*, Meyrick.

Staudinger (1901): *bondii*, Knaggs = *morrisii*, Tutt: *extrema*. Hb. = *concolor*, Gn.: *fulva*, Hb., ab. *fluxa*, H.-S., ab. *concolor*, Tutt.

Spuler (1906): *bondi*, Knaggs; *extrema*, Hb. = *concolor*, Gn.: *fulva*, Hb., ab. *concolor*, Tutt.

South (1907): *extrema*: *bondii*.

Hampson (1910): *bondi*, Knaggs = *morrisii*, Tutt: *extrema*, Hb. = *concolor*, Gn.: *pygmina*, Haw., ab. *extrema*, H.-S. = ab. *concolor*, Tutt (nec Gn.).

Warren-Seitz (1911): *extrema*, Hb. = *concolor*, Gn.: *morrisii*, Dale = *bondii*, Knaggs: *pygmina*, Haw. = *extrema*, H.-S. part (nec Hb.).

Culot (1913): *bondii*, Knaggs: *extrema*, Hb. = *concolor*, Gn.

Meyrick (1928): *concolor*, Gn. ? = *extrema*, Hb.: *bondi*, Knaggs = *morrisii*, Tutt.

Taking the assessment of Warren-Seitz as the most probable it is not intended to discuss the matter further.

Tapinostola, Led. (1857) [*Arenostola*, Hamp. 1910] *concolor*, Gn. = *extrema*, Hb.

Tutt did not unite *concolor*, Gn. with *extrema*, Hb., but took them to be quite separate in 1891; in 1893, however, he united them doubtfully.

Barrett records, *l.c.* V. 106, an example "having the first line shown by four black dots arranged perpendicularly, and the second by a complete row from dorsal to costal margin."

ab. *radiata*, Wagn. *Int. Ent. Zt.* XVI., 39 (1922).

ORIG. DESCRIP.—"In a short series of this usually very rare species I find a few examples, which have along the veins on the very pale forewings a radiate accumulation of dark scales—analogous to the ab. *nigristriata*, Stdgr. of *Senta maritima*—and thus forms a very distinctive character."

Chortodes, St. (1836) "*extrema*, Hb. (*bondii*, Knaggs)" of Tutt becomes

Arenostola, Hamps. (1910) *morrisioni*, Dale (1841) = *bondii*, Knaggs (1861).

According to Barrett, *l.c.* V. 111, "Hardly variable except in size." He records a specimen "in which the dots of the second line are not perceptible."

ab. *impura*, Swing., *Verh. z. b. Wien.* LXXIII. 28 (1923).

ORIG. DESCRIP.—"But in contrast to the pure white colour of most Gumpoldkirchner *bondii*, there is in a few examples a black grey darkening on the forewings spot-like between the veins on the disc, streak-like in the outer area in the cell."

The following List of References may be useful:—

- 1808 Hübner, *Eur. Noct.*, f. 412.
- 1816 Ochsenheimer, *Schm. Eur.* IV., 32.
- 1825 Treitschke, *Schm. Eur.* V(2), 315.
- 1827 Duponchel, *Hist. Nat.* VII(1), 89.
- 1837 Dale, *Nat.* II. 88.
- 1841 Humphrey and Westwood, *Brit. Moths*, I. 243, pl. LIV. 12.
- 1845 Herrich-Schäffer, *Sys. Bearb.* II. 225, figs. 336-337.
- 1852 Guenée, *Noct.* V. 103.
- 1861 Staudinger, *Cat. Led.* 46.
- 1861 Knaggs, *Tr. Ent. S. Lond.*, 133.
- 1861 Stainton, *Ann.* 84.
- 1863 Wormald, *Zoologist*, XXI. 8861.
- 1867 Milliére, *Icones, Ann. Soc. Linn. Lyons*, 22, pl. 87.
- 1867 Doubleday, (Zeller), *Ent. Mo. Mag.* III. 257.
- 1869 Staudinger, *Stett. e. Zeit.* XXX. 85.
- 1869 Stainton, *Ent. Mo. Mag.* VI. 34-36.
- 1870 Newman, *Brit. Moths*, 274-6.
- 1871 Staudinger, *Cat. Hed.* 107.
- 1880 Goss, *Ent. Mo. Mag.* XVII. 134.
- 1884 Homeyer, *Stett. e. Zeit.* XLV. 432.
- 1888 Tutt, *Ent.* XXI. 207.
- 1888 Tutt, *Ent. Mo. Mag.* XXV.
- 1891 Tutt, *Brit. Noct.* I. 46.
- 1893 Tutt, *Ent. Rec.* IV. 72 pl. C. 1-3.
- 1893 Tutt, *Brit. Noct.* IV. 96 etc.

- 1895 Meyrick, *Brit. Lep.* 121.
 1897 Tutt, *Ent.* XXX. 284.
 1899 Barrett, *Lep. Brit. Is.* V. 105, pl. 197 : 110, pl. 198.
 1901 Staudinger, *Cat.* IIIed. 189.
 1906 Spuler, *Schm. Eur.* I. 220, pl. 42.
 1907 South, *Moths Br. Is.* I. 301, pl. 146.
 1909 Pierce, *Genit. Noct.* 32, pl. IX.
 1910 Hampson, *Lep. Phal.* IX. 290.
 1911 Warr.-Seitz, *Pal. Noct.* III. 236, pl. 49g.
 1913 Culot, *Geom. et Noct.* II(2), 25, pl. 42, figs. 8-9.
 1928 Meyrick, *Brit. Lep.* (rev.) 75.

Chortodes, Steph. (1836) [*Petilampa*, Aur.: *Acosmetia*, Steph.: *Miana*, Steph.: *Caradrina*, Treit.: *Lampetia*, Boie.] *minima*, Haw. (*arcuosa*, Haw.)

Although Tutt knew that *minima* (♀) was the first name applied to this species, *B.N.* I. 47, he did not substitute it for *arcuosa* (♂) which Haworth described subsequently. Hampson and Warr. (Seitz) rightly use *minima* as the specific name. Cf. the case of *jurtina* ♀ and *janira* ♂.

This species has been moved from genus to genus. The dull colour and suppressed markings coupled with its habitat in marshes tended to its being classed among the *Nonagria* and *Leucania* species.

Hampson puts it in *Petilampa* next to the species *palustris*.

Warren (Seitz III. 215) puts it in *Petilampa* with *palustris*; treats *duponchelii* and *airae* as synonyms of *minima*.

Tutt, *Br. Noct.* I. 47 (1891): *Barr. Lep. Br. Is.* V. 270, pl. 219 (1899): *Stdgr. Cat.* IIIed. 199 (1901): *Splr. Schm. Eur.* I. 235, pl. 42 (1906): *South, Moths Br. Is.* I. 320, pl. 134 (1907): *Hamp. Lep. Ph.* VIII. 415 (1909): *Warr. (Seitz), Pal. Gr. Schm.* III. 215, pl. 45h. (1911): *Culot, N. & G.* I(2) 58, pl. 48 (1913)

H.-S. figures 178-9 *airae*, *Frr.* but in his text p. 245, vol. II. calls it by the prior *duponchelii*, *Bdv.* He puts it in the genus *Apamea* with *strigilis*, *furuncula*, *captiuncula*, etc.

Culot's fig. 15, *N. & G.* I. pl. 48, is a very strongly marked ♀, fig. 16, purporting to be of a *morrisii* from England is that of a very pale (not white) *minima* (*arcuosa*).

Barrett says, *l.c.* V. 268, "Variation is mainly in the less or greater shading of brown over the creamy white surface, and in the presence or absence of the brown cloud near the apex. In Ireland the colouring seems sometimes intensified to smooth reddish ochreous and there is also a disposition to larger size." He records a specimen of "A lovely pure white with a faint dusting of black, the usual row of dots constituting the second line; and the cilia of the forewings dotted at the base with blackish dusting, and intersected by a double grey shade; thorax and abdomen white and hind-wings nearly so."

The forms to be discussed are:—

minima, Haw, *Lep. Brit.* 215 (1806) ♀.

ab. *lutescens*, Haw., *l.c.* 260 (1806).

arcuosa, Haw., *l.c.* 260 (1806) ♂.

(ab.) *duponchelii*, Bdv., *Ind. Meth.* 82 (1829).

race *airae*, Frr., *Neu. Beitr.*, II. 109, pl. 162 (1836).

[race *morrisii*, Dale, *Nat.* II. 88 (1837)]

ab. *lucida*, Prochas., *Verh. z.-b.* LXX. (97), (1920).

Tutt deals only with *minima* (*arcuosa*) and *morrisii*.

Stephens, *Ill.* III. 15, treats *minima*, Haw. as a species near *fasciuncula* in his genus *Miana* and on p. 123, *l.c.*, deals with *arcuosa*, Haw. in the genus *Acosmetia* near *rufa* and *caliginosa*, and includes *lutescens*, Haw. as another species in the same genus, p. 122, *l.c.*

Wood, *Index*, figures all three (in the same genera as Steph.). 281 = *minima*, is a rather dark form with sparsely emphasised markings and unusually dark hindwings. 429 = *lutescens*, has all marking suppressed and neither rufous nor ochreous, lighter than fig. 281. I should call it a representation of a markingless *minima*. A useless figure for *lutescens* and does not agree with the description. 433 = *arcuosa*, a pretty good figure. 287 *minima* is a ♀ fig. hence the dark hindwings.

Staudinger puts (?) to *minima* and "nimis variegata" to *airae*. Hampson accepts *morrisii* as ab. 1 of *minima* "whiter."

Although Tutt mentions *airae* he does not deal with it, in fact the species is scarcely more than mentioned. But in the Appendix B.N. vol. IV., he discusses the position of *morrisii*, deletes it from *minima* (*arcuosa*) and attaches it to *bondii*, Knaggs = *extrema*, Hb.

ab. *lutescens*, Haw., *Lep. Brit.* 260 (1806).

FIGS.—Wood, *Ind.* 429; Warr. (Seitz), *Pal. Noct.* III. pl. 45h.

ORIG. DESCRIP.—"Alis subunicoloribus sordide rufo-lutescentibus ad marginem crassiorem rufis; posticis subfuscis. Cilia omnia rufescentia, anticarum saturiora."

"More or less strongly suffused with ochreous or rufous," Warr. (Seitz).

(ab.) *duponchelii*, Bdv., *Ind. Meth.* 82 (1829).

FIG.—Dup. *Hist. Nat. Sup.* III. pl. 28 (1836).

ORIG. DESCRIP.—"Statura *cubicularis*; alis anticis pallide flavo-albidis, fascia postica sub-dilutiori, strigis duabus punctorum nigrorum, macula reniformi puncto nigro, orbiculari subnulla; alis posticis obscuris; corpore graciliori; anticis subtus nigricantibus, ad apicem subravidis."

"In nemoribus paludosis Turoniae detexit Cl. Rippert." This is of the ♂ only.

Bdv., *Ind. Meth.* 116 (1840) puts *airae*, Frr. as a synonym, but the above description is that of typical *minima* (*arcuosa*) ♂. On the other hand Duponchel's fig. on pl. 28 is almost identical with the typical figure of *airae*, Freyer, and is not of the typical form.

race *airae*, Frr., *Neu. Beitr.* II. 109 (1836).

FIGS.—*l.c.* pl. 162.

ORIG. DESCRIP.—“*Noctua latruncula* and still more *eraticula* comes very near to this species. The male is larger than the female and its wings are broader. The fringes are dark. The excellent figure will spare me the trouble of a lengthy description. Fig. 3 is undoubtedly only an aberration, although Herr von Boie is inclined to consider this imago as a separate species, because he found the pupae on another food plant, viz., on *Holcus lanatus*. But the form and outline agrees wholly with *airae* and the ground colour only is darker. Since we now have the knowledge that Hübner's *combusta* belongs to *rurea*, the difference of which is much more striking, so must the union of the three specimens figured lying before us be separated upon no reasonable grounds.”

The form *airae* is certainly a very variegated *minima* (*arcuosa*) and not typical.

As South says “This pale whity-brown insect is often without markings.”

The markings of the typical form are always more or less suppressed and not as in *airae* variegated and clear.

The form *airae*, as figured by Frr. and H.-S. is certainly not like typical *minima* (*arcuosa*); it is a reddish-brown insect and more variegated than the *lutescens* figured by Warr. (Seitz).

ab. *lucida*, Prochaska, *Verh. zoo.-bot. Ges. LXX.* (97) (1920).

ORIG. DESCRIP.—“Obtained in Tobelbad near Graz. By its sharply marked, shining, coppery-red forewings of which the central part appeared darker coloured, it differed considerably from typical examples.”

Coenobia (Steph.) Walk. (1856) [*Phytometra*, Haw.; *Nonagria*, Treit.; *Acosmetia*, Steph.] *rufa*, Haw.

NOTE.—In *Lep. Cat. V.* Strand has placed this species among the *Agaristidae*, a family consisting of a large number of tropical species of both hemispheres with only one other European species. I can find no justification for this action in any modern author I have consulted, nor that Strand has given in his references.

Coenobia of Steph. was a Cat. name only. Walker described the genus in *B.M. Cat. IX.*, 118 (1856).

Barrett says, “This species stands singularly alone. So far as I am aware there is nothing allied to it in the world.” Meyrick says, “close to *Nonagria*.” Hampson recognised its isolation. Warr.-Seitz classifies a species from the Amur with it in *Coenobia*.

Treit, *despecta* is considered by most authors as the same species form as *rufa*, Haw. Haworth's *rufa* is described as of a red shade and so figured by Wood, *Index*, 431. Treitschke's *despecta* is of a brown shade as figured by Hübner, but Treit says “ferruginous towards the fringes.” I am inclined to consider them as two different local forms or races.

Tutt is the only author who says “very red.”

Tutt, *Ent.* XXI. 208 (1888): *Br. Noct.* I. 48 (1891): Barr. *Lep. Br. Is.* V. 93, pl. 196 (1899): *Stdgr. Cat.* IIIed. 188 (1901): *Splr. Schm. Eur.* I. 218, pl. 42 (1906): *South Moths Br. Is.* I. 299, pl. 145 (1907): *Hamp. Lep. Ph.* IX. 300, fig. 124 (1910): *Warr.-Seitz Pal. Noct.* III. 238, pl. 48e (1911): *Culot N. et G.* 1(2). 22, pl. 41, 16 (1913).

Spuler's fig. of *rufa* is the rich brown (not red) *despecta* of Hb.

Hübner's fig. 751 of *despecta* is a rich brown not red, hindwings slightly paler.

Duponchel's fig. pl. 32 of *despecta* is a *lineola* the ab. with the brown median streak; the description also agrees.

Her.-Sch's fig. 365 of *despecta* is a *lineola*, grey tinged red or flushed pink; hindwings v. light, tinged light brown. He says Hb's. fig. has f.w. too short and h.w. too long and his own fig. 365 h.w. too broad.

Wood's fig. 431 of Haw's *rufa* is red brown and his fig. 432 of Haw's *lineola* is the *despecta* of H.-S.

Humph. and Westw., *Brit. Moths*, I. have a fig. pl. LIV. 6 of *lineola* without the brown line at the base. Fig. 5 is a good red *rufa*.

Culot's fig. pl. 41, 16 is a grey form slightly tinged with rufous.

Of the Variation Barrett says, "Rather variable in the ground colour of the forewings, from yellowish-white to pale purplish-red and even to grey-brown." *L.c.* 94.

Culot says (1) reddish yellow (2) reddish grey (3) pale grey, *L.c.*

Guenée says, V. 102, "*lineola*, Steph. does not appear to me to be a distinct race." Steph. refers to one specimen only with a V.

From the fore-going notes it seems that there is much confusion among authors as to the forms of this species. The name *lineola* applied at first to one specimen with a V marked shade by Steph. has gradually come to be applied to the grey red tinged form with or without one arm of the V-shaped cloud. Neither Hamps. nor Warr.-Seitz mention the shade in *lineola*.

The forms for consideration are:—

rufa, Haw., *Lep. Br.* 260 (1906-10).

r. *despecta*, Gey.-Hb., *Samm. Noct.* 751-2 (1828).

ab. f. *lineola*, Steph., *Ill.* III. 123 (1829).

ab. *pallescens*, Tutt, *Ent.* XXI. 208 (1888).

ab. *fusca*, Bankes, *Ent. Rec.* XXI. 4 (1909).

ab. *rubicundipennis*, Strand, *Lep. Cat.* V. 45 (1912).

In his *Prodromus*, 1803, Haw. used the name *ruferculina* and Stephens in his *Cat.* 1829 used the name *rufula*. Other authors used these names also, but as they were mere Catalogue names without descriptions, they have no status.

Tutt dealt with (1) the red suffused form, (2) *lineola* the grey tinged red form, and (3) *pallescens* the pale grey with no red. He treated *despecta* as a synonym of *rufa* the type. Comparing the descriptions and figures illustrative, I am treating them as two subspecies, or at least two races, *despecta* being the continental form with a rich brown shade; see Hb's. fig., while *rufa* has a red shade, see Humphrey's and Wood's figs.

Subsp. *despecta*, Gey.-Hb. *Samm. Noct.* 751-2 (1828).

FIGS.—Wood, *Ind. Ent.* pl. 17, fig. 431 (1834): Humph. & Westw. *Br. Moths*, I. pl. LIV. 5 (1845).

ORIG. DESCRIP.—“*Alis anticis micantibus fusco ferrugineis, margine anteriore dilutiore, fimbriis obscurioribus.*” “They have a strong gloss and are here and there paler and darker, towards the fringes ferruginous. The middle vein has blackish powdering, the outer margin is always the palest. Stigmata not visible. In a curve near the waved band lies a row of black dots continuing also on to the hindwings with a considerable marginal area. The veins from the dots to the ferruginous fringes darker powdered and form fine longitudinal streaks. The wings are so unicolorous as a whole there is no distinct character to separate them from one another except by the more grey or reddish suffusion.”

This description is sufficient, as are most of the early figures, to distinguish *despecta*, Treit., from *rufa*, Haworth. The former is a glossy rich brown, not red, the latter a red-brown.

ab. *fusca*, Banks. *Ent. Rec.* XXI. 4 (1909).

ORIG. DESCRIP.—“Forewings dark fuscous, somewhat tinged with red. Hindwings dark grey, paler towards the base. The usual black dots on both fore- and hindwings are either visible or traceable. The head, thorax, cilia, etc., are proportionately dark as compared with the type.” I. of Purbeck.

Hamps. says, *l.c.*, “Forewings dark rufous; hindwing suffused with fuscous.”

ab. *rubicundipennis*, Strand, *Lep. Cai.* V. 45 (1912).

Hampson, *l.c.*, quoted Banks for his ab. 1, but refrained from quoting the varietal name *fusca*; Strand, jumping to the conclusion and anxious to record his name once more and without turning to the record in the *Ent. Record*, renamed ab. *fusca*, Banks, as ab. *rubicundipennis*, Strand.

Senta, Steph. (1834) [*Nonagriæ*, Tr. (1816-25): *Chilodes*, H.-S. (1845): *Simyra*, Tr. (1816-25)] *maritima*, Tausch (1806).

Tutt did not give the original description, but only a summary of it, until the appendix in Vol. IV. 100 (1892).

Tutt, *Brit. Noct.* I. 48 (1891): IV. 101 (1892): Barrett, *Lep. Br. Is.* V. 98, pl. 196 (1899): *Stdgr. Cat.* IIIed. 188 (1901): *Splr. Schm. Eur.* I. 218, pl. 42 (1906): South, *Moths Br. Is.* I. 299, pl. 145 (1907): *Hamp. Lep. Phal.* IX. 321 (1910): Warr.-Seitz, *Pal. Noct.* III. 238, pl. 48e. (1911): *Culot, N. & G.* I.(2) 22, pls. 41 and 42 (1913).

Barrett says, *l.c.* V. 97, “Variable and in rather more definite lines than is usual. Perhaps the most frequent of these is the form named *bipunctata* by Haworth. In it the longitudinal fine lines or dustings are obscured or absent, leaving the forewings pale drab or whitish drab, but both the upper stigmata are conspicuous as black spots very nearly equal in size, somewhat rounded, and without the white edging.

Another form, equally or more striking, is known as *wismariensis*, Schmidt; it has along with these two spots, and partly enclosing them, a broad, black, ill-defined stripe from the middle of the base down the discal cell toward the hind margin. "These remarkable varieties occur in both sexes and appear, at first sight, quite like separate species; intermediates between them and the type form hardly seem to occur, but the latter is sometimes exaggerated, the fine dark lines and inter-lines becoming more distinct, connected and defined."

Herrich-S. says "very variable in size, colour and marking, either the colour of the reed-stem as Hübner's figures, or a brownish grey, with the stigmata marked by a few white dots, or finely and sharply defined in white." (II. 245).

The names to come under review are—

maritima, Tausch., *Mem. Mosc.*, I. 178 (1806), pl. XIII. 5.

ab. *bipunctata*, Haw., *Tr. Ent. S. Lond.* I. 387 (1812): Seitz *Pal.*

III. pl. 48e.

subsp. *ulvae*, Hb., *Noct.* figs. 635-6; 666-8 (1818-22).

sericea, Curt., *Brit. Ent.* V. 201 (1828); Wood, *Ind.* fig. 1437 (1837).

anella, Steph., *Ill.*, IV. 297 (1834): Wood, *Ind.* fig. 1437 (1837).

ab. *wismariensis*, Schmidt, *Stett. e. Zt.* XIX. 361 (1858): South,

Moths B.I. I. pl. 145.

ab. *nigromaculata*, Schmidt, *Stett. e. Zt.*, XIX. 361 (1858).

ab. *nigrostriata*, Stdgr., *Cat.* IIed. 107 (1871): H.-S., *Bearb.* II. fig. 397 (1845).

ab. *nigricostata*, Stdgr., *l.c.*

ab. *combinata*, Edels., *Ent. Rev.* XXII. 149 (1910): *l.c.* pl. VI. fig. 3.

ab. *conjuncta*, Rangn., *Int. Ent. Zt.* VI. 190 (1912).

ab. *spormanni*, Heydem., *l.c.* XIX. 358 (1926): *l.c.* fig. 19.

Warr.-Seitz, *l.c.*, treats *sericea*, Curt., and *anella*, Steph., as typical *maritima*. He says that *nigromaculata*, Schmidt, is ab. *bipunctata*, Haw.

Several authors wrote *bipunctana*. Possibly because Haw. called the species a *Tortrix*.

Tutt dealt with (1) *bipunctata*, with 2 black stigmata, (2) *ulvae* the reddish form, (3) *wismariensis* with black central stripe, (4) *nigricostata* with the costa much darkened, and (5) *nigrostriata* with the whole wing with dark interneural streak, but he did not give the orig. descriptions of *maritima* and *bipunctata* until the end of Vol. IV., and summarised them, from a secondary source probably; he omitted *nigromaculata* altogether even in his appendix, where he gave the above two orig. descriptions he had omitted. The original description of *wismariensis* he also omitted to quote.

Gn.'s var. A. is *wismariensis*, as Tutt says.

Newman's figures are *nigrostriata*, *bipunctata* and *wismariensis* with the British typical form.

South's figs., 7, a dark ♂, and 8, a good *wismariensis*.

Hübner's figures 635-6 and 665-7 are a quite different form to our British form. They are distinctly red with all markings quite traceable and not suppressed almost to obsolescence as in so many of our

British examples. Were it not for the shape of the wings, the silky white hindwings and the identity of the markings, one would not consider them to be this species. They are certainly a subspecies at least.

The fig. of H.S. is a very distinct *nigrostriata* form of which he gives no description and no mention; the whole forewing is streaked with black.

There are 4 figs. in Seitz, *l.c.* Vol. III. pl. 48e. Two, ♂ and ♀, of the typical grey colour, a *bipunctata* form, with the same ground and an *ulvae* of a dark brown but not a distinct red brown as the four figures of Hübner.

sericea, Curt., *Brit. Ent.* V. 201 (1828).

FIG.—Wood, *Index*, 1439 (1837).

ORIG. DESCRIp.—“This insect has a silky appearance. The thorax and superior wings are dull ochreous with a carneous tinge, minutely freckled with fuscous, and a row of dots at the posterior margin of the same colour; the body is paler and the inferior wings almost white. Forewings obtuse.” Suffolk, late at night.

This is nothing but a redescription of the typical form.

anella, Steph., *Illus.* IV. 297 (1834).

FIG.—Wood, *Index*, 1437 (1837).

ORIG. DESCRIp.—“*Alis anticis griseis, punctis duobus centralibus nigris subocellatis, scutello albo apice fusco.*”

“Anterior wings griseous, with two central subocellated black dots, and a fine streak of the same colour on the shoulder; cilia ashy-grey, with an uninterrupted blackish streak at the base; posterior wings ochrey-white.” Stepney.

Stephens says = *bipunctata*, Haw., but ascribes *anella* to the Fab. *Ent. Sys.* III. (2), 299. 56. He includes it in the *Tineidae* with *sociella* in the genus *Ilythia*; he also placed *sericea*, Curt., in the *Tineidae*.

In fact there seems to have been great confusion of correctness and incorrectness of identification. But why the *anella*, Steph., is connected with *maritima* by Hampson and then by Warr.-Seitz, I cannot understand? (Probably Warr. copied Hamps.) Stephens says that *Ilythia anella*, *Ill.* IV. 297, is the *anella*, Fab., *Ent. Sys.* III. (2), p. 299, of which he had one specimen taken by Hatchett in the Jews' burying-ground, Stepney. This was figured by Wood, *Ind. Ent.* no. 1437 in 1837, not 5 years after Stephens' description and from the actual specimen undoubtedly. The figure is that of *Melissoblyptes anellus* (c) of the Entomologist's List of South; a honey moth, classified next to *Aphomia sociella*. Stephens was correct in putting it with *sociella* in the genus *Ilythia*. He did not connect it with *maritima* (*ulvae*). Doubleday in his *Zool. Syn. List Brit. Lep.*, Ed. 2, did not connect *anella* of Steph. with *maritima* (*ulvae*). The shape of Wood's figure of *anella*, Steph., is not that of *maritima*, but closely agrees with that of *sociella*, and the markings are in quantity and well expressed, which is not so in *maritima*; nor are they positionally in agreement with those of *maritima*. And yet in spite of all this Stephens says “*punctis duobus centralibus nigris subocellatis*,” whereas Fabricius says, “*puncta duo albida, annulo fusca cincta.*” Haworth's *Tortrix bipunctata* also

has, "punctis duobus, strigaeque humerali *atris*," which also does not agree with Fabricius.

Therefore Fabricius' *anella* cannot be Stephens' *anella* nor Haworth's *bipunctata*, but it may be typical *maritima*, with the light or very light stigmata. On the other hand Stephens' *anella* with two black spots cannot be typical *maritima* as both Hampson and Warr.-Seitz say, but it *might have been* Haworth's *bipunctata*. had not the figure of the actual specimen by Wood showing a "honey" moth precluded it.

Stephens identified *bipunctata*, Haw., as *anella*, and this is copied by Wood and others, and Guenée accepts Stephens' *anella* as the *bipunctata*, Haw. His specimen came from Doubleday, who in his *List* ignores *anella*, Stephens, altogether. Again confusion.

ab. *wismariensis*, Schmidt, *Stett. ent. Zeit.* XIX. 361 (1858).

FIGS.—South, *Moths Br. I. I.* pl. 145, etc.

ORIG. DESCRIP.—"The var. *wismariensis* is distinguished from v. *nigromaculata* by a black broad longitudinal streak lying along the middle vein of the forewing. It consists of a large pyramid-like longitudinal spot with its concave base outwards, beginning between veins 3 and 8 on the elbowed line, becoming black first in the neighbourhood of the vein 5 and including the two stigmata continues to the base of the wing. The similarly coloured whitish margined stigmata lie in it but quite recognisable."

ab. *nigromaculata*, Schmidt, *Stett. v. Zeit.* XIX, 361 (1858).

ORIG. DESCRIP.—"Chiefly characterised by the quite black stigmata a similarly coloured longitudinal streak at the base, a few blackish cross lines in the neighbourhood of the obsolescent waved line on the forewing, by a more delicate ground colour showing reddish and on the hindwing, and by sharper discal spots both above and below than in the typical form."

The author remarks that his v. *nigromaculata* may probably be identical with Haworth's *bipunctata*. It seems to be practically identical.

ab. *combinata*, Edel., *Ent. Rec.*, XXII. 149 (1910).

FIG.—*l.c.*, pl. VI., f. 3.

ORIG. DESCRIP.—"A combination of *bipunctata* and *nigrostriata*."

ab. *conjuncta*, Ragn., *Int. Ent. Zeit.* VI. p. 190, 1912.

ORIG. DESCRIP.—"A very interesting form in which the two spots of ab. *bipunctata*, Haw., are broad, black, and run into one another. It was taken at Berlin."

ab. *spormanni*, Heydemann, *Int. Ent. Zt.*, XIX. 358 (1926).

FIG.—*l.c.* fig. 29.

ORIG. DESCRIP.—"Besides the deep black stigmata there are the deep, black streaks between the veins of the forewing as in *nigrostriata*, while the ground colour is the brownish silver-grey of typical *bipunctata*." Pomerania.

NONAGRIA DISSOLUTA, FORM ARUNDINETA, AND NEURICA.

NOTE I.:—In Tutt's time there was considerable absence of knowledge of some of the *Nonagria* species and *N. neurica*, Hb. (381) was treated by him as including *arundineta*, Schmidt, and *dissoluta*, Tr. (Hb. 959-61) as local racial forms, an action which he more strongly emphasised in *Br. N.* IV. p. 101, although he was aware that continental entomologists as shown by Staudinger in his *Cat.* (1871) considered *neurica*, Hb. 381 and *dissoluta*, Tr. (*neurica*, Hb. 659-61) as two distinct species. In his IIIed. *Cat.* (1901) Staudinger repeated his action and also included *arundineta* as a local race of the latter. But in 1907 Edelsten brought up the matter again in an exhaustive paper, *Ent. Record*, XIX., p. 1, etc., plt. II., and it was definitely pointed out that there were two clearly defined species involved, viz., *neurica* and *dissoluta*. Edelsten concluded by showing that we did not get the true *neurica* in Britain and that the *arundineta* of Britain and of all British authors prior to 1908 was a form of the *dissoluta*, Tr. Subsequently Tutt *Ent. Record* XX., p. 164, returned to the subject and persisted in his opinion that we had only one species in Britain and that was *neurica*, Hb. = *arundineta*, Schmidt. Mr. Edelsten retorted by obtaining from Püngeler (who had received them from Stange and Schmidt) specimens of what they considered to be the true *neurica*, Hb. 381. Tutt failed to see this and ended by naming the German species *edelsteni*. Later in the same year Messrs. Sharp of Eastbourne and Wightman of Lewes obtained a fine series of this *neurica-edelsteni*, absolutely proving that there were two species in Britain, of which the nomenclature would be according to Tutt, *N. neurica*, Hb. (= *arundineta*, Schmidt) and *N. edelsteni*, Tutt (= *neurica*, Schmidt).

In *Ent. Rec.* XXI., p. 46 (1909) L. B. Prout pointed out the inconsistencies of the nomenclature thus stated and said that the correct relationships were those of Staudinger's *Catalog.* with *edelsteni*, Tutt added as a synonym of *neurica*, Hb. Tutt in reply could not accept Prout's determinations and the matter rested by his closing the discussion.

NOTE II.:—Staudinger's *Catalog.* IIIed. 188 (1901) reads

N. neurica, Hb. 381: Schmidt. *Stett. e. Zt.*, 367 (1858): Tr. *Schm. Eur.* V(2). 319 (1825) pro parte: [*edelsteni*, Tutt, *Ent. Rec.* XX., 164.]

[I have put *edelsteni* in the synonymy.—H.J.T.]

N. dissoluta, Tr. *Schm. Eur.*, V(2)., 319 (1825) pro parte: *neurica*, Hb., 659-61 (non 381), v. *arundineta*, Schmidt, *Stett. e. Zt.*, 369 (1858).

NOTE III.:—The Differentiation of the two species is—

N. neurica, Hb., has no dark lunule on the underside of the hindwings; always has a transverse white thoracic (prothoracic) crest: is of slight build; is only found in East Sussex (and has been taken in Suffolk several times) in Britain.

N. dissoluta, Tr., has a dark lunule on underside of hindwings: has a self-coloured crest, is of stoutish build: is well distributed throughout the British Isles.

var. *arundineta*, Schmidt, is the pale form of *dissoluta*.

Wightman says (in lit.) "The larvae of *dissoluta* and of its form *arundineta* is greenish-white with pinkish dorsal area. The larva of *neurica* is dull white, lined and suffused with greyish brown. They

are not in the least alike. The genitalia of the imagines also differ greatly." [See Pierce, *Gen. Brit. Noct.*, p. 31, pl. VIII. (pencils of hair present in *neurica*, absent in *dissoluta*) and Edelsten who described and figured the early stages of *neurica*, Hb., 381 in *E.M.M.*, vol. XLVII. (XXII. n.s.) Sept. 1911].

NOTE IV. :—Meyrick, *Ied.*, 1896 gives *dissoluta* and its var. *arundineta* correctly.

Barrett, is hopeless, he calls our fen species *neurica*, and ignores *arundineta*.

Staudinger, *Cat.*, 1901, See above.

Spuler, follows Staudinger.

South, mixes all as *arundineta* apparently accepting 'Tutt's dictum.

In recent issues of South, the matter is referred to at the end and *neurica* correctly given.

Rebel (Berger), Hampson, Warren (Seitz), and Vorbrodt all follow Staudinger.

Culot gives *arundineta* as a var. of *neurica* and gives his reasons in detail.

Meyrick, *Ied.*, 1928, accepts the discovery of true *neurica* in Britain, follows Staudinger and gives *edelsteni* as a synonym of *neurica*.

Nonagria, Ochs. (1816-25) [*Archanara*, Walk. (1866)] *dissoluta*, Treit.

Tutt *Brit. Noct.* I. 49 (1891) as *neurica* var. : *l.c.* IV. 101 (1892) : *Barr. Lep. Brit. Isles.* V., 91 (1899) as *neurica* : *Stdgr. Cat.*, *Iied.*, 188 (1901) : *Splr. Schm. Eur.* I. 217, pl. 42 (1906) : *South Moths Br. Is.* I. 298, pl. 144 (1907) : *Hamp. Lep. Phal.* IX. 294 (1910) : *Warr.-Seitz, Pal. Noct.* III. 237, pl. 49h (1911) : *Culot N. & G.* I(1). 210, pl. 38 (1912) treats *arundineta* as a form of *neurica*.

Warr.-Seitz figures are most misleading. Seitz *dissoluta* is the lightest figure, whereas it should be much darker than average *neurica*. Seitz *arundineta* is a darker figure than than of *dissoluta*, whereas it should be lighter than average *dissoluta*.

The forms are :—

dissoluta, Tr. *Schmett.* V(2). 319 (1825).

neurica, Hb. *Noct.* 659-61 (1818) [excluding Hb. 381 the true *neurica*].

race *arundineta*, Schmidt, *Stett. e. Zt.* 369 (1858).

ab. *hessii*, Bdv. *Ind. Meth.* 134 (1840).

ab. *rosea*, Tutt, *Brit. Noct.* I. 50 (1891).

ab. *flava*, n. ab. *Ent. Rec. Supp.* (1930).

Tutt discussed four of these but not *hessii*.

Hampson emphasises that *dissoluta* is much more rufous than its form *arundineta*. Edelsten says that *dissoluta* varies in colour from deep black to red brown.

ab. *hessii*, Bdv. *Ind. Meth.* 134 (1840).

FIG.—Warr.-Seitz *Pal. Noct.* III. pl. 49h (much larger than the type specimen is).

ORIG. DESCRIp.—“Alae anticae nigrofuscae, macula reniformi albida, intus fusca; alae posticae pallidae,” Darmstadt. This is a very dark melanic form according to Seitz figure.

Hess sent this form to Boisduval as a variety of *neurica* (about 1840 or earlier).

Stdgr. in all three editions of his *Cat.* puts *hessii* to *arundineta*. Heydenreich in his *Cat.* which was the fore-runner and model of Stdgr's *Cat.* in 1851, put *hessii* as a species with a reference to Hb. figs. 659-61.

Duponchel, *Cat. Meth.* p. 117 (1844) put *hessii* as a species with “(var. of *neurica* ?)” that is the *neurica* of Hübner's fig. 659 [id. est. *dissoluta*].

Mr. Edelsten very kindly looked up the original type specimen of *hessii*, Bdv. which came to this country with the Oberthur collection, and I have since seen it and agree with him that it is undoubtedly *dissoluta* with the self-coloured crest and the lunule on underside of hindwings, agreeing with 659 Hb. Hence the name *hessii* is a synonym of *dissoluta*, Tr., or a name applicable to the very darkest form.

Warr.-Seitz figures *hessii* as having very dark forewings but with grey hindwings, distinct from typical *neurica*, and of large size, and in the text gives it as a synonym of *dissoluta* the type. [This is referred to in “corrections” at the end as being doubtful., p. 510.]

ab. **flava**, n. ab.

ORIG. DESCRIp.—In Mr. A. J. Wightman's box of bred specimens before me is one from Yorkshire which he points out as a “fine yellow form with dark markings suppressed.” The typical coloration of *dissoluta* is a rufous tending to pinkish and not yellow without pinkish tinge as is this specimen. He has others similar.

Nonagria, Ochs. (1816-25) [*Archanara*, Walk. (1866).] *neurica*, Hb.

Tutt *Ent. Record* XX. 164 (1908) as *edelsteni*; Stdgr. *Cat.* IIIed. 188 (1901): Splr. *Schn. Eur.* I. 217, plt. 42 (1906): Hamp. *Lep. Ph.* IX. 295 (1910): Warr.-Seitz *Pal. Noct.* III. 237, plt. 49b (1911): Culot *N. & G.* I(1). 210, plt. 38 (1912).

Warr.-Seitz. figure of *neurica* may be nearer correct if compared with Hüb. fig. 381, but the white crest is not emphasised in nature.

The forms are:—

[*neurica*, Hb. *Noct.* 381 (1808)] as *edelsteni* subsequently to *Brit. Noct.*

edelsteni, Tutt, *Ent. Rec.* XX. 164 (1908)

ab. *fusca*, Edlstn. *Proc. Ent. S. Lond.* (1909) p. lxxi.

ab. *rufescens*, Edlstn. *l.c.*

Tutt dealt with typical *neurica* as *edelsteni*.

ab. *fusca*, Edlstn. *Proc. Ent. Soc. Lond.* p. lxxi. 1909.

ORIG. DESCIP.—The aberration was exhibited under the name *fusca* but no description was then published. In the *P. M. M.* XLVII. 207 (1911) Edelsten described this form as "blackish-brown." In addition I would add that the hindwings are also much darker than the type.

ab. *rufescens*, Edlstn. *Proc. Ent. Soc. Lond.* p. lxxi. (1909).

ORIG. DESCIP.—The aberration was exhibited under the name *rufescens*, but no description was then published. In the *E. M. M., Lc.*, Edlesten described this form as "reddish." In this form too the hindwings are darker.

Nonagrja, Ochs. (1816-25) auct. South, Meyr. [*Archanara* Wlkr. (1866) Hamps., Warr.-Seitz] *geminipuncta*, Haw. (1809-10).

This species was figured by Hub. 624 and 637, under the name *paludicola* and again as *guttans* 624, and was known for some years by these names on the continent.

Treit, *Schm.* V(2). 323 (1825), says that Borkhausen's *fraterna*, IV. 724, which he (Bork.) ascribed to *nervosa*, Esper, *Abbild. Noct.*, LXIX. 1, belongs here rather than to *typhae* as Ochsenheimer thought, but since the figure and description are in such disagreement he (Treit.) could not adopt the two references necessitating the alteration to one of these two names. Borkhausen says that his species *fraterna* is the *nervosa* of Esper, but that Esper's name must be rejected, there already being a species called by that name IV. 725. The figure of Esper's *nervosa* is certainly not a form of *typhae*, the shape of wing, size, marking, etc., give no resemblance to it, but the figure does resemble strongly that of Hub. 624. Esper's description and his figure of *nervosa* are strongly at variance, as also is Borkhausen's description of his *fraterna* with his reference to Esper's figure.

Tutt apparently overlooked Borkhausen's definite statement that his *fraterna* was Esper's *nervosa* and had he compared the original figure of Esper with Hubner's figures I am quite sure that he must have come to the decision that *nervosa*, Esp. (*fraterna*, Bork.) as figured (but not as described) was *geminipuncta*.

Hatchett, *Trans. Ent. Soc.* 327 (1812) is often given as the reference for the orig. descrip. This is not so, as in the article quoted Hatchett gives the reference to Haw. *Lep. Brit.* 176, which was made in 1809 (10).

Tutt *Ent.* XXI. 226 (1888) : *Brit. Noct.* I. 50 (1891) : *Barr. Lep. Br. Is.* V. 88 (1899) : *Stdgr. Cat.* IIIed. 187 (1901) : *Splr. Schm. Eur.* I. 217 (1906) : *South Moths Br. I.* I. 297 (1907) : *Culot N. & G.* 1(1). 209 (1909) : *Hamps. Lep. Phal.* IX. 293 (1910) : *Warr.-Seitz Pal. Noct.* III. 236 (1911).

The figure of Esper's *nervosa*, *Noct.* pl. CXLVIII. (69). 1, to me seems to represent the species Hübner's fig. 624, *paludicola*, pourtrays. The special features are the dark coloration, the light marked outer

marginal portions of the veins, the presence of the reniform, traces of the elbowed line outside the reniform, the orbicular marked by a black dot, and the dark hindwings, all markings present in some form or other of *geminipuncta*.

Hübner's 628 *guttans* is typical *geminipuncta*, but the twin spots are unusually large; 624 *paludicola* is a subvar. of *rufa*, Tutt; 637 *paludicola* is *geminipuncta* ab. *unipuncta* "rather dark."

Hübner's 624 cannot be *nigricans*, Stdgr., because the latter is wholly blackish whereas Hübner's fig. has the outer portions of the veins light in colour.

Sepp. *Beschou.* IV. 65, pl. 20, under the name *arundinis* gives two figures of *geminipuncta*, dark, somewhat crude in shape, the upper of the two white spots much too basad in position.

Wood's fig. 373 shows two black dots, not white.

Gn., *Ann. Soc. ent. Fr.* II. 447, pl. xvi. (1832), gives 2 figs. both very dark especially the outer two thirds of the hindwings intensely; fig. 3 has two white spots, fig. 4 the whole reniform is white (changed?).

Duponchel says that the forewing has a white spot cut into two by a black mark. Two out of his three figs., *Supp.* IV. pl. XXXIII. 1a and 1b, have white reniform stigmata undivided fig. 1 has the two white dots.

South's figs. Pl. 144, figs. 6, 7 British, have the white spots very obsolescent. My own series of 23 specimens from several localities are mostly *unipuncta* forms; the upper white spot if present is almost microscopic.

Warr. (Seitz) puts *guttans* and *paludicola*, 637 as synonyms of *geminipuncta*. The latter is a form of the typical form undoubtedly. He suggests exaggeration of colour in Hb. 624 and does not identify it with *nigricans*, Stdgr., which last he says is Tutt's *fusca*. But this cannot be as *fusca*, Tutt has 2 white spots, whereas *nigricans*, Stdgr., is uniformly sooty black.

Culot has an excellent figure of typical *geminipuncta*, perhaps on the light side.

Barrett says, *l.c.* V. 88, "There is variation in the colour of the forewings, paler to drab, darker to black brown, always with the greasy gloss, and some males are of a soft light yellow brown with darker clouding on the nervures; while the darker forms are often unicolorous except for the stigmatal dots, the pale shade being obliterated." He records an example "of a wholly unicolorous smoky-black, the spots being also absent."

Mr. Wightman says that he does not agree with Tutt in saying that *geminipuncta* is the most variable of the whole group.

Hering, *Stett. ent. Zt.* IV. (1843), 345-6, says that the imago in Pomerania varies through all shades of brown and usually is devoid of the white spots on the forewings.

"The ground colour may be anything from reddish ochreous through deep red brown to black; all shades of ground colour having forms without the white dots or with only one of them present." Wightman *in litt.*

- [*nerrosa*, Esp., *Abbild.* IV(2). 479, pl. CXLVIII. (69) I. (1786)].
 [*fraterna*, Bork., *Schm. Eur.* IV. 724 (1792)].
geminipuncta, Haw. *Lep. Brit.* 176 (1809-10).
 ab. *paludicola*, Hb. *Noct.* 624 (1818).
 [*guttans*, Hb. *l.c.* 628-9 (1818)].
 [*arundinis*, Sep. *Beschou.* IV. pl. 20 (1836)].
 ab. *nigricans*, Stdgr. *Cat. Ied.* 46 (1861).
 ab. *pallida*, Tutt *Brit. Noct.* I. 50 (1891).
 ab. *pallida-unipuncta*, Tutt *l.c.*
 ab. *pallida-obsoleta*, Tutt *l.c.*
 ab. *rufa*, Tutt *l.c.*
 ab. *rufa-unipuncta*, Tutt *l.c.*
 ab. *rufa-obsoleta*, Tutt *l.c.*
 ab. *unipuncta*, Tutt *l.c.*
 ab. *obsoleta*, Tutt *l.c.*
 ab. *fusca*, Tutt *l.c.*
 ab. *fusca-unipuncta*, Tutt *l.c.*
 ab. *nigropunctata*, Kroul. *Int. Ent. Zeit.* XIII. 180 (1920).

ab. *nigropunctata*, Kromb. *Int. Ent. Zt.* XIII. 180 (1920).

ORIG. DESCRIPT.—“Reniform and orbicular stigmata each represented by a black spot.”

Nonagria, Ochs. (1816-25) [*Archanara*, Walk. (1866)] *cannae*, Ochs. and Treit (1816-25) = *algae*, Esp. (1786).

Tutt's treatment of this species is very meagre. He apparently, at the time, knew only of continental examples.

In 1786 Esper published his *Abbild.* Vol. IV(1). with a number of plates in excess of those treated in the letterpress and on plate CXL. figs. 1-2, he gave a figure under the name *algae* which, although very crude, is recognisable as the insect we have long known as *cannae*. In 1792 Borkhausen published his *Nat. Schm. Eur.* vol. IV. and gave a description of this figure p. 720* as he had no example of the insect. Thus we have the prior name and description by the year 1792. In 1816 Ochseneheimer listed this species under the name *cannae*, *Schm. Eur.* IV. 82, and in 1825 Treitschke described the species under the same name *cannae*, *l.c.* V(2). 325 [not V. 225 as printed in *Br. Noct.*] stating that the names *algae* and *nerrosa* given in the citations were already used for other species and a new name was necessary.

Present day authorities (*e.g.*, Hampson, Warr.-Seitz, etc.) have reverted to the prior name *algae*, Esp.

Treit. put Lang's *nerrosa* in his synonymy. This is not supported by subsequent authors. Lang's *nerrosa* = *nerrosa*, Schiff., which is taken to be the *fraterna* form of *typhae* (*arundinis*, Fb.). A complication in nomenclature.

* 721, error in pagination.

Tutt, *Brit. Noct.* I. 52 (1891): Barrett, *Lep. Br. Is.* V. 79, pl. 149 (1899): Stdgr. *Cat.* IIIed. 187 (1901): Splr. *Schn. Eur.* I. 216, pl. 42 (1906): South, *Moth B.I.* I. 296, pl. 144 (1907): Culot, *N. et G.* I(1), 208, pl. XXXVIII. 27 (1909): Hamps. *Lep. Phal.* IX. 299 (1910): Warr.-Seitz. *Pal. Noct.* III. 238, pl. 49k (1911).

Ernst. and Engram. *Pap. d'Eur.* VIII. f. 501 (171), figures are much too pink, crude but recognisable. They say distinctly that this species is *not* the *nervosa* either of Schiff. or of Lang.

Duponchel's fig. 3 of pl. 106 is unrecognisable in shape, size and coloration, which he himself admits in the *Supp.* III. 361 (1836) and redescribes it and figures it on pl. XXXIII. 2-3, by quite good figures of the two sexes.

H.-S.'s figures 354-5 have the hindwings much too dark.

Culot's figure, pl. XXXVIII. 27 is an excellent one, a ♀.

Of the variation Barrett says, *l.c.* V. 78, "Rather variable in colour, from pale yellow to dull red, dingy blackish-yellow, or blackish-brown, and in the female to drab. Also somewhat inconstant in size."

Mr. A. J. Wightman, who has bred this species several times, says, "The ground colour varies greatly, but except that the two rows of dots are sometimes clear and sharp and at other times faint or lost in some deep-toned ground colour, the markings such as they are, are constant as far as I know. I have bred specimens pale ochreous grey, smoky grey, golden yellow, pale terra-cotta, deep red (Indian), and smoky brown so deep in tint as to appear almost black when freshly emerged." This last has been named ab. *fumata*, Warr.-Seitz.

The names to be discussed are :—

[*nervosa*, Schiff., *Verz.* 85 (1775).

[*typhae*, Schev., *Naturf.* XI. 30, pl. III. (1777).

algae, Esp., *Abbild. Noct.* IV(2). 441 (1793?) pl. 140, 1-2 (1786).

[*nervosa*, Lang, *Verz.* IIed. 142 (1789).

arundinis, Hb., *Samm.* 386-7 (1808) nec Fb.

cannae, Ochs.-Treit., *Schn. Eur.* V(2). 325 (1825).

ab. *russa*, Evers., *Bull. Mosc.* III. 79 (1847).

ab. *brunneo-ochraceus*, Hamps. (Strnd.), *Lep. Phal.* IX. 299 (1910).

[Strand, *Arch. Naty.* LXXXI. 165, A. 11 (1015).]

ab. *fumata*, Warr.-Seitz, *Pal. Noct.* III. 238, pl. 49k (1911).

ab. *liturata*, Warr.-Seitz, *l.c.*

The names *nervosa* and *typhae* refer to other species; *arundinis*, Hb., is a synonym.

algae, Esp., *Abbild.* IV(2). 441 (1790 circa).

FIG.—*l.c.* pl. 140 (61) 1-2.

ORIG. DESCRIP.—"Alis deflexis ruffis (f. pallide ochraceis) venis nigricanibus, serie duplici punctorum nigrorum versus marginem posticum; posticis supra fuscis."

Esper gives Borkhausen *Natj. Schm.* IV. 720 published in 1792 as a reference. Borkhausen gives Esper as a reference and says that he does not know the insect but made his description from Esper's figure pl. 140. I surmise that the figure was issued long before the letterpress belonging to it. My copy of Esper, vol. IV(1). with plate 140 is dated 1786. Evidently Esper's description was not available for Borkhausen to quote, and Borkhausen's vol. IV. was published before Esper's IV(2). letterpress.

race *rusa*, Evers., *Bull. Mosc.* III. 79 (1847).

ORIG. DESCRIP.—“*Noctua sordide rufo-testacea, ciliis concoloribus, alis anticis puncto medio nigricanti.*—♀.

“Paulo major, quam *Cerastis vaccinii*, L. Tr., cui tamen alarum colore et litura media nigricante primo adspectu accedit, sed ob alarum formam et seriem punctorum externam *Nonagria* adnumeranda est.

“Alae anticae, sicut thorax et antennae setaceae, cervino-testaceae, unicolores, sine umbris, excepto puncto seu macula media dilute nigricante; ve diligentius explorata series externa e punctis minutis nigris composita, *Nonagriis* propria, reperitur. Alae posticae, sicut abdomin sordide rubricosae, ciliis paulo pallidioribus, immacolatae.

“Subtus alae sordide rubricosae, seu testaceae; anticae disco nigricante; posticae serie externa e lineolis longitudinalibus seu punctis oblongis nigris composita e obsoleta.—Mas latet.”

“Alis anticis rutilo-hepaticis (mas.)” *Bull. Imp. Un. Casan.* 129 (1855).

ab. *brunneo-ochraceus*, Strand. *Arch. Natj.* LXXXI. 165, A.11. (1915).

ORIG. DESCRIP.—“Pale brownish ochre with pale suffusion.”

ab. *fumata*, Warr.-Seitz *Pal. Noct.* III. 238 (1911).

ORIG. DESCRIP.—“A very dark form occurs in the Norfolk Fens, with the wings, especially in the ♂, dark brown or black brown.”

Tutt quotes F. D. Wheeler in *F.M.M.* XXII. 170, who says that some of the Norfolk examples are getting on for black. This form has now been named ab. *fumata* by Warr.-Seitz.

ab. *liturata*, l.c.

FIG.—l.c., 49k.

ORIG. DESCRIP.—“Has both lines complete and dentate throughout, the median vein thickly black.” This is not shown in the figure, but traces of the reniform are blackish spots at top and bottom. Norfolk.

Nonagria, Ochs. (1816-25) [*Archanara*, Walk. (1866). Hamps., Warr.-Seitz], *sparganii*, Esp.

Tutt *Brit. Noct.* I. 53 (1891): Barrett *Lep. Br. Is.* V. 82 (1899): Stdgr. *Cat. III* ed. 187 (1901): Splr. *Schm. Eur.* I. 216 (1906): South *Moths Br. I.* I. 296 (1907): Hamp. *Lep. Phal.* IX. 297 (1910): Warr.-Seitz *Pal. Noct.* III. 237 (1911): Culot *N. et G.* I(1). 208 (1909-12).

In the *Naturforscher*, Stk. XI. p. 30, plt. III., figs. 1-4 (1777) there is a description of the life-history of this species by Pastor von Scheven. The figures are extremely crude, but the descriptions are unmistakable. The larvae figured are very different, fig. 1 (green) is that of *sparganii* but the brown one, fig. 2 is probably that of *typhæ* (*arundinis*). Curiously exactly similar figures are given by Ernst and Engram. figs. 501. Fig. 3, pupa, is that of *typhæ* showing the peculiar knob for breaking the "window" of the burrow. Fig. 4 imago, is a non-descript mixture of the two species.

Esper's figures plt. 148 are crude but recognisable and with the characteristic marginal dots, submarginal row of dots and black marking at base of reniform. The dark powdering of the ♂ is too rough and too dark.

Hübner's figures 549-50, ♂ and ♀, are both too dark for average specimens, the ♂ particularly so. It is the *rufescens* form of Tutt and differs from the extreme form *rufa* named in Wightman's summary below, in that it is irregularly marked by lighter clouding on the forewing, and by a lighter clearly cut marginal area on the hindwings, which area is bounded inwardly by a darker band. H.-S. says these figures are very brightly coloured (*lebhaft*).

Treit. says that Hübner's fig. is too deep a yellow. V(2). 323.

Herrich-S. has a very good figure of the ♀, *obsoleta* form, but the hindwings of the ♂ are much too dark basally and the darkened area covers too much instead of running with the nervures.

Freyer's plt. 88 gives two figs. which would be fairly correct if the darker shading (blackish) had been carefully and properly distributed instead of being smudged on. H.-S. says of them "strongly black-marked examples."

Duponchel's fig. 6, the ♂ is a very good *rufa*, a rich dark uniform red, the ♀ fig. 7 is too grey without ochreous tint, probably incorrectly coloured, like other figures on the same plate.

Carrington gives two very fair figures in *Ent.* XIII. 49 (1880) with the account of the discovery of the species in Britain. (Kent.)

Barrett has very good figures, V. plt. 194.

Warr.-Seitz figures a large ♀ rather dark, a small light *obsoleta* with costa too arched, a ♂ and a ♀ *bipunctata* and a *rufescens* (not *rufa*) on the dark side, a badly balanced figure; a useful series.

Culot figures a typical male, but not quite so good a figure as his usual work.

Barrett says, *l.c.*, V. 81, "Variation seems in this species to be confined to greater or lesser intensity of the red or orange clouding and of the black along the nervure." He records examples "with the forewings very rich red" and others "in which the median nervure is deeply striped with black," with a female "in which the dots along the margin are greatly enlarged."

Of the Variation Mr. A. J. Wightman, who has bred large numbers from Kent and Sussex, considers it the most variable species in the genus *Nonagria*. He says (*in lit.*), "Had Tutt had the material and dealt with it on the same lines as *geminipuncta*, he would have found it necessary to name at least five forms on account of the markings differing from the type and these would be multiplied by eight or nine on account of colour. This species tends to produce local races,

but in no locality that I know of is the local facies so marked or represented in such proportion as would justify a racial name."

Mr. Wightman says, "The four differently marked forms, the type, ab. *obsoleta*, ab. *bipunctata*, and ab. *nigrostriata* occur in many shades of colour, but ab. *roseoradiata* is only found with the ground colour pale, as the red suffusion is lost in the richer ground colour forms. Endless intermediate shades of colour occur, some of the reds being almost orange." These minute shades have not been named.

Unless one has the actual specimen it is often difficult or almost impossible to allocate a form to such a term as "*rufescens*." Mr. Wightman suggests the following identification of *sparganii* ab. *rufescens*, Tutt. "He (Tutt) says it has the ground colour 'much suffused with reddish ochreous' and a few pages earlier (p. 42) he (Tutt) says of his *phragmitidis* ab. *rufescens*, Tutt, 'anterior wings entirely suffused with rich deep red.' It follows therefore, I think, that his (Tutt's) form *rufescens* of *sparganii* is less red than the well known *phragmitidis* ab. *rufescens*."

The forms to be considered are:—

sparganii, Esp. *Schm. Abbl.* IV(2). 481 (after 1792) pl. 148. 2 3 (1786).

ab. *obsoleta*, Tutt, *Brit. Noct.* I. 53 (1891).

ab. *bipunctata*, Tutt, *l.c.*

ab. *rufescens*, Tutt, *l.c.*

ab. *strigosa*, Stdgr., *Mem. Rom.*, VI. 468 (1892).

ab. *unimaculata*, Dumont, *Bull. Soc. ent. Fr.* 168 (1926).

ab. **clara**, ab. nov.

ab. **impunctata**, ab. nov.

ab. **lutea**, Whtmn., *in lit.*

ab. **rosea**, Whtmn., *l.c.*

ab. **rufa**, Whtmn., *l.c.*

ab. **nigrostriata**, Whtmn., *l.c.*

ab. **roseoradiata**, Whtmn., *l.c.*

ab. **deleta**, Whtmn., *l.c.*

Of these Tutt dealt with (1) the typical form; (2) the sparsely and faintly marked ab. *obsoleta*; (3) ab. *bipunctata*, with a distinct fine line on the median nervure; and (4) ab. *rufescens*.

[ab. *rufescens*, Strand (Hamps.) *Cat. Lep. Ph.* IX. 297 (1910).

"Much more strongly suffused with rufous; hindwing suffused with black except terminal area."

Hampson noted Tutt's ab. *rufescens*, but did not use his name nor any name. Strand finding a short description (Hampson's) without a name gave it one, at the same time translating the description into German (*Arch. Nat. gesch.* LXXXI. 165 A. 11, 1915). Strange to say he called it *rufescens* as Tutt had done.]

race *strigosa*, Stdgr., *Rom. Mem.* VI. 468 (1892).

ORIG. DESCRIP.—"They are not light nor even reddish grey, but dusky straw yellow coloured, which colour occurs only extremely rarely in the pretty variable German specimens. All the Amur specimens show a very distinct dark longitudinal streak on the median vein of forewings, such as very rarely is distinguishable even quite faintly in

German *sparanii*. Further than this, just before the outer margin, there exists a mostly very distinct, dark, trace of a spot, which can be considered as a continuation of this streak. In a few examples also the subcostal of the forewing is darkened in a streak-like way almost up to the end of the middle cell. Further there always exist in the middle cell of this var. *strigosa* in the males 3 black dots behind one another, in the ♀ only 1, which are always wanting in *sparanii*." Amur.

ab. *unimaculata*, Dumont., *Bull. Soc. ent. Fr.* 168 (1926).

ORIG. DESCRIPT.—"Forewings uniformly dull ochraceous yellow, tinted with rose; the marginal line of black points alone is well marked, less strongly, however, than in the type; the external or elbowed line is scarcely indicated by a minute point upon each nerve; the reniform is only visible at its lower part where it forms a spot made up of four black dots; there is complete absence of the pink suggestion along the nervures. The hindwings are lighter on the inner two thirds, but browned on the remaining portion." Bred near Beauvais, Oise.

ab. *impunctata*, ab. nov. *Cat. Dobr. Coll.* 21 (1909-30).

ORIG. DESCRIPT.—Browne reports an aberration from Hungary (*Cat. Dobr. Coll.*) with, "No trace of the row of black dots parallel to the hind margin." I suggest the name *impunctata* for this form.

ab. *clara*, ab. nov. (1930).

ORIG. DESCRIPT.—Among the numerous specimens I have seen, two from N. E. Kent, one bred and the other taken by Mr. Wightman, are extremely light in ground colour and stand out quite distinctly among the thirty specimens lying before me now. The hindwings are very pale straw almost white with just a uniform slightly creamy tinge. The forewings are slightly, only slightly, darker ochreous cream, without any suggestion of rufous, brown, or pink. The marginal and antemarginal lines of black points are complete. Only three larger dots at the base of the reniform are present and distinct, and the positions of the two remains of the basal transverse line are indicated by a dark scale or two. These two specimens seem to stand out so clearly and have not hitherto been noted that I call them ab. *clara*. They are more extreme than Tutt's *obsoleta*.

Hamp. *Cat. Lep. Phal.* IX. 297 (1910) describes as ab. 1, but gives no name to it, a form as "Paler, greyish-ochreous without rufous tinge." This may possibly be classified here.

Mr. Wightman, whose practical experience of this species in the field is unrivalled has submitted the following six most extreme bred forms and described them as follows:—

1. Markings on the forewings as in the type. The ground colour bright clear sulphur. Hindwings paler yellow with black suffusion at base. East Sussex. ab. *lutea*.

2. Markings on the forewings as in the type. Ground colour pale pink with slight orange tint, nervures in paler pink. Hindwings pale ochreous white. ab. *rosea*.

3. Markings on forewings as in type. Ground colour rich, deep, coppery red. Hindwings pale reddish, with dark grey streaks from base to centre of wing. ab. *rufa*.

4. Colour as in the type. A black streak under the median nervure from the base to the dots representing the elbowed line. Two black dots on the nervure distinct and a third dot above the outer one of the pair. A fine blackish line just inside and parallel with the hind-margin, and another just below the costa. Hindwings pale smoky ochreous with distinct black grey streaks from the base to the centre of the wing. E. Sussex. ab. *nigrostriata*.

5. As 4, but the black lines below costa and above hind-margin replaced by a streak of purplish red colour, the dark shade under the central nervure also suffused with purplish red, which spreads out on to the adjacent areas of the wing, so that the major portion of the wings are red or red suffused, and yet the pale ground colour, quite free from scattered red scales, is present as two pale wide streaks, one just above the central nervure, and the other half-way between the dark shading under the median nervure and the inner margin. Hindwings as in 4, but tinged with pink. E. Sussex. ab. *roseoradiata*.

6. As 5, but without the dark central nervure. ab. *deleta*.

Nonagria, Ochs. Treit (1816-25) [*Phragmatiphila*, Hamps. (1910)], *arundinis*, Fb. (1787) = *typhae*, Thnbg. (1784).

Hampson has divided the old genus *Nonagria* into *Phragmatiphila*, *Arenostola* and *Nonagria*. Without going into detail there seems reason for giving *typhae* separate generic status. It certainly stands alone among the other species which have hitherto been associated with it.

Tutt gave the description of Fab. *Mant.* II. 141 (1787) under the name *arundinis*, possibly unaware that Thunberg in his *Ins. Suec.* I. 3 (1784) had already described it under the name *typhae*, which name therefore has the prior status.

Tutt *Brit. Noct.* I. 54 (1891): Barrett *Lep. Brit. Is.* V. 85, pl. 195 (1899): Stdgr. *Cat. Hled.* 187 (1901): Splr. *Schn. Eur.* I. 216, pl. 42 (1906): South *Moths. Br. Is.* I. 297, pl. 144 (1907): Hamps. *Lep. Phal.* IX. 271, fig. (1910): Warr.-Seitz *Pal. Noct.* III. 234, pl. 49a (1911): Culot *N. et G.* I(1). 209, pl. 38, figs. 29-30 (1909-12).

In *Naturf.* XI. pl. III. f. 4, Pastor v. Scheven gives a very crude figure, which may be considered as representing the dark form of *typhae*, bred from a larva in *Typhalatifolia* and shown in fig. 2. Fig. 3 of pupa shows the well-known "beak" with which the "window" of the burrow is broken by the emerging pupa. No name is given.

Borkhausen noted the two quite different larvae figured by Scheven in *Naturf.* III. and suggested that they were of two different species, fig. 2 being that of *typhae*.

Esper's fig. IV(2). pl. 140, fig. 5, var. of *typhae* is a blackish brown form subsequently named *fraterna*.

Esper's *nerrosa* pl. 148, 1, has forewings which may be termed intermediate between type and *fraterna*, but the hindwings are extreme in their dark colour. Hübner's fig. 437 is darker but has the light hindwings of a normal example.

Ernst. and Eng. *Pap. d'Eur.* pl. 296, figs. 502 have figured a very dark ♂ and a more or less typical ♀, the former with too great a contrast of shades. They have copied Seheven's figures of the (two different) larvae and pupa. An underside fig. is much too dark (black). The ♂ may represent a *fraterna* form.

Hübner's fig. 415 is rather too red for typical *typhae* otherwise very good; fig. 437 is not such a good figure but is the dark blackish brown form to which the name *fraterna* has since been given.

Duponchel gives a very fair figure of a very dark rich brown ♂, which may be called *fraterna*. VII(1). pl. 106 (1827).

Herr.-Schäff. gives 3 figs., 349 ♂ *typhae*, 350 ♀ *typhae* (miscalled *fraterna*), 351 a large very dark ♀ *fraterna* (miscalled *typhae*). They are not good; the peculiar margin and fringes of the wings are not correctly given.

Herrich-Schäffer's fig. 351 is the black *fraterna*, while Hübner's fig. 437 is the brown *fraterna*. Esper's fig. pl. 148, 1, *nervosa*, is quite a distinct form with its deep black hindwings and its light-bordered veins on the forewings. But the shape and margins are in no way like those of *typhae*.

Freyer's fig. pl. 89 is a good figure of an ordinary light form.

Warr.-Seitz gives a rich dark form of *fraterna*, and ♂ and ♀ of the typical form.

Culot, I(1). pl. 38, f. 29-30 (1909) gives excellent figures of ♂ *typhae* and ♀ *fraterna*.

Of the Variation Barrett says, *l.c.* V. 85., "Usually only slightly variable in the depth of colour of the forewings."

Treit, V(2). 99 (1825) records, "A very fine variety, pale brown, grey powdered, with broad dark marginal band on all wings, and especially large, I have obtained from Herr Kindermann, who took it in Syria."

The forms named are:—

typhae, Thnbg. *Ins. Suec. (Dissert.)*, I. 3 (1784).

arundinis, Fb. *Mantis*. II. 141 (1787).

latifolia, Lang. *Verz. IIed.* 142 (1789).

ab. nervosa, Esp. *Abbild.* IV(2). 479, pl. 148, f. 1 (1790?)

ab. fraterna, Bork. *Naturg. Schm.* IV. 724 (1792).

subsp. *sulzeri*, Vorbt. *Mitt. Schw. ent. Gesell.* XIII. 188 (1921) [? sp.]

Tutt treats of the species (*typhae*) under the name *arundinis*, and of the form *fraterna*, Tr. Of the latter he (Tutt) said, "Under the name *fraterna*, Tr., Guenée, somewhat erroneously, describes an intermediate form between *fraterna* and the type." It should read "Under the name *nervosa*," as Guenée does not recognise true *fraterna* by name. As Tutt says his var. A form and his description is *fraterna* = H.-S's. fig. 351 (in error called *typhae*).

Tutt ascribed *fraterna* to Tr., it should have been to Bork.

Borkhausen describes a form which he says is the same as Esper's *nervosa*, IV(1). pl. 148, fig. 1. He however names it *fraterna* as the name *nervosa* is preoccupied. He says it is to be distinguished from *typhae* by the untoothed hind-margin of the hindwings.

Treit, V(2). 99 (1825) said "Under the name *fraterna* the variety

was established, which occurred among the usual forms, uniformly brown or blackish, almost markingless." *i.e.* two forms.

Borkhausen says that Esper's fig. 5, pl. 140, p. 442, is that of a red brown variety of *typhae* with blackish veins and whitish reflection and exceptionally large.

N. typhae, Thnbg. *Ins. Suec. (Dissert. Ins.)* I. p. 3 (1784).

ORIG. DESCRIP.—“Cristata alis incumbentibuscanis fusco striatis, margine postico nigro-punctato.

“Alae incumbentes, rotundatae. Antennae fusco-striatae striis obsoletis subramosis; intra marginem posticum ordo punctorum octo nigrorum. Subtus concolores punctis marginalibus vix conspicuis. Posticae supra immacolatae, subtus puncto in medio nigro. Thorax immaculatus, hirsutus, cristatus.”

Fabricius' description (quoted by Tutt) is really a paraphrase of that of Thunberg.

[*latifolia*, Lang.]

Lang. *Verz. Schm. Augs.* IIed. 142, lists Noct. *latifolia* and gives the reference to *Naturf.* XI. 30, pl. III. (1777), which, although no name is given, can be no other than *typhae*. Lang. says in a footnote that the *nervosa* of the *Verz.* of Schiff. is this species. This is not correct as the *nervosa*, Schiff. is a separate species allied to *albovenosa*.

ab. *nervosa*, Esp. *Abbild.* IV(2). 479, pl. 148, f. 1 (1790).

Werneberg says this is the brown grey form of *fraterna* (not the black grey *fraterna*).

Two forms of the dark examples of *typhae* have been noted by many including Tutt in B.N. Borkhausen's *fraterna* was a black brown, this figure of *nervosa* is of a brown grey colour, and the name may well remain as a varietal name. Not only is the form dark brown but it is also characterised by the emphasised veins on the forewings. And we find that Warr.-Seitz takes Esper's *nervosa* as the intermediate form between the type and *fraterna*, *Pal. Noct.* III. 234.

Kretchmar, in *Ber. Ent. Zt.* 441 (1863), suggested that *fraterna* was a good species “Not only was its colour richer but the larva was always blue-green and the upper part of the head was yellowish; whereas the larva of *typhae* never occurs of this green colour, whenever it does vary it appears always yellowish white, transparent, with whitish back and side lines.”

No one has ever supported this view.

Subsp. *sulzeri*, Vrbt. *Mitt. Schw. ent. Gesell.* XIII, 188 (1921.)

ORIG. DESCRIP.—“Reddish violet grey fore-wings, the fore and hind margins are strongly suffused. The orbicular is not emphasised, the reniform is whitish margined. The longitudinal shade present in *dissoluta* is wanting. The outer transverse line forming a curve is indistinct, beyond it is an obsolescent row of black dots. The wedge-shaped deep black marginal triangles on the outer margin are separated by a pale marginal line from the unicolorous grey brown fringes. Hindwings unicolorous grey with darker discal spot. Under-side shining blue grey; the forewings on the outer margin with traces

of a dark marginal line and an indistinct discal spot. Hind-wings with dark discal lunule and sharp marginal line." 16 mm.

This has been doubted as a *typhae* form.

Calamia, Hb. (1818) [*Nonagrja*, Ochs. (Gn.): *Leucania*, Ochs. (Dup.): *Caradrina*, Ochs. (Meyr.): *Arenostola*, Hamps.: *Rhizedra*, (in lit.) Warr.-Seitz. (1911)] *lutosa*, Hb. (1820).

There has always seemed to be an uncertainty as to the generic position of *lutosa*. Hübner placed it in the genus *Leucania* at first.

Dr. Cockayne says that he suspects from his intimate knowledge of the earlier stages and habits of *lutosa*, that it should be placed near *Hydroecia*.

Tutt *Brit. Noct.* I. 55 (1891): Barrett *Lep. Br. Is.* V. 82, pl. 194, 2 (1899): Stdgr. *Cat.* IIIed. 187 (1901): Splr. *Schm. Eur.* I. 216, pl. 42, f. 12 (1906): South *Math. Br. Is.* I. 296, pl. 144 (1907): Culot. *N. et G.* I (1). 208, pl. 38, f. 28 (1909): Hamp. *Lep. Phal.* IX. 297 (1910): Warr.-Seitz. *Pal. Noct.* III. 237, pl. 49i (1911).

Steph. *Ill.* III. 72, pl. 29, figures *pilicornis*, but the fig. does not agree with the description for the fuscous dots are not present on one wing and are deficient on the other.

Steph. *l.c.*, also says of *crassicornis* "somewhat reddish ash," whereas in the original description there is no mention of "reddish."

Dup. *Hist. Nat. Sup.* III. 313 (1836), says that *vectis*, Curt. is *bathyerga*, Fr.

Wood's figures are incomprehensible, fig. 358 *cannae* the "spotted wainscot" has no spots at all nor has either of the other figures 357 *crassicornis* and 356 *pilicornis*, 358 and 356 have dark grey hindwings; 357 has rufous hindwings like the forewings.

Freyer's fig. II. 122, pl. 170 (1836) *bathyerga* is that of a *crassicornis*, pale ochreous with a well developed series of submarginal dots and longitudinal shades on the forewings.

Humph. and Westw. *Br. M.* gives seven figures of the species on pl. XLVI. f. 9=*lutosa*, figs. 4-5=*pilicornis*, ♂ and ♀, figs. 6-7=*crassicornis* ♂ and ♀, fig. 10=*cannae*, fig. 8. an aberration with a broad marginal dark band on the hindwings.

H.-S. uses the name *bathyerga* but corrects it in the index to *lutosa*. He notes that Hübner's fig. 232 *lutosa* has no dots and says that Freyer's fig. 170 has forewings too broad and hindwings too white.

H.-S.'s fig. 307 is a good one of *pilicornis* and fig. 312 is *crassicornis*, with dark margined hindwings.

Warr.-Seitz says that *pilicornis*, *vectis*, *bathyerga* are typical *lutosa*, that *cannae*, Stephs. is *rufescens*, Tutt.

Culot gives two fine figures of the typical ♂ and ♀. *N. and G.* I(2). pl. 43, figs. 1-2 (1913).

Barrett says, *l.c.*, V. 117, "Rather variable in colour from the palest drab to various shades of pale red drab; often with smoky-brown clouds along the principal nervures in lieu of the dusting; occasionally in the more darkly shaded individuals one or two faint black dots will appear on the nervures, or one on the dorsal margin, suggesting the place of the usual first line." "There is also a remarkable variation

in size." He records specimens of a terra-cotta red, the colour of *N. cannae*, but more glossy.

Gn. refers to the variation in size from that of a small *pallens* to that of a large *typhae*.

The forms to pass in review are:—

lutosa, Hb., *Noct.* 232 (1802) plt.

ab. *crassicornis*, Haw., *Lep. Brit.* 173 (1809): Humph. and W. plt. 46, 6-7.

ab. *pilicornis*, Haw., *Trans. Ent. Soc.* (old series) 336 (1812): Steph., *Ill.* III. plt. 29.

ab. *cannae*, Steph., *Ill.* III. 72 (1829): Humph. and W. plt. 46, 10.

ab. *vectis*, Curtis, *Br. Ent.* 459 (1833) plt.

bathyerga, Freyer, *Schm. Abb.* II. 122 (1835) plt. 170, 1.

ab. *rufescens*, Tutt, *Br. Noct.* I. 56 (1891).

ab. *rufescens-suffusa*, Tutt, *l.c.*

ab. *strigata*, Rbl., *Berge-Schm.* 226 (1910): *Tijds.* XLI. plt. 2. f. 2 (1898).

ab. *lechneri*, Rbl., *l.c.*, fig. 3.

subsp. *griseata*, Warr-Seitz., *Pal. Noct.* III. 235 (1911): plt. 49c.

race *taurus*, Strnd., *Arch. Naturg.* LXXXI. 1 and 2, A. 11 (1915).

ab. *rufovenosa*, Schille, *Zt. wiss. Ins. biol.* XIV. 120 (1918).

Tutt deals with (1) pale typical form. (2) *pilicornis*, the pale form without longitudinal shades, but with a complete row of dots. (3) *crassicornis*, pale with longitudinal shades and row of dots. (4) *rufescens*, without shades and dots. (5) *cannae*, reddish without shades but with dots. (6) *rufescens-suffusa*, reddish with both shades and dots.

ab. *vectis*, Curtis, *Brit. Ent.* X. 459 (1833).

FIG.—*l.c.*

ORIG. DESCIP.—“Pale ochreous; superior wings alternately marked with numerous longitudinal ochreous and cream-coloured lines, the nervures being pale; the central nervure suffused with reddish ochre, as well as the one next the interior margin, which is slightly freckled with black; at the disc is a fuscous dot and an imperfect curved line of similar dots between it and the posterior margin which bears 7 black dots, the posterior angle emarginate; inferior wings white slightly tinted with ochre and freckled with brown below the centre, where there is a pale spot shining through from beneath, the obscure line of fuscous dots is continued across this wing, they are somewhat oval and there are a few black dots on the margin.”

This does not agree with either of Tutt's six forms but is partly ochreous and partly rufescent. Hence the name should stand for a form.

ab. *strigata*, Rbl. *Berge-Schm.* 226 (1910).

FIGS.—*Tijds.* XLI. 169, plt. 2, f. 2 (1898)

ORIG. DESCIP.—“With a toothed outer transverse band on all the wings, the forewings also marked with an anterior transverse band.”

The figure looks much as if caused by a deposit from a fluid which saturated the body and spread along the wings irregularly.

ab. *lechneri*, Rbl. *Berge-Schm.* 226 (1910).

FIGS.—*Tijds.* XLI. 169, pl. 2, f. 3 (1898).

ORIG. DESCRIP.—“Forewings powdered thickly with brown-grey, the veins, a fold-streak to the base and a longitudinal spot in the middle cell are pale.”

subsp. *griseata*, Warr.-Seitz *Pal. Noct.* III. 235 (1911).

FIG.—*l.c.* 49c.

ORIG. DESCRIP.—“The hindwings are dark grey beyond the middle with the fringe pale. The forewings also are greyer ochreous with the pale veins more distinctly defined by dark scaling.” Japan.

subsp. *taurus*, Strand., *Arch. Naturg.* LXXXI. 102, A. 11. (1915).

ORIG. DESCRIP.—“Greyer, powdered and suffused with dark-brownish.” Taurus.

ab. *rufovenosa*, Schille. *Zt. wiss. Ins. biol.* XIV. 120 (1918).

ORIG. DESCRIP.—“Markedly smaller than the typical form, the ♂ s somewhat larger, 15.5mm. Forewings as in the typical form ochre yellowish grey with paler veins and a posterior transverse row of black dots on veins M_3 , C_1 , C_2 and A_1 yet still more grey, the males especially with dark grey suffused hind margin and similar basal streaks running out beyond the median, reaching up to the end of the cell, and hindwings completely dark grey with veins appearing bright reddish, and similar fringes.” Galicia.

II. Sub-class. GENUINAE, Gn. (*contd.*)

2. Family. APAMEIDAE, Gn.

Tutt followed Guenée in the main for his Classification (*Hist. Nat. V=Noct.* I. 62). Neither the *Leucaniidae* nor the *Apameidae* are now recognised as integral groups and the species they contained are scattered among the various sections of the more recently accepted groupings.

In the attempt to obtain a “natural classification” families, etc., have been formed very loosely and often are quite incapable of distinct definition. For instance, the *Apameinae* as defined by Kirby, *Hand. Ord. Lep.* V. 22, is as follows:—“Small or moderately sized moths, generally of dull colours, with somewhat short, ascending, pilose palpi, and rather distinctly marked forewings, the subterminal line often forming a distinct W. The body is stout and pilose, and the thorax is often crested and the abdomen very long. The larvae are stout, smooth and cylindrical, hiding themselves (1) at the roots, or (2) in the stalks of plants, or (3) under leaves. The pupae are generally subterranean, and enclosed in a casing of agglutinated earth.” (The italics are ours to emphasise the more indefinite characters attributed to the group.)

On the other hand our classification should not be a frame in which jugglery has to be used to fit in a species, often to the detriment

of the stability of the more or less small groups, which are apparent to all as natural, such as the *Acrionicta*, the *Metachrostis*, the *Caradrina*, the *Agrotis*, etc., etc.

The classification now in use is in the main mechanical. Useful to run down a species, but more or less useless to give us information on the natural relationships of groups and species and often affords suggestions of relationships which do not exist.

In his little book on *British Moths* in 1896, Tutt adopted Chapman's suggested Classification of the larger groups and placed his own smaller groups therein, but kept the same group of genera in the Tribe *Apameidi*, which he had in the *Brit. Noct.* Vol. I.

The genera dealt with in Tutt's *Apameidae* have been distributed among the subfamilies EUXOINAE, HADENINAE, CUCULLINAE and AMPHIPYRINAE (Warr.-Seitz) and the British species are distributed as follow—

The *Euxoinae*, have spines on the tibiae, not claws. 1 species.

The *Hadeninae*, have hairy eyes. 11 species.

The *Cucullinae*, have ciliated eyes. 2 species.

The *Amphipyrinae*, absence of the above three characters. 35 species.

Although Tutt's grouping is retained for easy reference to the original work, it would be as well perhaps to give the species as they are now distributed in the above four subfamilies.

I. EUXOINAE.—*R. (A.) putris*.

II. HADENINAE.—*X. (X.) conspiciellaris*, *S. (X.) zollkofferi*, *T. (M.) albicolon*, *B. (M.) brassicae*, *P. (M.) persicariae*, *P. leucophaea*, *T. (N.) popularis*, *H. (N.) reticulata*, *C. (C.) graminis*, *P. (L.) luteago*, *T. (L.) cespitis*.

III. CUCULLINAE.—*L. (H.) oditis (hispid)*, *A. australis*.

IV. AMPHIPYRINAE.—*X. (G.) flavago*, *A. (H.) oculoa (nictitans)*, *A. (H.) paludis*, *A. (H.) erinanensis*, *A. (H.) lucens*, *H. micacea*, *H. petasitis*, *G. (H.) leucostigma*, *P. (X.) monoglypha*, *P. (X.) lithoxylea*, *P. (X.) rurea*, *P. (X.) hepatica*, *P. (X.) sublustris*, *P. (X.) scolopacina*, *D. scabriuscula*, *P. (A.) basilinea*, *P. (A.) pabulatricula (connexa)*, *P. (A.) ophiogramma*, *P. (A.) gemina*, *P. (A.) unanimis*, *P. (A.) secalis (didyma)*, *O. (M.) strigilis*, *O. (M.) bicoloria*, *O. (M.) fasciuncula*, *O. (M.) literosa*, *O. (P.) captiuncula*, *O. (C.) haworthii*, *P. (M.) oblonga (abjecta)*, *P. (M.) sordida*, *C. (M.) furva*, *C. exulis*, *T. (C.) matura*, *L. dumerilii*, *L. guenei*, *L. testacea*.

Gortyna, Ochs. (1816-25) [*Ochria*, Hb. (1822) : *Xanthoecia*, Hamps. (1910)] *ochracea*, Hb. (1786) = *flavago*, Schiff. (1775).

Most authors have used *Gortyna*, a few including Meyrick *Ochria*, while Warren-Seitz has followed Hampson's *Xanthoecia*.

One of the chief characteristics of the genus *Gortyna*, restricted to *flavago* is that the frons of the imago is armed with a projecting spike or beak. (See Hamps. fig. IX. p. 34.)

Gortyna = *Xanthoecia* is in the *Amphipyrinae* (Warr.-Seitz).

Tutt took the *ochracea*, Hüb., *Beitr.* I(1). 19, pl. 2 (1786), as the original description. The species was however sufficiently indicated under the name *flavago* by Schiff. in the *Verz.* 86 (1775).

The Original Description is as follows :—

“ The larvae are naked ; they have a unicolorous, generally yellowish or whitish head, otherwise a smooth and delicate colour especially on the lower half of the body. The metamorphosis takes place underground in a cocoon made of earth. The imago has a sharp-edged or pointed crest, dependent, bright yellow forewings, on which usually there are three oblique, red brown or dusky transverse lines. The lower wings are for the most part white.”

The above is the sectional general description of ten species of golden yellow Noctuae, of which No. 5 is the “ *Königskerzen Eulen*,” *N. flavago*. A foot note says that this species feeds in the stems of plants in the pith itself. The “ *Königskerzen* ” is *Verbascum thapsus*.

The above description and note clearly distinguishes the species and can be accepted as the Orig. Descrip. as is done by Warren (Seitz). Thus *flavago* is the prior name. Most of the early authors used the name *flavago*: Esper, Bork., Fuess., H.-S., Fab., Freyer, Duponchel, Stephens, Guenée, Hampson, etc.

In the *Nachtrage* at the end of pt. IV. Hübner himself says that his *ochracea* is the *flavago* of Schiff. in the *Sys. Verz.* and of Esper in *Abbl.* pt. 33 (112). This note was apparently overlooked by Tutt.

In his description of *ochracea*, *Beitr. Gesch. Schm.*, Hübner likens it in size, shape, marking and colour to *oo*; hence the form was both very small and of very light coloration. Therefore as Borkhausen, Lang and others say *ochracea* is the varietal name for a very small and very pale form.

[Esper. 1786 refers to Hübner *Beitr.* I. 1786. Hübner *Beitr.* IV. 1789 refers to Esp. 1786, therefore Hübner's *Beitr.* I. was published before Esper's part containing p. 213 and pt. 112 in 1786, and his *Beitr.* IV. after the publication of Esper's p. and pt. cited.]

Lang, *Verz.* 1759 treats the *ochracea* of Hüb. *Beitr.* as a different species, p. 146.

Meyrick, who “ carefully revised and corrected in the light of all available information,” still uses the name *ochracea*, although Hübner himself rejected it in both his *Beitr.* and his *Saml.* for the prior name *flavago*.

Tutt *Ent.* XXI. 271 (1888): *Brit. Noct.* I. 57 (1891): Barr. *Lep. Br. Is.* V. 75 (1899): *Stdgr. Cat.* III. ed. 187 (1901): Splr. *Schm. Eur.* I. 215 (1906): *South Moths. Br. I.* I. 295 (1907): Hamp. *Lep. Phal.* IX. 33 (1910): Warr.-Seitz *Pal. Noct.* III. 225 (1911).

The figure in Moses Harris, *Aur.* pt. XXXV., is very small and poorly portrayed, there is not sufficient contrast between band and ground, the bands are much too orange and no deepening of the usual leaden tint in them, the basal band goes right to the base leaving no ground colour there, and the claviform is not recognisable as it is in almost every specimen I have seen as an “ acorn and cup.”

There is no doubt that Esper's figures pt. 112 were copied from Sepp's beautiful work *Wunderen* I. pt. 3. When compared, the colour and markings are identical, of both larvae and imagines. (But fig. 1 is wrongly named *flavago*, and in the text (p. 218) is described and named *argyritis* a different species from *flavago*. As Werneberg says, it represents *moneta*, Fb. (*Beitr.* II. 39).

Engram., *Pap d'Europe*, VII. 158, recognises this species as the *flavago*, Schiff.; the figures on pl. CCCII. are too richly coloured, but otherwise correct.

Hüb's fig. of *ochracea* is small and very pale "cf. oo."

Hüb's fig. of *flavago* 186 is also small and pale but not very so and has white hindwings, fig. 187 is of normal size and orange yellow with dark ferruginous markings with grey hindwings.

Freyer figures a female, *Neu. Beitr.* pl. 484, but the ground is no paler than that of a male and the basal fascia is very strongly expressed.

Humph. and Westw., I. pl. 45. The figure has an unusually dark orange-ground of forewing and there is a dark ferruginous fascia from costa to the level of the bottom of the stigmata.

Newman's, p. 279, figure does not show the acorn "cup," it has a clear band of ground colour between the submarginal band and the fringe, a rare occurrence, the reniform is almost indistinguishable, and there is a considerable confusion of the usually definite marks in the central area across the forewings between the two bands.

South, I. pl. 144, figures the female as being of a paler yellow with the basal fascia scarcely perceptible, and with a faint transverse ferruginous line between the stigmata.

Culot's figure, I(1). pl. 38, f. 25, is a very good bright form with the apical ground colour mark extended complete to the inner margin, and of uniform depth of colour.

Of the Variation Barrett says—"Hardly variable, though probably the largest specimens with the deepest colouring are found on the South Coast, and those of the darker purple and paler yellow in the North. But the full richness of colouring is rarely seen in specimens captured on the wing, since the rich orange-yellow colour fades very rapidly to pale yellow during life."

Tutt apparently found this a most difficult species, for his treatment seems confused. He did not know of Esper's further figure on plate 176, nor did he note Donovan's fig. pl. 340 named *lappae* nor Goetze's *aurae-maculata*, *Beitr.* III. 3. On pages 57-6 of *Brit. Noct.* I. he speaks of (1) Hübner's fig. in the *Beitrage*, small, pale yellow, hindwing pure white; (2) the small pale form from Ulverston; (3) the *ochracea*-like somewhat larger form from Hull; (4) Hübner's fig. 186, pale yellow, hindwing pure white; (5) Hübner's fig. 187, orange yellow, hindwing grey. Later he emphasises his remarks (2) and (3) and yet finally diagnoses and recognises only one form besides *ochracea* of Hüb. viz. the *flavago* of Esper.

There are one or two phases of variation not yet noted.

The outer dark band may be (1) complete up to the dark fringe; (2) have an apical wedge of ground colour; (3) separated from the fringe by a complete narrow band of the ground colour; (4) instead of the last a more or less complete narrow band of mottling.

The claviform nearly always appears as an acorn and cup, a feature occurring in the closely allied species mentioned below.

A dark line between stigmata from costa to inner margin may be well developed, traceable or absent.

Sub-basal band on outer side (1) throws out a projection to the orbicular; (2) very uneven in width; (3) diffuse on inner margin; (4) often contains a light dot towards the costa.

**An Account of the Hemiptera-Heteroptera
of Hampshire and the Isle of Wight; with
Additional Notes on British Species not
recorded for the County.**

(=A Synopsis of the British Fauna.)

PREPARED BY

H. P. JONES, F.E.S.

FOR

**The Entomological Society of Hampshire and the South of
England.**

WITH TWO PLATES

ERRATA.

Pages 17, 18.—Under *Fremocoris*, and genera immediately following, read "1st (basal)" for "2nd antennal" joint in the descriptions of the antennae respectively.

Page 83.—GLOSSARY. Delete the term "clypeus" and its definition, and substitute "labrum (or mouth)."

It is desirable that *Notonecti* be mounted with the wings and both surfaces of the abdomen exposed. Habitat: ponds or nearly stagnant waters.

[*N. halophila*, Edw.—Front angles of pronotum in lateral aspect acute and projecting. Elytra sordid greenish-white, inclining to yellowish in ♀, with a row of irregular blackish spots running from the costa; a few other dark markings usually present on inner angles of corium and cuneus. Wing narrowly fuscous at apex, otherwise clear, usually with a white reflection; strong vein along front margin of wing brown, black-brown towards the point where it combines with the other frontal veins; these and the strong basal vein also dark (see plate II). Abdomen beneath with the long hairs on the middle keel, and on inner edge of connexivum, black in ♂, dark brown in ♀. Expanse 25-26.5mm. *Sp. nov.* On or near the coast, perhaps chiefly in brackish water.]

N. glauca, L.—Front angles of pronotum in lateral aspect right angles or obtuse. Elytra brownish-yellow, with more or less of blackish mottling, which originates next the costa, and exceptionally extends over the disc; the majority of specimens have little more than the costa spotted, as in *halophila*. Apex of wing, and adjoining portions of frontal veins, faintly yellowish or dusky; wing otherwise (including veins) almost clear, with a white reflection. Abdomen beneath with the hairs on the middle keel, and on inner edge of connexivum, pale brown in both sexes. Expanse 26-27mm. Var. *marmorea*, Fab., is characterised by an excess of dark mottling on the elytra. In all forms the strong vein along the front margin of the wing seems practically colourless. Stoneham (Killington); N. Forest (Ryles: Nottm. Mus. Coll.). Probably the commonest species in Hants as usually elsewhere.

N. furcata, F.—Elytra black or bluish-black, corium with an elongate ochreous spot at base, and clavus pale except narrowly along inner margin. Wing fuscous at apex, otherwise largely clear, with a purplish-blue reflection; strong veins brown to dark brown, others brownish. Abdomen beneath with the hairs on the central carina, and on inner edge of connexivum, brownish-yellow in ♂, pale brown in ♀. Expanse 31-33mm. New Forest and Southampton (F. J. Killington).

N. maculata, F.—Metanotum orange-yellow, with a black spot on each side at base; sides of abdomen yellow. Elytra brownish-yellow, inclining to orange, closely mottled at least inwardly with blackish-brown; wing more or less smoky yellow, darker at apex, with a bright yellow-orange streak running centrally from the base; strong vein bordering front edge of wing yellow, veins otherwise yellowish-brown to brown. Abdomen beneath with long hairs on the middle keel, and on inner edge of connexivum, black in ♂, pale brown in ♀. Expanse 27-28mm. Broader than any of the foregoing, with shorter elytra; the yellow metanotum renders it remarkably distinct. In many examples the dark spots show a tendency to disappear from the lateral margin of the corium, particularly at the base, and where this is carried to extremes we have perhaps forms leading up to the immaculate var. *fulva*, Fuente, of S. Europe and N. Africa. The tendency to the production of a spotless costal region in *N. maculata* is interesting, as the lateral margin of the corium in *N. glauca* and *N. halophila* is the

one portion of the hemi-elytron that is invariably strongly spotted. New Forest (Piffard: Nottm. Mus. Coll.).

Plea, Leach. *minutissima*, Fuessl.—Comparatively minute, short, very convex, not twice as long as broad. L. $2\frac{1}{2}$ mm. Head and pronotum very wide (about equally so) the last convex, with sides short, and base largely produced and arcuate; face rounded, vertical; eyes remote, vertex of head between twice as wide as each eye; elytra short, very declivous posteriorly, without a distinct membrane; hind legs not very long, ambulatory, tarsi of all legs with claws. Pale ochreous, shiny, strongly punctured, head with a smooth reddish central line. Has only a very distant relationship with *Notonecta*, and should, I think, constitute a distinct family. In ponds and dykes, crawling about the weed. New Forest and elsewhere, by various collectors; no doubt common in Hants. I. of Wight: generally distributed.

Fam 4. **Corixidae**.—Prosternum short, legs inserted as in *Notonectidae*: rostrum concealed, apparently unjointed; vertex of head free from pronotum. Scutellum lacking; antenna four-jointed. Other important characters are as follows: Sub-elongate or elongate-ovate, only slightly convex; elytra strongly sulcate laterally, placed horizontally: head very concave posteriorly so as to cover and embrace the prothorax, wider than the last, only narrowly attached, and capable of great rotation; face elongate, rounded, inflexed, its apex transversely striated; eyes large, triangular. Pronotum extremely short at sides, at base usually somewhat angularly produced, with a more or less distinct dorsal carina; scutellum imperceptible. Front tarsi or palae longer and often much wider than tibiae (the latter very short) variable in form, single-jointed, fringed inwardly with long bristle-like hairs; middle legs elongate, tarsi single-jointed, ending in narrow claws; hind legs elongate, their tarsi flattened, oar-shaped, two-jointed, equipped with long swimming hairs. Abdomen in ♂ strangely distorted on one side, producing a want of symmetry in the segments; 6th dorsal segment with a curious asymmetrical organ consisting of rows of closely set comb-like plates of chitin, usually dead black in colour (=“strigil” of the descriptions). This structure is attached to the segment by a short pedicel, and appears always to be on the distorted side, hence may be either to the right or left of the abdomen (see under genera). Face in ♂ usually more or less widely excavated, in ♀ sometimes flattened. ♂ pala generally with a line or two of opposing lines of stridulatory teeth or pegs, situated on the 2nd, counting from the outer edge, of four more or less distinct ridges running the length of the pala. Ochreous, thorax and elytra (including membrane) with numerous black or dark brown transverse markings, or almost entirely dark brown except for delicate cross-pencillings of paler colour; markings on elytra frequently much broken up or irregular in outline, on pronotum usually continuous, sub-parallel. Entirely smooth, shiny, or with the surface above more or less rastrate—*i.e.*, striated very minutely in a fashion reminiscent of a file. Habitat: ponds and streams, generally the former. Pal. (including *Micronecta*) 100.

NOTE:—The curious red globular or pear-shaped objects found

attached to the legs or even bodies of *Corixidae*, and other aquatic bugs, are the parasitic larvae of *Hydrachnidae* ("Water-mites")

Sub-Fam. 1. CORIXINÆ.—Pronotum with transverse lines; head short, rarely much wider than pronotum, eyes extending back to hind margin.

Corixa, Geoff. (= *Macrocorixa*, Thoms.).—Large species, 8-14mm., without rastration; asymmetry to left in ♂. Strigil long-oval (see plate II.).

C. geoffroyi, Leach.—L. 13-14mm. Pronotum with 16-20 pale lines (irregular, and difficult to trace). Insect entirely smooth and shiny; pronotum and elytra greenish-black, the former marked as stated, the latter with numerous short, close, vermiculate pale markings; front tibia in ♂ spined at apex, pala elongate, parallel-sided, curved on upper margin close to apex; pala in ♀ elongate, curved, pointed. Almost indistinguishable from the next species except as follows: Intermediate tibia in both sexes more or less parallel-sided, the inner side towards the apex not cut away in a broad curve; intermediate femur in ♂ without a large dentiform bundle of strong bristles on the posterior side towards the apex; pala four times as long as wide, provided with a single row of 28-31 stridulatory teeth or pegs; strigil shorter, with 9 to 10 regular, parallel, combs; left paramere (genital forceps) widened at apex, its inner side more or less gradually narrowed. A common pond insect in most parts of Hants and I. of Wight; possibly the allied species may occur locally with it.

[**C. dentipes*, Thoms.—Practically identical with *geoffroyi* in size and colour, but rather easily known by the following characters: Intermediate tibia in both sexes, particularly in ♂, thickened towards base, the inner side below the articulation with the femur cut away in a more or less broad curve; intermediate femur in ♂ with a large bundle of strong bristles, more or less fused together in a dentiform mass, placed towards apex on posterior side; pala rather more than three times as long as wide, provided with a single row of 24-28 teeth; strigil longer, with 12-14 combs, of which the inner examples are regular, parallel, the outer broken up and confused; left paramere widened towards apex, then on inner side suddenly constricted and narrowed. Has so far been noticed in this country only in Lincs., Norfolk, and Cumberland.]

The two undermentioned species differ so slightly from each other that they have for long been united in British and Continental lists under the name *C. affinis*, Leach (= *C. atomaria*, Illg.) Although admittedly very fine the points of difference, except in very old faded specimens, are sufficiently appreciable in every case, and seem constant. From *C. dentipes* and *C. geoffroyi* these two forms may be known collectively as under:

Smaller, 8-10½mm. Pronotum shorter, hence with only 12-14 lines; strigil with 6 broad combs. ♂ pala outwardly more curved, thus becoming broader at the apex instead of nearly parallel-sided; pala in ♀ shorter, more curved. Colour in one species always much paler.

*For fuller information concerning this fine insect cf. Mr. W. E. China's paper on *C. dentipes* and *C. geoffroyi* in "E.M.M." vol. 64 (H.P.J.).

[*C. panzeri*, Fieb. (*C. affinis* pars O.C.)—L. $10\frac{1}{2}$ mm. Colour usually darker, black lines in general thicker than yellow; pronotum shorter, lines fewer; ♂ pala with outer margin more curved, its apex broader, and surface more hollow and scoop-like; ♂ genital capsule larger, broader; intermediate tarsi longer as compared with tibiae; face in ♂ with a larger and deeper impression. Said to be partial to ponds in chalk-pits or gypsum pits—*i.e.*, to water containing salts in solution. Such is certainly the case in Notts., where the insect, moreover, frequents the smallest pools.]

C. affinis, Leach. (*C. affinis* pars O.C.)—With characters of *panzeri*, but smaller, 8-9mm. Colour usually paler, black lines in general thinner than yellow; pronotum longer, lines more numerous; ♂ pala with outer margin straighter, apex narrower, surface less hollow; ♂ genital capsule considerably smaller and paler, the appendages (forceps) of different shape; intermediate tarsi shorter as compared with tibiae; face in ♂ with smaller and shallower impression. Teeth of strigil finer. The smaller size and paler colour are considered to be sufficient to distinguish it in the field. Has occurred to Butler in ponds chiefly near the sea, often in brackish water. "Hants" (B.Br.H.-H.).

Sigara, F. (= *Arctocoris*, Wall., O.C. = *Corixa*, Br. Cat.)—Smaller species, more or less rastrate; asymmetry to right in ♂. Eyes not very large and projecting.

GROUP I.—Corium not rastrate, and pronotum and clavus nearly smooth. Strigil minute, consisting of only a single comb-like plate.

[*S. lugubris*, Fieb.—Dark lines of pronotum as broad as pale lines; markings at base of clavus broader, towards apex narrower, fragmentary; markings of corium transverse, short, arranged rather in longitudinal series. ♂ with a feeble transverse keel on frons on a level with the lower margin of the eye (viewed from in front) bounded above by a large shallow impression; the characteristic excavation on frons feeble. ♂ pala with outer of the usual four ridges abruptly arched near base; line of pegs on 2nd ridge commencing at extreme base, rising thence in a high arch near centre, then declining again, and joining outer margin near apex. ♀ with pronotal keel not more than $\frac{1}{4}$ as long as pronotum. L. 6-6 $\frac{1}{2}$ mm. In ponds, often when these are very foul; also in stagnant brackish water on saltmarshes.]

S. selecta, Fieb.—Slightly smaller than the last species, otherwise differing perhaps only as follows: ♂ with a strong transverse keel on forehead at about $\frac{1}{3}$ the height of inner margin of eye (viewed from in front) bounded above by a rather deep impression; entire frons below keel excavated, the excavation reaching from eye to eye. ♂ pala smaller, outer edge more evenly curved; line of pegs on 2nd ridge running nearly straight from base to a little beyond the middle of the outer edge, then curving slightly before joining the margin at some little distance from the apex. Pronotal carina in ♀ nearly $\frac{1}{2}$ as long as pronotum. With similar habits to *lugubris*, but, according to Butler, rarely found in the same ponds, although frequently in the same localities. "Hants" (B.Br.H.-H.).

S. hieroglyphica, Duf.—Pronotum paler than in the two preceding species, with narrower dark lines. Pale greenish ochreous, with 8-10 narrow black lines on pronotum; clavus entirely pale at extreme base, otherwise crossed by short irregular black lines; corium with transverse, fragmentary, dark markings arranged in three or four series. ♂

pala evenly curved outwardly, line of pegs nearly straight for about $\frac{2}{3}$ of its length, then curving somewhat abruptly downwards to meet the outer margin near the tip. L. $5\frac{1}{2}$ - $6\frac{1}{2}$ mm. On saltmarshes. "Hants" (B.Br.H.-H.) Lymington (H.P.J.) I. of Wight: Nettlestone (C. Morley).

Group II.—Corium, clavus, and pronotum deeply rastrate, dull. Larger species 7-8mm. Transverse pale lines very narrow, nearly entire. ♂ pala with a triangular process at base towards outer margin; strigil large, elongate, with rounded ends.

S. sahlbergi, Fieb.—Pronotum with 7 to 8 rather irregular pale lines; apex of corium widely pale. ♂ pala truncate at apex, and gradually increasing in width from the base outwards; row of pegs running in a perfectly straight line to the bend in the margin that forms the truncation—*i.e.*, the widest part of pala—then turning abruptly, and running almost concurrently with the margin itself to very near the tip. Facial impression of ♂ distinct. Pronotum and elytra dark brown, deeply rastrate, dull, with very narrow nearly entire paler cross-bands. A somewhat local species, but abundant where it occurs, inhabiting usually, in my experience, rather deep clear ponds or dykes in low pastures, particularly near woods. S. Hants and I. of Wight: locally common.

S. linmaei, Fieb.—Resembles *sahlbergi*, but pronotum crossed by 5 or 6 pale lines, and apex of corium not pale. On the average a distinctly smaller species, with basal pale lines of clavus often dilated inwardly. ♂ pala very similar, but with pegs slightly larger, and truncation more abrupt. ♂ facial impression very indistinct. Rather similar in its habits to the last, but scarce in comparison. "Hants" (B.Br. H.-H.). I. of Wight: Parkhurst Forest (F. Morey).

Group III.—Insect less deeply rastrate, surface less dull; transverse pale lines wider, much abbreviated, interrupted; ♂ pala without a subtriangular process or ridge at base. Pronotal central carina visible only in front; hind tarsi unspotted.

Section A.—Larger species, $6\frac{1}{2}$ -7mm. ♂ pala with two opposing lines of stridulatory pegs; facial impression shallow, extending between the eyes; strigil variable in shape and size.

S. striata, Fieb.—Pronotum with 6 pale lines; basal pale lines of clavus much dilated inwardly (this character is often visible to the naked eye). ♂ pala strong, stout, gently convex outwardly, almost straight inwardly; rows of pegs running from near base and apex respectively, and nearly meeting on disc. Rather elongate, somewhat shiny, discal markings of corium separated by a broad dark line both from the claval and lateral margins. Intermediate claws shorter than the tarsi. Strigil large, elongate, subreniform, sinuate, with about 15 irregular and greatly overlapping rows of teeth. Very common in ponds and slow-running streams almost everywhere in Hants and I. of Wight.

S. distincta, Fieb.—Pronotum with 8 to 9 pale lines; pale lines of clavus scarcely if at all dilated. Pronotal angles normal—*i.e.*, obtuse. Pala of ♂ thin and slightly concave on upper and inner surface, with a more strongly curved outer margin, which is highest very near the base; rows of pegs running very similarly but not nearly meeting,

leaving disc perfectly clear. Strigil small, subquadrate, with only 5 rows of teeth. Insect with finer yellow markings, thus appearing darker than *striata*; corium usually with a dark line only towards apex of claval suture. Intermediate claws not shorter than tarsi. More local than *striata*, although often common with it in ponds. Lynington and N. Forest (H.P.J.).

S. fallenii, Fieb.—Resembles the last, but with the pronotum shorter, its side angles acute. ♂ pala thin, concave above, but larger, and abruptly truncate at base, where its diameter greatly exceeds that of the tibia. 1st row of pegs consisting of only about 6 projections, and situated close to the margin beyond the middle; 2nd row of about 30 pegs commencing from very near the base, and running diagonally across the disc to within a short distance of the 1st row. Strigil minute, narrowly pyriform, with four combs. Insect usually paler, basal pale lines of clavus sometimes dilated inwardly. In ponds, common in S. Hants and I. of W.

Section B.—Much smaller, about 5mm. Intermediate tibiae scarcely longer than intermediate tarsi; tarsi subequal in length to claws.

S. moesta, Fieb.—More or less dark brown, paler transverse markings usually very indistinct. About 6 pale lines, however, can generally be traced on the pronotum. Strigil oval, much larger than in the three preceding species, with 5 or 6 combs. ♂ pala like this in *S. linnaei*, but smaller. A very common species in ponds, etc., almost throughout S. Hants and I. of Wight; as a rule easily detected in the net by its colour.

Section C. Small, 5-6mm. Intermediate tibiae much longer than tarsi, tarsi much shorter than claws; pale transverse markings very distinct. Pronotum much longer than vertex of head, crossed by 7-10 pale lines; strigil short, variable in form, with about 5 rather irregular rows of teeth.

S. limitata, Fieb.—With two black longitudinal lines on corium. ♂ with excavation on frons large, continued upwards between eyes; very deep, strongly margined, terminating superiorly in a deep rounded arch. ♂ pala short, anterior margin very convex, inner margin very concave; row of teeth in two parts, one of which originates near base, and extends in a straight line down disc of pala for about $\frac{2}{3}$ the length of the surface; the other row runs along outer margin from the tip for about $\frac{1}{3}$ the length; between the two rows exists a scattered group of very minute pegs. Anterior tibiae in ♂ much swollen. Strigil small, triangular, sides slightly rounded. Black markings narrower than in next species, hence insect appears pale in comparison. L. 6mm. "Hants" (B.Br.H.H.) Lynington (Blatch). I. of Wight: Parkhurst Forest (Power).

S. semistriata, Fieb.—With three or four longitudinal black lines on corium (pale markings on last very short, fine). ♂ facial impression large, very deep, concave, continuing between eyes, but subtruncate superiorly; ♂ anterior tibia swollen, and pala formed much as in *limitata*, but with line of pegs continuous, the part occupied by the very minute pegs in *limitata* being here represented by a continuous curved line of pegs of the normal size joining the basal with the apical part of the line; there are a few scattered pegs below apical portion. Insect darker and rather shorter than *limitata*, very rastrate. "Hants" (B.Br.H.H.).

S. venusta, D. & S.—Corium with three or four longitudinal dark lines: ♂ facial impression large, extending between eyes, but not very deep, and more parallel-sided; anterior tibiae not or scarcely swollen. ♂ pala with outer margin arcuate, but less so than in the three preceding species; a row of pegs runs from about the middle of the base of pala in a straight line to the middle of the disc, and then curves towards the inner margin for about half of the remaining space; here it breaks, and is continued at a higher level, just within the anterior margin, almost to the tip. Strigil subquadrate. ♀ broader, shorter, its pala longer, more than twice as long as wide. Pronotum and elytra very rastrate; pronotum slightly shorter than in *semistriata*, with not more than 7 pale lines. L. 5½-6mm. Inhabits streams, but said by Butler to keep near the banks. "Hants" (B.Br.H.H.) I. of Wight: Rookley Wilderness and Brading (Butler).

S. fabricii, Fieb. (= *U. nigrolineata*, Br. Cat.)—Markings of corium not divided into series by dark longitudinal lines. Pale lines of pronotum and elytra usually much broader than dark lines. ♂ facial impression very shallow, not reaching upwards between the eyes. Pala of ♂ very simple, only slightly arcuate on outer margin, and almost straight on inner; a single row of pegs runs almost straight from a point near the base to the outer margin near the apex, when it suddenly bends, and joins with the margin itself. Strigil subquadrate. L. 5½-6mm. In ponds. Common in S. Hants and I. of Wight; perhaps after *S. moesta* the most frequently taken of all the smaller *Sigari*.

Section D.—Small species, with a general resemblance to those in the preceding section. Pronotum scarcely as long as vertex of head, crossed by 5 or 6 distinct, nearly parallel pale lines.

S. fossarum, Leach.—Larger, pronotum with 6 pale lines. Facial impression of ♂ shallow but distinct, abruptly terminated superiorly; pala semi-oval, slightly truncate at base, with a row of about 16 pegs running diagonally along 2nd ridge from nearly the middle of the base of the pala to slightly beyond middle of outer margin; strigil minute, pyriform, with 6 combs (dorsal surface of abdominal segment preceding it also strongly transversely striate). Pale markings of corium separated by two dark longitudinal lines, bands of clavus often indistinct near middle. L. 6mm. Ponds in S. Hants, locally common. I. of Wight; several localities.

S. scotti, Fieb.—Rather like the last but smaller, pronotum with 5 pale lines (sometimes also with a pale transverse spot in the basal angle). Pronotum distinctly shorter than in *fossarum*, hence the fewer lines; ♂ without a distinct facial impression. ♂ pala semi-oval, its base slightly truncate, its outer margin at first abruptly curved, then straight for a space, afterwards slightly arcuate to apex; line of pegs situated a little below the middle of the disc, running nearly straight at first, then, after a slight break near its centre, gently arcuate to outer margin. Strigil minute, pyriform, with 5 rows of teeth. L. 5 mm. Ponds and dykes. "Hants" (B.Br.H.-H.)

Group IV. (Subg. *Arctocoris* auct.)—Pronotal central carina visible nearly throughout, very pronounced anteriorly; hind tarsi unspotted. This small group is at least of sub-generic value, the ♂ palae especially being very aberrant. Our two species have the

following characters in common: Rather large, about the size and shape of *S. distincta*; pronotum with 9-12 pale lines, but with these broken up, particularly in middle; markings of clavus and corium very fragmentary, rather vermiculate; corium rastrate only at base, surface with long remote hairs. ♂ pala more or less cultrate, with a curious twist or bend; a line of strong pegs runs from the base diagonally almost to the apex. ♀ pala resembling this in *S. concinna*. Strigil somewhat circular (see plate II.).

S. carinata, Shlb. (*Corixa*, subg. *Glaenovorisa* id. Br. Cat.).—L. $8\frac{1}{2}$ -9mm. Colour usually darker, markings indistinct; pronotum shorter, central carina practically complete; frontal fovea of ♂ extending in a high arch between the eyes. Pala of ♂ thin, usually pale in colour, and twisted near base; line of pegs more regular, slightly sinuate. Strigil small, with 8 regular consecutive combs, and perhaps two others much broken. Mainly a northern insect in Br. but recorded for Hants by Butler.

[*S. germari*, Fieb.—Much like *carinata* but smaller, $7\frac{1}{2}$ -8mm. Colour paler, markings distinct; pronotum longer, central carina less strong and complete; facial impression in ♂ scarcely extending between eyes. ♂ pala stouter, usually darker, slightly twisted or incurved towards middle; pegs larger, irregular beyond middle, those running from the base somewhat cramped together. Strigil large, with about 16 narrow and irregular combs. Chiefly a northern insect in Br.]

Group V. (Subg. *Callicorixa*, B. White).—Basal joint of hind tarsus with a large black spot at apex; pronotal central carina very indistinct, even in front. Strigil absent. L. $6\frac{1}{2}$ -7mm.

S. praevusta, Fieb.—Corium rastrate, its markings transverse but narrow, not much broken; pronotum with 9 to 10 irregular lines, its lateral angles obtuse. ♂ pala elongate, suddenly dilated at about half its length from the base, then boldly arcuate (down) to the tip; with a dark spot on outer margin at the point of dilatation. Anterior tibia strongly curved or twisted, the upper surface with a distinct ridge, and largely black in colour. Claws of middle legs about as long as tarsi. L. 7mm. In var. *wollastoni*, D. & S., the markings are very obscure and fragmentary. The type, apart from its black spotted hind tarsi and fore tibiae, has more than a little resemblance to *S. limnai*; as in the last insect it has often the basal pale lines of the clavus dilated inwardly. "Hants" (B.Br.H.-H.) I. of Wight: Heytesbury Farm, 9.x.07 (F. Morey).

[*S. sodalis*, D. & S.—Resembles *praevusta*, but has the claws of the middle legs only about $\frac{2}{3}$ as long as the tarsi. Inner apical angle only of hind tarsal joint black. L. $6\frac{1}{2}$ mm. Has occurred in Northumberland.]

[*S. caledonica*, Kirk. (= *C. cognata*, D. & S.)—Corium rastrate, its markings transverse but broader, clearer, more yellow and broken than in the allied species; pronotal lateral angles obtuse. Pronotum with 7 wide, very distinct, yellow lines; ♂ pala less suddenly dilated, and unicolorous, otherwise much like that of *S. praevusta*; anterior tibia almost simple, its outer edge not widely black. L. $6\frac{1}{2}$ mm. Unknown in Europe outside Scotland.]

[*S. concinna*, Fieb.—Corium rastrate only at base, markings guttulate or vermiculate; pronotal lateral angles sub-acute. Pala of ♂ simple,

PLATE I. = III.

- 1.—Elytron of ♂ *Mecomma ambulans*, Fall. (*Capsidae*) S. = Scutellum (position of).
- 2.—Elytron of ♀ (brach.) *Mecomma ambulans*. The dotted line indicates the extent of abdomen exposed.
- 3.—Antenna of *Mecomma ambulans* ♀.
- 4.— „ „ ; *Halticus luteicollis*, Pz. (*Capsidae*).
- 5.— „ „ „ *Byrsoptera rufifrons*, Fall. ♀ (*Capsidae*).
- 6.—Head and pronotum of *Plea minutissima*, Fssl. (*Notonectidae*).
- 7.—Wing of *Notonecta* sp. Fr. = frontal vein.
- 8.—Abdomen (separated from metanotum) of ♂ *Corixa panzeri*, Fieb., Str. = Strigil. Diagram from a dried example.
- 9.—Apex of intermediate femur and base of tibia of ♂ *Corixa dentipes*, Thoms. (Incidental pubescence not shown).
- 10.—The same in ♀ *Corixa dentipes*.
- 11.—The same in ♂ *Corixa geoffroyi*, Lch.
- 12.—Face of ♂ *Sigara limitata*, Fieb.
- 13.— „ „ ♂ *S. semistriata*, Fieb. (Fovea only).
- 14.— „ „ ♂ *S. venusta*, D. & S.
- 15.— „ „ ♂ *S. fabricii*, Fieb.
- 16.— „ „ ♂ *S. fossarum*, Lch.
Showing in each case the approximate form and extent of the impression.
- 17.—Outline of pronotum of *S. distincta*, Fieb.
- 18.— „ „ „ „ „ *S. fallenii*, Fieb.
- 19.—Strigil (outline only) of ♂ *S. germari*, Fieb. P. = Pedicel.
- 20.—Strigil of ♂ *S. carinata*, Shlb., to same scale, showing “combs.”
- 21.—Pala of ♂ *S. lugubris*, Fieb.
- 22.— „ „ ♂ *S. selecta*, Fieb.
- 23.— „ „ ♂ *S. sahlbergi*, Fieb.
- 24.— „ „ ♂ *S. distincta*, Fieb.
- 25.— „ „ ♂ *S. fallenii*, Fieb.
- 26.— „ „ ♂ *S. moesta*, Fieb.
- 27.— „ „ ♂ *S. limitata*, Fieb.
- 28.— „ „ ♂ *S. praeusta*, Fieb.
- 29.— „ „ ♂ *S. carinata*, Shlb. (Showing terminal spine.)
- 30.— „ „ ♂ *S. germari*, Fieb. (Not showing terminal spine.)

Diagrams 19-30 drawn to a different scale. Figs. 19 and 20 represent a higher magnification than 21-30.

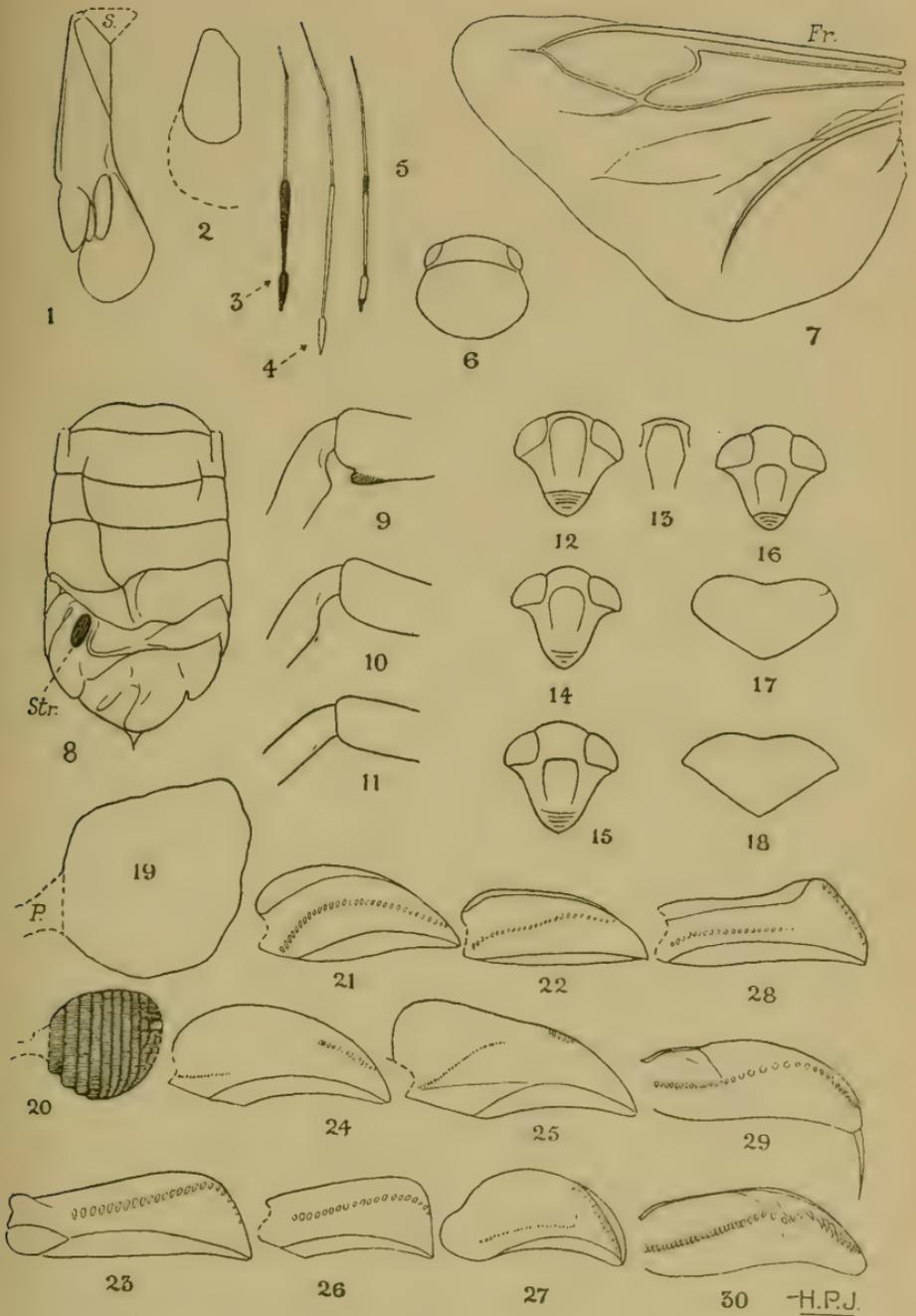
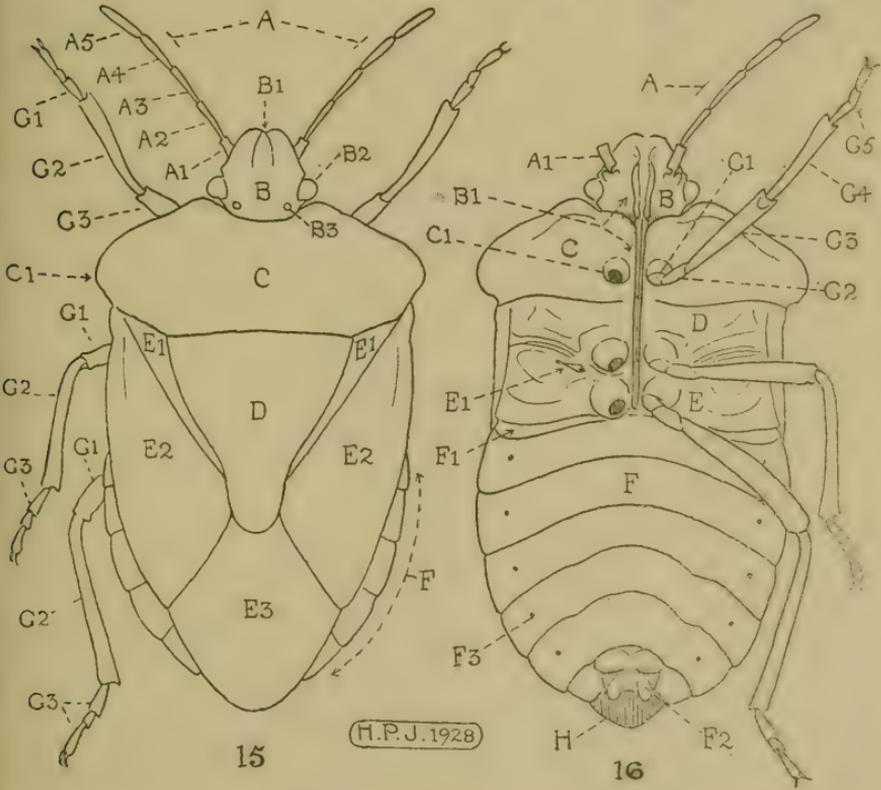
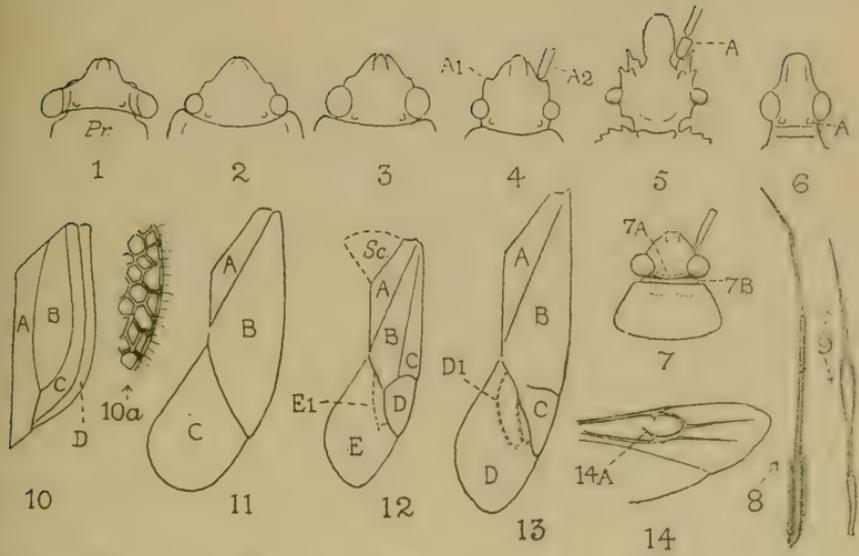


PLATE II.

(DIAGRAMS FROM ACTUAL SPECIMENS.)

- 1.—Head of *Henestaris laticeps*, Curt. (*Lygaeidae*). Pr. = Pronotum (Front).
- 2.—Head of *Aphanus lynceus*, F. (*Lygaeidae*).
- 3.—Head of *Aphanus pini*, L. (*Lygaeidae*).
- 4.—Head of *Gastrodes ferrugineus*, L. (*Lygaeidae*). A¹. Antennary tubercles; A². 1st antennal joint.
- 5.—Head of *Aradus betulae*, L. (*Aradidae*). A. 1st ant. joint.
- 6.—Head of *Anthocoris*, sp. (*Cimicidae*). A. Ocelli (two).
- 7.—Head and pronotum (entire) of *Lygus pratensis*, L. (*Capsidae*); 7A. Carinated vertex of head; 7B. Pronotal collar or ring.
- 8.—Antenna of *Notostira (Megaloceraea) erratica*, L. (*Capsidae*).
- 9.—Antenna of *Capsus ater*, L. (*Capsidae*).
- 10.—Elytron of *Orthostira* sp. (*Tingididae*). A. Sutural area; B. Discoidal area; C. Lateral area; D. Marginal area. (Diagram).
- 10a.—Portion of marginal membrane of *Tingis (Monanthia) ciliata*, Fieb., showing "meshes" and hairs (*Tingididae*).
- 11.—Elytron of *Gastrodes ferrugineus*, L. (*Lygaeidae*). A. Clavus; B. Corium; C. Membrane.
- 12.—Elytron of *Anthocoris* sp. (*Cimicidae*). A. Clavus; B. Corium; C. Embolium; D. Cuneus; E. Membrane; E¹. Cell. Sc. = Scutellum (position of).
- 13.—Elytron of *Calocoris ochromelas*, Gml. (*Capsidae*). A. Clavus; B. Corium; C. Cuneus; D. Membrane; D¹. Cells of last.
- 14.—Wing of a sp. of *Capsidae*. 14A. Hamus of cell.
- 15.—Upperside of *Palomena prasina*, L. (*Pentatomidae*):—A. Antennae; A¹⁻⁵. Antennal joints (1st joint often termed the basal, terminal the apical); B. Head; B¹. Central "lobe"; B². Eye; B³. Ocelli (two in number); C. Pronotum; C¹. Posterior or lateral angle; D. Scutellum; E¹. Clavus; E². Corium; E³. Membrane of elytron; F. Connexivum of abdomen (flattened extensions of abdominal segments); G¹. Femur; G². Tibia; G³. Tarsus of leg.
- 16.—Underside of *Palomena prasina*, L. (*Pentatomidae*):—A. Antenna; A¹. 1st. or basal joint; B. Head; B¹. Rostrum (jointed) in repose; C. Prosternum; C¹. Acetabulum; D. Mesosternum; E. Metasternum; E¹. Orifice, with channel, of odoriferous sac; F. Abdomen; F¹. 1st or basal segment; F². Genitals; F³. Stigmata; G¹. Coxa; G². Trochanter; G³. Femur; G⁴. Tibia; G⁵. Tarsus of leg; H. Membrane (tip). Diagram from a dried example.



cultrate, with a line of about 40 pegs; pala of ♀ long and narrow, terminating in a long pointed claw. Pronotum with about 9 irregular pale lines. L. 7mm. In certain of its characters shows some approach to *S. carinata* and *S. germari*. Mainly in ponds and dykes on salt-marshes, or otherwise near the coast.]

Glaenocoris, Thoms., *G. cavifrons*, Thoms., (*Oreinocorixa* id. B. White).—Eyes very large and rounded, projecting much beyond pronotum; pronotal central carina very distinct, especially in front; hind tarsi unspotted. Strigil present. Asymmetry to right in ♂. L. 7-9mm. Nearly black, even to the legs, with only very obscure and fragmentary yellow markings on the elytra, running through forms little darker than the average *Sigara distincta* to those in which the yellow colour actually predominates. The very pale form (?=*G. propinqua*, Fieb.) is distinctly smaller than the dark varieties, the more extreme of which seem confined in Br. to Scotland. Pronotum in all forms very rastrate, with a strong central carina; lateral angles sub-acute. Clavus of elytra very rastrate, corium nearly smooth except at base. Sides of head behind eyes each with a very short, minute, spine-like process. Outer margin of ♂ pala at base with a marginated concave enlargement; margin of enlargement darkened in Scottish var., and perhaps certain intermediate forms. Pala of ♀ resembling that of the same sex in *S. concinna*, but longer and narrower, with a longer terminal claw. Strigil small, subquadrate, with 4 or 5 combs, one of which is irregular. The small pale race is recorded for Hants by Butlér (*cf.* B.Br.H.-H.)

Sub-Fam. 2. CYMATINÆ.—Pronotum without transverse lines. Head very large, roundedly produced in front, much wider than pronotum; eyes remote from hind margin of head.

Cymatia, Flor.—Brown, without rastration, elytra with either transverse or longitudinal dark markings; pronotum with lateral angles very obtuse, disc with a well-marked frontal carina or tubercle. Pala elongate, pointed. ♂ apparently without a strigil, and with no teeth to pala; face excavated in ♂, flattened in ♀.

C. bonsdorffi, Sblb.—L. 6mm. Pronotum nearly as long as head, somewhat angularly produced posteriorly; elytra with very delicate, fragmentary, transverse markings. Insect robust in appearance, brown or ochreous-brown, elytra prettily marked with black in the manner stated; lateral sulcus of corium not very wide, membrane distinct. ♂ with the pala subcylindric, terminating in a powerful curved claw. Local, occurring in my experience only in large ponds, particularly those that are well stocked with fish; in such waters, however, it usually frequents the shallows or wired-off drains. "Hants" (B.Br.H.-H.).

C. coleoptrata, F.—Much smaller; 3mm. Pronotum $\frac{1}{3}$ as long as head, slightly arcuate behind; elytra without transverse markings. Brownish-testaceous, corium with two dark longitudinal stripes, and clavus darkened; lateral sulcus of corium very wide, membrane indistinct. The large size of the head is particularly noticeable in this little species. In weedy ponds. Common in Hants and I. of Wight.

Fam. 5. **Micronectidae**.—With principal characters of *Corixidae*, but showing a distinct scutellum, and with 3-jointed antenna (see also under the genus).

Micronecta, Kirk.—Very small, sub-oval. Head short, not wider than pronotum; scutellum small, triangular. Greyish-testaceous, with longitudinal brown spots; lateral margins of elytra sulcate. Face in ♂ not excavated; strigil present. Ponds or streams; gregarious in habit.

M. minutissima, L.—Pronotum nearly as long as vertex of head. L. 2mm. Pronotum greyish-brown, margins and a central line paler; elytra greyish-testaceous, base of clavus and corium, apex of first, a band across the corium beyond the middle, and apex of membrane, darker (brown). Clavus sometimes entirely dark. Surface dull. Var. *poweri*, D. & S., is larger, dull ochreous, with well-defined black-brown markings. Inhabits weedy streams; locally abundant in S. Hants. Var. *poweri* was, I believe, first taken by its discoverer, Dr. Power, in the New Forest.

M. scholtzii, Fieb. (= *M. meridionalis*, Cost., Br. Cat.).—Pronotum much shorter than vertex of head. Insect slightly larger than typical form of *minutissima*, 2½mm. Paler, surface shiny; elytra marked very similarly, but with spots smaller, more numerous. In ponds, particularly at the margins about the roots of rushes; very common where it occurs. "Hants" (B.Br.H.-H.).

NOTE ON THE LAST TWO FAMILIES: The elevation of *Micronecta* to family rank is open to objection, but follows naturally on the introduction of subfamilies in *Corixidae*. Some such scheme seems the most fitting alternative to the "betwixt and between" method of classification at present in use. The arrangement of certain of the *Sigara* divisions in *Corixidae* is hardly ideal, but may stand for the time being. Except that the three species of the *S. limitata* group should rather precede than follow the group of *S. striata*, the sequence of the species is practically the same as in Oshanin's Catalogue (now, however, considerably out of date). For two species at present on the British list *Sigara saundersi*, Kirk., and *S. boldi*, D. & S., I am unable to find a place, the specific distinctness of both, *S. boldi* in particular, being highly questionable.

In collecting *Corixidae* (especially in new localities) the student should always endeavour to obtain a good proportion of the males; these may usually be recognised in the field by the hollowed form of the face, and should subsequently (except perhaps in the case of the very commonest and distinct species) be mounted with the wings spread, and the peculiar "palae" arranged at a convenient angle for examination.

ADDENDA ET CORRIGENDA.

Foreword: For plate now read plates.

Introduction: The description on page (2) "cuneus and embolium, small divisions of the elytra bordering the membrane" is infelicitous, and hardly accurate as applied to the embolium; read simply for these two parts "divisions of the corium" (cf. plate I.).

Page (2), line 7 from bottom (Introduction): Delete the comma following the word base.

Measurements may usefully be added to the descriptions of the following genera, viz.:—

Pages (4)-(6).—Long. *Eurygaster*, 8-12mm. *Podops*, 5½-6mm. *Thyreocoris*, 3-4mm. *Geotomus*, 3½-4mm. *Schirus*, 6-9mm. *Gnathoconus*, 3-4mm. *Neotiglossa*, 4-4½mm. *Eusarcoris*, 4½-6mm.

Pages (8)-(10).—*Syromastes*, 14-15mm. *Verlusia*, 10mm. *Gonocerus*, 11-12mm. *Bathysolen*, 6-7mm. *Ceraleptus*, 8-10mm. *Coreus*, 7-8mm. *Therapha*, 9mm. *Stictopleurus*, 8-10mm. *Corizus*, 5-7mm.

P. (6).—In the description of *Eusarcoris aeneus* read “patch” for “patches.”

P. (6).—? *Chlorochroa* confined to juniper.

P. (7).—Under *Troilus*. Correct misprint in “carnivorous.”

P. (10).—line 9 from top. For “*hyoscami*” read “*hyoseyami*.”

P. (12).—Add to characters given for Sub-Fam. *Cymina* “membrane perfectly transparent.”

P. (13).—Place bracket before line 9 from top.

P. (13).—line 16 from top. Insert comma between the words “narrow ochreous.”

P. (15).—Delete “dull” from the description of *Stygnocoris* genus, two Br. species of which, *S. rusticus* and *S. pedestris*, are somewhat shiny.

P. (16).—line 7 from top. Read “larger” instead of “large.”

P. (16).—Bracket line commencing “*A. alboacuminatus*.”

P. (16).—The colour of the antenna in *Beosus* is so variable that it may be best described in detail, viz.:—1st joint either black or yellow; 2nd yellow, often black at apex; 3rd yellow, black at apex; 4th black, yellow usually at extreme base.

P. (17).—Under *Drymus* genus read “1st” for “2nd” joint in the description of the antenna.

P. (20).—The character, “marginal membrane of elytra with only one row of meshes,” serving to distinguish *Acalypta nigrina*, *A. marginata* (*macrothalma*) and *A. parvula* from their immediate allies was unfortunately given as if peculiar to *A. parvula*, and the characters separating the two first-named from *A. parvula* accidentally omitted from the descriptions (*mea culpa*). Apart from this serious slip the definitions are correct. The following table should correct the error:—

A.	Marginal membrane of elytra with only one row of meshes (=brach. form).	
(2) 1.	Lateral dorsal carinae (3) touching the hood	A. PARVULA.
(1) 2.	Lateral dorsal carinae (3) abbreviated, not touching the hood.	
(4) 3.	Sutural area of elytra (<i>cf.</i> Pl. I.) normally with 3 rows of meshes; 1st ant. joint red	A. NIGRINA.
(3) 4.	Sutural area of elytra with 2 rows of meshes; 1st ant. joint black	A. MARGINATA.

P. (23).—The statement under *Mesovelia* “. . . with darker transverse markings” is not intended to apply to macropterous forms.

P. (24).—Bracket line commencing “*G. asper*.”

P. (26).—To characters of Sub-Fam. *Nabidina* add “widest posteriorly.”

P. (29).—The description under *Salda setulosa* “Face darker, yellow markings characteristic of *opacula* much obscured with black” is meant to apply solely to the face, which is compared in colour with this part in *opacula*. The face in most *Salda* spp. is more or less pale.

P. (33).—line 4 from bottom. "Distinctly shorter" should not have been italicised.

P. (35).—line 24 from bottom. "Hallet" should be "Hallett."

P. (43).—line 4 from bottom. Delete "*D. rufipennis*" (cf. P. 44, line 1).

P. (48).—line 4 from top. "*Lygus pastinacae*" should read "*Lygus kalmii*."

P. (49).—BOTHYNOTINA represents, of course, Sub-Fam. "II." not "III." as printed.

P. (63).—The brownish-red colour of the body in *Psallus quercus* is dull (sordid) and very unlike the reds met with in the allied *Ps. variabilis*. In fresh examples the coarse whitish pubescence is very characteristic.

P. (65).—Add to characters of *Psallus luridis*:—"Pronotum with brown atom-like spots; head and scutellum usually more or less brown. This species may be regarded as following *Ps. fallenii* in our lists."

P. (71).—line 6 from bottom. Correct misprint in the word collectively.

P. (74).—line 22 from bottom. For "frons" read more accurately "face."

"PLATE IV. (II)." should have been headed "Plate III. (I)." to correspond with the text, and *vice versa*. The lettering of the anterior leg in fig. 15 of Plate I. (corrected as above) has been accidentally reversed.

BIBLIOGRAPHY.—In addition to the works mentioned in the text the student of the British fauna should consult "The Br. H.-Heteroptera," by J. W. Douglas and J. Scott (Ray Society, 1865). Although naturally out of date—the nomenclature in certain parts is almost unintelligible to-day—it contains much valuable information on the Br. species as then known, together with exquisite black and white plates (Dels. E. W. Robinson.)

SUPPLEMENTARY HAMPSHIRE AND I. OF WIGHT RECORDS OF H.-HETEROPTERA.

(* Indicates new to county.)

Sehirus luctuosus.—Sandown, I. of Wight (Jas. M. Brown). P. (5).

Eusarcoris aeneus.—Nr. Ringwood, hibernating in moss (F. H. Haines). P. (6).

**Chorosoma schillingi*.—St. Helens, I. of W. (J. M. Brown). P. (11).

**Berytus signoreti*.—Very plentiful at grass roots, Brading Down, I. of Wight (J.M.B.). P. (11).

B. montivagus.—Shanklin Down, I. of W. (J.M.B.). P. (11).

Metatropis rufescens.—Plentiful in various stages on *Circaea*, Haven St., I. of Wight (J.M.B.). P. (11).

**Nysius thymi*.—Sandown (J.M.B.). P. (12).

Piesna maculata.—Bembridge, I. of Wight (J.M.B.). P. (19).

Dictyonota strichnocera.—Sandown (J.M.B.). P. (20).

Coranus subapterus.—Plentiful on St. George's Down, I. of W., 5.ix.23 (J.M.B.). P. (26).

**Nabis lineatus*.—St. Helens, I. of W. (J.M.B.). P. (27).

Lopus sulcatus.—Lymington, 20.vii.29 (H.P.J.).

SUMMARY.—The total number of species recorded for Hants and I. of Wight is 350 as against *477 Brit. species. A comparison is here made with three other county lists—kindly supplemented to date by the respective authors concerned :—

FAMILY	BRIT.	HANTS.	NOTTS.	SUFFOLK.	GLAMORGAN.
<i>Pentatomidae</i>	38	30	9	22	15
<i>Coreidae</i> and <i>Berytidae</i> ..	31	24	3	18	14
<i>Lygaeidae</i> and <i>Pyrrhocoridae</i> ..	67	45	15	37	35
<i>Tingitidae</i> and <i>Aradidae</i> ..	30	20	7	16	15
<i>Hebridae</i> and <i>Gerridae</i> ..	17	13	7	12	10
<i>Reduviidae</i> and <i>Saldidae</i> ..	37	27	15	24	20
<i>Cimicidae</i> (= Br. list) ..	37	27	16	24	16
<i>Capsidae</i>	179	134	106	131	117
	436	320	178	284	242
<i>Cryptocerata</i>	41	30	18	21	26
TOTALS	477	350	196	305	268

The list for Notts. is by Prof. J. W. Carr, forming part of the same authors *Invertebrate Fauna of Notts* (J. and H. Bell Ltd, Nottm.); for Suffolk by Mr. Claude Morley; for Glamorgan, S. Wales, by Mr. H. M. Hallett in *Trans. Cardiff Nat. Soc.* Nottinghamshire covers too small an area to represent adequately the N. Midland fauna, whilst the Hants records are almost entirely derived from captures made in the extreme south of the county, and in I. of Wight. Considerable additions will probably yet be made to the Glamorgan list, and possibly that of Suffolk. I believe over 360 species are recorded from the well worked county of Surrey, the soil and climate of which are practically identical with that of Hampshire.

Appendix to **Lygaeidae**, Sub-fam. APHANINA.—Although it is impossible to produce any hard and fast divisions in this extensive sub-family, the under-mentioned definitions will be found useful in conjunction with the text (pp. 13-19). Genera in natural order :—

Sub-fam (7) APHANINA.—Stigmata of all or at least the last three abdominal segments ventral; cheeks much shorter than central lobe: membrane without basal cells.

Div. I.—With 1st. antennal joint, except in the aberrant genus *Pamera*, short; basal tarsal joint not twice as long as the other two together.

Pamera—*Trapezonotus*

Div. II.—1st. ant. joint usually short (*Beosus* is an exception); basal tarsal joint very long, twice as long as the other two together.

Calyptonotus—*Emblethis*.

Div. III.—1st. ant. joint, especially in *Eremocoris*, long, or insect very wide and flat; basal tarsal joint not twice as long as other two together (Head long, eyes, except in some *Drymus* species, remote from pronotum).

Eremocoris—*Gastrodes*.

Divs. II and III are natural; the somewhat diverse genera in Div. I. may be most conveniently separated as follows (*Pamera* is without very close allies in this country) :—

* Two spp. of *Corixidae* on the Brit. list are not regarded in the present paper (H.P.J.).

- A.—Pronotum in front without distinct foliaceous lateral margins, convex; pronotum strongly constricted beyond middle. *Pamera*.
- B.—Pronotum in front with distinct foliaceous lateral margins, not strongly constricted beyond middle (Characters common also to all genera in Divs. II and III).
- (4) 1.—Pronotum constricted at base, usually very wide anteriorly, entirely black in colour.
- (3) 2.—Insect comparatively large. *Rhyparochromus*.
- (2) 3.—Insect very small. *Tropistethus*.
- (1) 4.—If at all constricted at base pronotum never entirely black.
- (16) 5.—Foliaceous lateral margins of pronotum not entirely yellow; species very small, or with eyes produced prominently beyond pronotum.
- (11) 6.—Insect very small (2-3mm.) eyes not or scarcely produced.
- (8) 7.—Sub-elongate; glabrous, pronotum dull. *Ischnocoris*.
- (7) 8.—Sub-elongate; glabrous, pronotum shiny *Macrodema*.
- (10) 9.—Oval, with erect hairs, and spotted elytra; pronotum not very wide in front. *Pionosomus*.
- (9) 10.—Oblong, glabrous, unicolorous; pronotum very wide in front, sub-parallel sided. *Plinthisus*.
- (6) 11.—Eyes projecting beyond anterior angles of pronotum.
- (15) 12.—Smaller, 2-4mm. Eyes smaller, more produced; pronotum shorter (Insect dull or not very shiny).
- (14) 13.—Insect glabrous. *Acompus*.
- (13) 14.—Insect pilose. *Stygnocoris*.
- (12) 15.—Larger, 4-5mm. Eyes larger, slightly less produced; pronotum longer *Peritrechus*.
- (5) 16.—Foliaceous lateral margins of pronotum yellow throughout; eyes not produced, insect not very small (common generic characters in Div. II.).
- (18) 17.—Pronotum very shiny, smooth, punctuation fine and remote (Face widely yellow) **Lasiosomus*.
- (17) 18.—Pronotum not very smooth and shiny, punctuation coarser, not remote *Trapezonotus*.

NOTE.—In the text the primary characters of the various species of *Lygaeidae* are invariably presented in the form of tables; where the same treatment has not been accorded to the genera the more peculiar differences in each are made to head the descriptions. A similar plan has been followed in all the other families.

GLOSSARY.

(See also Introduction and Plates.)

Abbreviations used.—L.=Long (or length); mm.=millimetres (25=1 inch); id.=*idem* (the same).

- Apex.— Point furthest from the base; the tip.
- Arcuate.— In the form of a bow; curved.
- Areola.— A small sunken area.
- Articulated.— Jointed.
- Base.— As applied to any part of an insect signifies the portion of the member nearest the central point of juncture of the pronotum with the scutellum (hence the bases of the elytra in repose may be said to adjoin the base of the pronotum).
- Brachypterous.— Short-winged. In Heteroptera species coming under this heading (more usually ♀ ♀) may either have the hemi-elytra so abbreviated as to entirely expose the abdomen, or sufficiently extended to cover all but the apical segments of the last.

* The position of the genus is unnatural (*cf.* text). The single Br. species somewhat resembles *Stygnocoris pedestris* in colour. (H.P.J.)

- Callosity.— Convex prominence; hump.
 Callus.— Small, usually transverse, callosity.
 Carina.— A keel or sharp ridge.
 Cell-nerve(s).— Basal vein(s) of membrane. Cell=area defined by vein.
 Ciliate.— Fringed with hairs.
 Clavate.— Clubbed.
 Clypeus.— Portion of head between face and mouth.
 Contiguous.— Adjacent.
 Coriaceous.— Leathery.
 Costa.— As here used (rarely) the front edge of either hemielytron or wing. When an elytron is closed the outer margin is usually termed the lateral margin.
 Deciduous.— Liable to fall; exceptionally fragile (as applied to pubescence).
 Dimorphous.— Indicating that two very different forms of a species occur (*e.g.*, brach. and macr.)
 Disc.— Central region (*e.g.*, of pronotum).
 Elongate.— Drawn out; any especially long or narrow form.
 Emarginate.— Margin not continuous, broken by a notch or segment of a circle.
 Face.— Area between antennae and clypeus, bounded laterally by the eyes.
 Ferruginous.— Rust-red.
 Filiform.— Thread-like, or at least of uniform thickness throughout (as applied to antennae).
 Flavous.— Bright yellow.
 Foliaceous.— Applied to any flattened extended surface.
 Forceps.— ♂ genital appendages, claspers.
 Fovea.— A pit or circular impression of some size.
 Frons.— Region of head between vertex and face (frequently held to include the last in a general description).
 Fuscous.— Brown, cloudy.
 Glabrous.— Without hairs.
 Hyaline.— Glassy; applied often to membrane when this is especially clear.
 Immaculate.— Without spots. unicolorous.
 Impressed.— A strongly flattened portion—*e.g.*, “transversely impressed.”
 Impunctate.— Without punctures.
 Incrassate.— Thickened.
 Insertion.— Point of attachment of a moveable part.
 Macropterous.— Long-winged—*i.e.*, with elytra covering apex of abdomen.
 Membranous.— Of a thin semi-transparent nature (*cf.* “marginal membrane” of *Tingitidae*).
 Metanotum.— Basal section of thorax above (concealed by bases of elytra in repose).
 Micropterous.— See brachypterous and undeveloped.
 Obtuse.— Blunt or shortly rounded.
 Ocelli.— Simple eyes (2) on vertex of head.
 Ochreous.— Ochre-yellow; clear straw-colour.
 Piceous.— Pitchy, brownish-black. The opposite of testaceous.

Pilose.—	Finely hairy.
Porrect.—	Extended forward.
Prothorax.—	Anterior portion of thorax (frequently constricted on front margin into a narrow collar or "ring").
Pubescent.—	Hairy; with recumbent hairs.
Punctured.—	With small circular pits or impressions.
Pyriform.—	Pear-shaped.
Remote.—	Distant, isolated (as applied to hairs).
Reniform.—	Kidney-shaped.
Rugose.—	Irregularly or roughly wrinkled.
Serrate.—	With saw-like teeth; jagged.
Setae.—	Bristly hairs.
Signs used.—	♂ = male, ♀ = female. Square brackets prefacing the name of a species indicate that it is unrecorded for Hants.
Simple.—	Not especially modified.
Sinuate.—	Presenting a waved undulating surface; curved.
Sordid.—	Dirty, dingy, indefinite (when prefacing a colour).
Spiracles.—	Respiratory orifices (=stigmata).
Sternum.—	Underside of the three thoracic segments combined.
Striate.—	Bearing distinct impressed lines.
Strigose.—	Striated, usually irregularly so, presenting a scored appearance.
Sulcus.—	An impressed longitudinal furrow.
Suture.—	Point of juncture of inner margins of elytra in repose.
Teneral.—	Freshly disclosed, having the integument soft, and the colours faint.
Testaceous.—	Used much too loosely in Entomology to express a clear yellowish or pale reddish shade. The opposite of piceous. Often used in combination, viz.—Clear-testaceous, pale-testaceous, or (L.) <i>flavo-testaceus</i> , <i>rufo-testaceus</i> , <i>lurido-testaceus</i> .
Truncate.	Cut off rather abruptly at base or apex— <i>i.e.</i> , not terminating gradually in a point or largely rounded.
Undeveloped.—	Applied more especially to a brachypterous form of a normally macropterous species; must not be confused with nymph or larva— <i>i.e.</i> , an immature form.
Vertex.—	Hinder, highest, portion of head— <i>i.e.</i> , the part nearest the pronotum.
Wing-cell.—	Vein of hindwing, and area defined by vein.
Wings.—	In a detailed description applied only to the membranous hind-pair.
Xyphus.—	Prolongation of the middle of the hind margin of each segment of the sternum.

ADDENDA (Supplementary):—Mr. W. E. China adds, tentatively (*E.M.M.*, May, 1930), *Dicypheus stotti*, China (*Capsidae*) to the Br. list.

"*Notonecta halophila*, Edwards." The specific name *viridis*, Delcourt, must now be used.

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**The Ants (Formicidae) and Guests
(Myrmecophiles) of Windsor Forest
and District.**

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

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The Ants (Formicidae) and Guests (Myrmecophiles) of Windsor Forest and District.

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

Having made an intensive study of the beetles (*Coleoptera**) of Windsor Forest during the last seven years, as might be supposed the inhabitants of ants' nests (beetles and other myrmecophiles) have been strenuously searched for. The result being that not only a number of species have been added to the British list, but the majority of the known British myrmecophilous *Coleoptera* have been taken in the district.

This is what one would expect, as *Acanthomyops* (*Dendrolasius*) *fuliginosus*, Latr., *A. (Donisthorpea) brunneus*, Latr., and *Formica rufa*, L., all occur; the three ants, with which the greatest number of ants' guests are found in Britain.

Of the ants themselves, 18 out of the 35 known indigenous species occur. Several more (probably very few) species may turn up, including the common and widely distributed *Myrmica laevinodis*, Nyl., which is almost certain to be present; though we have not come across it so far.

The occurrence of the two species, *fuliginosus*, and *brunneus*, chiefly associated with trees is natural in this ancient forest land. It is a fact, however, that they are not found in the same areas; and we believe that if they were, the *brunneus* would be wiped out by the *fuliginosus*.

A certain number of the beetles and parasitica recorded here from ants' nests may be only chance guests, just sheltering, or hibernating, in suitable or convenient habitats. On the other hand they may represent cases where a species is experimenting in a myrmecophilous life. Such cases are called attention to (especially when they have occurred with ants on several occasions, and in different localities) and are not printed in italics. As pointed out in the "Guests of British Ants" (1927), a number of species of *Coleoptera* live with ants, and also in birds' nests. It cannot be the same individuals which are found in ants' nests and birds' nests, as the species are found to be present at the same time in both. It seems probable that at some distant period two sets of their ancestors had branched off into different modes of life; it might be that a bird's nest containing these ancestors was in the tree inhabited by ants, and the beetles found the nest of the latter

*On January 1st, 1930, the *Coleoptera* of Windsor Forest had reached the respectable total of 1339; more than one third of the whole of the British list.

a congenial atmosphere, and then continued the myrmecophilous habit, others remaining birds' nest frequenters.

With the exception of two species taken by Blatch†; all the rest of the species mentioned have been taken by us.

I must thank Mr. Lloyd, the Chief of the Crown Estate Office, for his kindness in rendering us every facility to enable us to carry out our investigations with ants' nests in this productive district; and also Miss Kirk for her assistance in this work, entailing as it does both patience and often considerable strenuous labour.

A short account of the ants of Windsor Forest, together with the myrmecophiles found with them, is now given.

MYRMECINAE.

Myrmecina graminicola, Latr.

This little species, though not rare, is decidedly local in this country; its most northern record being from Staffordshire. It lives in small communities, under stones, in stumps, etc.; individual workers being often found in the nests of other ants. I have kept a colony under observation in my study, which has been in my possession now for twenty years. The males and winged females may be swept off rushes, and other herbage, from August to October, the time of the marriage flight.

A male of this ant was swept off grass near Windsor at 2 p.m. (summer time) on September 11th, 1926.

Formicoæxenus nitidulus, Nyl.

This small shining reddish-yellow ant is a myrmecophilous species dwelling in the nests of the "wood ant" *Formica rufa*. Its colonies are not large, and it constructs its nests of the finer materials of which its hosts' nests are constructed. The male is wingless, and very worker-like in appearance. It is very widely distributed, having been taken in Invernesshire and in the Isle of Wight.

We have found it in the nests of *Formica rufa* in Windsor Forest in September and October, 1927; October, 1929; etc.

Monomorium pharaonis, L.

The little "house ant" has been spread by commerce all over the world; it lives in houses, bakers' shops, etc., and even on board ships. It may be looked upon as a British species now, as it has been known to occur in this country for over a hundred years.

Workers were observed running on the tea table in a Restaurant at Windsor on July 24th, 1925.

Myrmica ruginodis, Nyl.

This very common species, the most widely distributed in our islands, and our only ant found in the Shetlands, nests under stones, in rotten stumps, at the edges of woods, etc.; under which circumstances it occurs in Windsor Forest. Marriage flights have been observed there at 5 o'clock (summer time) on September 5th, 1928: and 12.30 p.m. (summer time) on August 21st, 1929.

†The late W. G. Blatch collected Coleoptera in the Windsor district in September 1887.

On July 7th, 1924, a colony was discovered in the stump of a birch tree, and as soon as the ants were disturbed, a number of a small fly put in an appearance, hovering over the ants. Several were captured, and subsequently proved to be *Pseudacteon brevicauda*, Schmitz, a species of Diptera new to the British list. The females of these flies possess a sharp pointed ovipositor with which they lay their eggs between the free segments of the ants' gasters. They are attracted first by the sense of smell, given off by the ants, and subsequently by sight, when near enough to see the ants.

Other myrmecophiles found with this ant at Windsor are the "wood-louse" *Platyarthrus hoffmanseggi*, Brdt., and the Collembolid, *Cyphodeirus albinus*, Nic., both of which occur with all our species of ants; and the beetle, *Drusilla canaliculata*, F., which was taken running in a sandpit with workers of the *Myrmica* on August 27th, 1929. The food of this beetle consists of ants which it kills and devours.

Myrmica sulcinodis, Nyl.

Though widely distributed, this ant is more or less rare. It nests under stones, and timber, in stumps, etc., and is fond of heaths and commons. It is also found on mountains.

On May 25th, 1927, a colony was found in Windsor Forest nesting in a Scot's pine stump.

Myrmica scabrinodis, Nyl.

A very common and widely distributed species occurring in both damp and dry districts. It nests under stones on heaths, and in banks in sandy areas, and also in sphagnum swamps and bogs. It is a thieving ant robbing other ants of their prey and brood: its colonies being often situated near those of other species, individuals entering their nests.

On June 29th, 1924, a dealated female was found in a mixed colony of *Acanthomyops (Chthonolasius) umbratus*, Nyl., and *A. (Donistherpea) brunneus*, Latr., (to be referred to later) situated in an ash tree. On September 3rd, 1924, a female was captured on the wing. On October 11th, 1927, a small colony was observed under the same stone as a large colony of *A. (C.) flavus*, F., apparently living in harmony: *Platyarthrus hoffmanseggi* was present. On April 10th, 1929, this ant was nesting in sphagnum in a swamp. On June 11th, 1929, a worker was present in a nest of *A. (C.) flavus* in a mole-hill.

Myrmica scabrinodis, Nyl., var. *sabuleti*, Mein.

On June 25th, 1924, a dealated female of this variety was taken in the *umbratus*-*brunneus* nest mentioned above.

Stenammas westwoodi, West.

This is a rare ant, its most northern range with us being the Midlands and Norfolk. It also occurs in the south-east, and south-west of Ireland. Its habits are obscure and it is only comparatively recently that independent colonies have been found in the British Isles. I possess a small colony sent to me from Ireland by Messrs. Philips and Stelfox, in 1921. The original queen is still alive—she must be over nine years old to-day! The winged sexes are sometimes

swept in September and October; and individual workers have been frequently taken in the nests of other ants. A male was taken by evening sweeping in Windsor Forest on September 21st, 1926; and several workers occurred in a colony of *A. (C.) flavus* situated in a rotten stump, covered by a mole-hill, on June 11th, 1929. A single worker was found in a mole's nest, which was full of *A. (D.) brunneus* workers, at the foot of a tree, on August 2nd, 1929.

Leptothorax acervorum, F.

Though these ants sometimes nest under stones, and in the cracks of rocks, etc.; they are mostly found in stumps and under the bark of trees. They also make use of the burrows of other insects in bark, galls, "oak-apples," and the like, in which to found their small colonies. This species is very widely distributed in Britain and Ireland.

In Windsor Forest a small colony was observed nesting under the bark of an oak tree, infested by *A. (D.) brunneus*, on June 26th, 1925; and a few workers were seen in an oak stump on August 14th, 1929. Females were swept up in the evening in a plantation on September 17th, 1926.

Leptothorax nylanderii, Först.

This *Leptothorax* is a much scarcer and more local ant than the preceding. Shropshire is its most northern range in England, and it has not been found in Scotland, nor Ireland. It nests in woods and parks in the bark of trees, and fallen boughs, etc., and will also make use of the borings of other insects. It occurs not infrequently, in company with other ants. It was found in several oak trees infested by *A. (D.) brunneus* in Windsor Forest in 1924. Its nests consist of little cells in and under the bark, and the workers run about freely in company with the *brunneus* in their "runs." One colony had its nest in the rather brittle wood of a rotten beech tree. A colony consisting of a queen, many workers, and larvae, inhabiting a poplar tree infested with *brunneus*, was taken home on April 22nd, 1924, and fixed up in a small plaster observation nest. On May 27th, another queen, and a few workers and larvae were brought home and introduced into this observation nest. A certain amount of fighting took place between the workers of the different colonies, but eventually they settled down, the new larvae being collected with the old, the new queen joining them. This compound colony was kept under observation for several years. On September 17th, 1926, some females were taken by "evening sweeping" in a plantation. A worker was found in a fungus inside a hollow beech tree on June 15th, 1928.

FORMICINAE.

Acanthomyops (Dendrolasius) fuliginosus, Latr.

This is a shining black ant which generally dwells in trees, but it will also build its carton nests in the earth, at the roots of trees and away from them, or even in houses and cellars. Its most northern locality in the British Isles is the Isle of Man, where we discovered it in 1923. It possesses an aromatic smell which is unlike that of any other ant. It may be seen walking in files along regular tracks for long distances, and the nest can often be traced by following up these

tracks. On the other hand it is sometimes very difficult to locate. The nest is constructed of carton which the ants manufacture by chewing up fragments of wood and bark mixed with earth and cemented together with the secretion from the mandibular glands, which are greatly developed in this species. These carton nests, which are often very large, have the appearance of a huge sponge, and consist of a number of irregular cells, separated from each other by thin walls which are rather brittle. These nests were formerly believed, by Huber and other early writers, to be excavated out of wood (and they certainly look like it) which was stained black by the ants' acid. The carton is usually black, but sometimes light brown, or reddish-brown according to the colour of the soil used in its construction. In one case to be mentioned later, it was entirely yellow. In Windsor Forest we have found this ant nesting in an old rabbit burrow in a bank; in oak trees; in the stools of Scots' pine, and larch trees; in a partly hollow hawthorn tree which was cracked, and the carton nest could be seen through the crack high up in the tree; etc. The nest made of yellow carton referred to above was originally situated in the base of a standing larch, but when the tree was cut down some five years ago the ants deserted the stool, and took possession of the trunk of the tree lying on the ground. The trunk was twelve feet long and the ants were using both ends to enter and leave the nest. The yellow carton filled up the whole of the broader end, and was present in strips among the perforated wood reaching to the other end. This tree was cut up in sections for me on September 18th, 1929, and a fine sample was selected for the Oxford Museum.

We have taken a considerable number of Myrmecophiles with this ant in Windsor Forest, as the following list will show. Those species not printed in italics may be only chance guests, and, at any rate, have not been recognised as true myrmecophilous species here-to-fore.

COLEOPTERA.

Microglossa gentilis, Märk.; *Oxyptoda vittata*, Märk.; *O. recondita*, Kr. (several 10.v.28; first record with this ant); *O. annularis*, Sahl. (10.v.28, 18.ix.29, 24.ix.29); *Thiasophila inquilina*, Märk.; *Myrmedonia funesta*, Gr.; *M. humeralis*, Gr.; *M. cognata*, Märk.; *M. lugens*, Gr.; *M. laticollis*, Märk.; *Notothecta confusa*, Märk.; *Atheta circellaris*, Gr. (10.v.28, 24.ix.29 also taken with this ant by Allen in Devonshire in 1918); *A. sodalis*, Er. (eight 28.iii.28, several 10.v.28. I have taken this beetle with five species of ants, in various localities, on different occasions). *A. palustris*, Kies., *A. sericea*, Muls., *A. inquinula*, Er., *A. germana*, Shp., *A. celata*, Er., *A. aterrima*, Gr., *A. parva*, Shp., *A. muscorum*, Bris., *Falagria sulcatula*, Gr., *F. obscura*, Gr., and *Placusa pumilio*, Gr., were all taken in the "runs" of this ant and in refuse beneath the larch trunk with the yellow carton, in September and October, 1929. *Quedius maurus*, Sahl. (28.iii.28); *Q. puncticollis*, Th. (six 4.x.27, 11.x.27. Walker has taken this beetle with *fuliginosus* at Cotbill, in 1914, on several occasions and he writes "under conditions which led me to suppose that it is a true inmate of the nest of this ant"; Collins has also taken it with this ant in the Oxford district. Walker again found it with this ant at Tubney in 1920); *Q. brevis*, Er., in March, May, and June in 1928 and 1929; *Othius melanocephalus*, Gr. (several

4.x.27); *O. myrmecophilus*, Kies.; *Cephennium thoracicum*, Müll., (six 10.v.28. This species has been found in other localities with different kinds of ants). *Trichopteryx thoracica*, Walk. (28.iii.28, 10.v.28); *T. montandoni*, All. (1.x.29); *Ptilium kunzei*, Heer., *P. rugulosum*, All., *P. n-sp.*, and *Ptenidium nitidum*, Heer., in the "runs" and refuse from the larch tree nest, September and October, 1929. *Amphotis marginata*, F., *Coninomus constrictus*, Gyll. (14.x.29. Walker has taken this species with the same ant at Tubney, in 1920, and I have done so, at Woking, in 1921).

HYMENOPTERA—*Braconidae*.

Parylomma fuliginosi, Wilkinson. On September 18th, 1929 we observed several specimens of a large *Parylomma* in Windsor Forest. Two of these were captured and proved to be a fine new species which Wilkinson has described, in a paper read by that author and myself before the Entomological Society of London, under the above name. The Braconids were hovering over the ants from the colony of *fuliginosus* inhabiting the large felled larch tree described above. On a subsequent visit, on October 1st, another specimen was secured. Cobelli has shown that another species, *P. cremieri*, de Romand, found on the Continent with *fuliginosus*, lays its eggs in the ants' larvae, when they are being carried by their nurses. It is very probable that the same habits are common to *P. fuliginosi*, as it was not until the tree which housed the ants was being cut up that the Braconids put in an appearance. They were probably attracted by the odour given off by the ants when agitated, as well as by the presence of the larvae which they were carrying.

HYMENOPTERA—*Chalcididae*.

Spalangia erythromera, Först.

This shining black Chalcid is only to be found in the nests of *fuliginosus* and I have proved by experiment that it is partly on friendly terms with its hosts, and is parasitic on the larvae of various small flies which live in their nests. We have found it with *fuliginosus* in Windsor Forest, and have bred it from the pupae of *Milichia ludens* and *Neophyllomyza fagicola* taken in the nests of that ant.

HYMENOPTERA—*Proctotrupidae*.

Platygaster sp.? Several examples of a very small species of this genus were taken with *fuliginosus* on September 3rd, 1929.

Amblyaspis scutellaris, Kief. A specimen was taken in the nest in the cracked hawthorn on June 14th, 1929. Other species of this genus, and varieties of this and other species have been captured with this same ant in other localities.

DIPTERA.

Apiochaeta aequalis, Wood. Several specimens were taken with *fuliginosus* in Windsor Forest on October 11th, 1927. This fly has been found in numbers with the same ant on various occasions and in different localities.

Limosina claviventris, Strob. (= *curtiventris*, Stnh.). Several specimens occurred in a *fuliginosus* nest in Windsor Forest on September 20th, 1927. This fly has been recorded in some numbers from nests of the same ant in other localities.

Milichia ludens, Wahl.

The larvae of this fly, which is only found with *fuliginosus*, and is very rare in Britain, were present in some numbers in a nest of this ant situated in the base of an oak tree on September 3rd, 1929, and also in the nest in the larch tree on September 18th, 1929.

Neophyllozoma fagicola, Hend.

This species was described by Hendel, in 1929, from Austria. We took it (an addition to the British list) in Windsor Forest, in a nest of *fuliginosus* in the stool of a Scots pine on September 9th, 1925, and again in a nest situated in a bank on September 28th, 1926.

Scatopse transversalis, Lw.

Specimens of this fly, the regular associate of *fuliginosus*, were taken in Windsor Forest, in the nest situated in a bank, on October 4th, 1926.

APHIDIDAE.

Stomaphis quercus, L.

On September 4th, 1929, *fuliginosus* was found to be attending a colony of this aphid on an oak tree situated near their nest. This was the first time I had found *quercus* with this ant at Windsor. This species was first taken in Britain many years ago by the late F. Walker at Dulwich, and nothing was known about its connection with ants. It was not found again until September 22nd, 1921, when I discovered specimens on an oak tree at Woking. My attention was called to these insects by the clusters of ants which were attending them. I found it again at Woking on October 7th, 1921, at Wimbledon Common, on July 18th, 1923, at Tubney, on July 16th, 1924, and at Woking on July 29th, 1925, on oak trees, in every case attended by workers of *fuliginosus*. On October 1st and 14th, 1929, the colony at Windsor was still being attended by these ants. On the latter date my attention was specially attracted to several specimens which were coloured differently and were smaller and more slender than the others. When submitted to my friend Mr. F. Laing of the British Museum, he pronounced them to be apterous ♂♂. This sex has very seldom been observed before.

The following other species of myrmecophiles have been found with this ant at Windsor:—the Collembolid *Cyphodeirus albinus*, Nic.; the Acarus *Urodiscella ricasoliana*, Berl. (on the bodies of the ants on September 14th, 1926) and *Laelaps cuneifer*, Mich.; and the "wood-louse" *Platyarthrus hoffmanseggi*, Brdt.

Acanthomyops (Donisthorpea) niger, L.

This ant is very abundant and widely distributed in the British Isles, nesting in the earth, under stones, in tree stumps, and even in towns, under the pavements, and in houses, etc. It is not, however, very abundant in Windsor Forest and very few myrmecophiles have been found in company with it. One very large colony was found under the bark of a large beech tree on August 26th, 1925, many males, as also egg masses, and cocoons of the ants being present. An example

of *Atheta sodalis*, Er., was captured in this nest, as also *Atheta analis*, Er.

In another colony under the bark of a beech tree an individual of *Euryusa optabilis*, Heer. (the usual guest of *A. (D.) brunneus*) was taken on July 30th, 1926.

We have also found it nesting in Scots pine stumps, in sphagnum, and under boards; in the last two cases *Cyphodeirus albinus* and *Platyarthus hoffmanseggi* being present.

A marriage flight was noticed on July 24th, 1925, extending over a large area.

Acanthomyops (Donisthorpea) alienus, Först.

This species is not nearly so widely distributed nor so common as *niger*, and it lives a more subterranean life. The only example we have met with so far in Windsor Forest was a single male taken sheltering under the bark of a felled beech on August 14th, 1929.

Acanthomyops (Donisthorpea) brunneus, Latr.

This very local species has only occurred in Oxfordshire and Berkshire in this country, and Windsor Forest is its headquarters. Here we have worked out its life-history, and many happy hours have been spent investigating its nests. It is a regular dweller in trees and we have found it nesting in oak, elm, ash, beech, poplar, willow, chestnut, hawthorn and maple. On August 8th, 1928, however, a colony was inspected inhabiting the timbers of the roof of "Ranger's Lodge." The beams were riddled by the ants, which had been present in considerable numbers. The nests are situated inside the trees, and may be in the roots, the centre of the tree, or in one of the main branches, and quite high up. The marriage flights take place in June and July, and the winged sexes are found present in numbers in the nests in those months, and, preparatory to a flight, running on the outer surface of the tree. After this flight, the young females enter holes or crevices in trees, boughs, etc., and found a new colony. Solitary young queens are found in such situations; and young colonies, consisting of a few small workers, with their galleries extending only a short distance into the wood. As the colony grows the galleries extend, until the greater part of the branch, or inside of the tree, is riddled with them. Some of the borings are as fine as lacework, and others much coarser, with much larger passages. In course of time vast quantities of frass accumulates, caused by the ants continually excavating chambers, galleries, and passages in the hard wood. The ants themselves run on the surface of the tree in tracks, under and in the crevices of the bark, and are not conspicuous; disappearing when disturbed.

A considerable portion of the food of this ant consists of the excreta of large grey plant lice (mentioned later) which they rear. I have also seen them carrying Psocids, and other small insects; and in captivity they will devour dead flies, honey, etc.

In observation nests without a queen the workers lay parthenogenetic eggs which produce very small workers.

Very many insects have been taken with *brunneus* at Windsor, but as before only the true, or known, myrmecophiles are printed in italics.

COLEOPTERA.

Aleochara sanguinea, L. in company with *brunneus* on June 7th, 1924. (I have taken this species in birds' nests in Richmond Park). *Microglossa gentilis*, Märk., has occurred with this ant on July 9th and 24th, 1925, and June 30th, 1926. (It is found usually with *fuliginosus* and also in birds' nest). *M. pulla*, Gyll. July 31st, 1925 (also usually with *fuliginosus* and in birds' nests). *Oxyppoda recondita*, Kr., often abundant with *brunneus* at Windsor. *Ilyobates propinguus*, Aubé, June 19th, 1924—"the behaviour of this individual in the presence of the *brunneus* workers was exactly that of an ants' nest beetle." (It has been taken with *rufa* in France and Germany, and the late H. Dollman found it with *flavus* and *Myrmica* sp. at Ditchling). *Myrmedonia limbata*, Pk. June 6th, 1924. *Drusilla canaliculata*, F. June 29th, 1924. *Callicerus rigidicornis*, Er., in a mole's nest, at the foot of a "*brunneus*" tree, full of the ants August 2nd, 1929. (This beetle has been taken with *fuliginosus* at Chobham by the late E. Saunders, and Wellington College, Joy; twice at Woking with *rufa* by the late G. C. Champion; and we have taken it with *niger* in the New Forest). *Atheta nitidula*, Th., sometimes not uncommonly (generally recorded with *fuliginosus*). *A. vicina*, Steph., some seven specimens were taken with *brunneus* on October 12th, 1926. (Harwood took 20 specimens with *rufa* in the Limpsfield Woods, Kent; Walker found it with *fuliginosus* at Tubney, and I captured it with the same ant at Oxshott). *A. analis*, Er. August 5th, 1925, etc. *A. sodalis*, Er. June 19th and 25th, September 3rd, 1924. *Euryusa optabilis*, Heer, frequently. *E. sinuata*, Er., generally present and often in numbers. *Tachysida gracilis*, Er., nine specimens of this beetle were taken by me in a nest of *brunneus* in an old oak in October, 1926, the only time it has ever occurred in Britain. *Quedius ventralis*, Ahr., March 28th, 1928 (recorded with *fuliginosus* by Rouget in France; Crotch took it with the same ant at Weston and Champion at Woking). *Q. aetolicus*, Kr. (subapicalis, Joy) October 16th, 1926 (usually found in birds' nests, fungi, etc.). *Q. scitus*, Gr., June 29th, 1924, August 31st, 1926, four September 16th, 1927, February 15th, 1928 (Crotch recorded it with *fuliginosus* at Cambridge). *Xantholinus glaber*, Nord., June 29th, 1924. (Often found in birds' nests. Rouget took it with *fuliginosus* in France, and Wasmann regards it as the regular guest of that ant; Schmitz found it with *brunneus* in Holland. In England Fowler records it often in company with ants, and Crotch with *fuliginosus* at Cambridge). *Leptacinus formicetorum*, Märk., one specimen October 16th, 1926 (this is the regular guest of *F. rufa*). *Othius myrmecophilus*, Kies., August 26th, 1925, August 31st, 1926. *Medon propinquus*, Bris., several May 5th, 1924. *Leptinus testaceus*, Müll., one November 26th, 1924. (This little blind beetle is parasitic on field mice and also occurs in the nests of *Bombi*; it has been recorded with *fuliginosus* by Rye at Mickleham, Champion at Tilgate Forest and Guestling by Collett). *Calyptomeres dubius*, Marsh., December 11th, 1924 in the wood-frass from the centre of the nest. *Stenichnus godarti*, Latr., August 31st, 1926, several February 15th, 1928. *S. exilis*, Er., May 4th, 1924. *Euconus claviger*, Müll., nine specimens in October, 1926; its only record for Britain. *Euthia schauumi*, Kies., June 25th, 1925. *E. formicetorum*, Reitt., August 12th,

1924; *Batrissodes venustus*, Reich., not uncommon. *B. delaportei*, Aubé., abundant, first British capture June 14th, 1924. *B. adnexus*, Hampe, very rare June 6th, 1924 first British capture, one June 30th, 1926. *Euplectus punctatus*, Muls., July 9th, 1926; *E. afer*, Reit. var. *infirmus*, Raff. June 25th, 1925 first British record, June 29th, 1925, and in numbers July 9th, 1926, always in company with *brunneus*. *E. sanguineus*, Den., June 26th, 1925. *E. piceus*, Mots., February 15th, 1928 (Märkel records it with *A. (D.) emarginatus* in Germany. Fowler gives *F. rufa* Parkhurst Forest, and Collins took it with *Leptothorax acervorum* at Wytham Park. André notes seven species of *Euplectus* with ants). *Trichopteryx montandoni*, All., on various occasions, and sometimes abundant. *Ptenidium kraatzii* August 12th, 1924, September 16th, 1924, July 17th, 1925 in some numbers. *P. turgidum*, Th., scarce October 12th, 1925, May 5th, 1925, July 9th, 1926. *Symbiotes latus*, Redt. In the tracks of the ants, June 29th, 1925, June 30th, 1926 (Wasmann gives *brunneus*, Redtenbacher 1858 says "this species lives with ants; the late E. W. Janson recorded it, in 1859, "moving about amongst the ants" in a strong colony of *A. (C.) umbratus* inhabiting an old tree. *Dendrophilus punctatus*, Hbst; July 9th and 17th 1925. *Plegaderus dissectus*, Er. September 3rd, 1924, June 25th, 1925, February 15th, 1928, and September 6th, 1928, occasionally abundant mixed with the ants and in their frass (it is, however, more usually found under beech and other bark away from ants). *Abraeus globosus*, Hoff; very frequently with *brunneus*, and sometimes common (Perris described the larva from a *fuliginosus* nest, Wasmann gives *brunneus*, *fuliginosus* and *rufa*, Rouget *fuliginosus*, and André mentions *F. rufibarbis* also. Fowler records it from Mickleham with *fuliginosus*, and Crotch with the same ant at Weston, and remarks "I have no doubt this species is a truly mymecophilous insect." Walker also took it with *fuliginosus* at Tubney. Although often found in rotten wood and under bark away from ants, there can be no doubt this beetle shows a great liking for the company of ants). *A. granulum*, Er., literally in hundreds in the frass of an ash tree in company with *brunneus*, February 15th and 22nd, 1928. (Märkel recorded it with *F. rufibarbis* in Germany. Crotch with *fuliginosus* at Cambridge). *Corticaria serrata*, Pk., June 8th, 1926 (Fowler records it with *rufa* at Weybridge and *fuliginosus* at Horsell). *C. elongata*, Gyll., September 3rd, 1924. *Cryptophagus pilosus*, Gyll., December 11th, 1924. *C. umbratus*, Er., January 15th, 1925 (this [and the proceeding] species is generally found in haystack refuse, etc. I have taken it deep down in the bed of a badger at Windsor). *Ptinus subpilosus*, Strm., April 22nd, 1924, August 12th, 1924, August 17th, 1925 (it has been found with *fuliginosus* in other localities: I regard this beetle as a regular myrmecophile). *Cryptocephalus pusillus* F., larva in larval case 29.vii.29 (Weise showed that it was probable that all the species of *Cryptocephalus* change to pupae in ant's nests. I reared a specimen of *C. fulvus*, Goetz., from a larva taken in a *fuliginosus* nest at Wellington College in April 1916). *Scraptia fuscata*, Müll., in wood of ash trees bored by, and full of workers of *brunneus* June 30th, 1926, July 9th, 1926, July 4th, 1927, several specimens on each occasion (Fowler remarks, ". . . the larva and the perfect insect appear to be, at all events to a certain extent myrmecophilous") *Dryophthorus corticalis*, Pk., in the utmost pro-

fusion and only in "*brunneus*" trees; first record for Britain July 9th, 1925. Its larvae and pupae are often present in the galleries side by side with the ant's brood. *Stereocorynes truncorum*, Germ. This species has occurred very frequently in oak trees inhabited by *brunneus* and sometimes in abundance in their galleries, but never in trees uninhabited by the ants.

HYMENOPTERA.

Chalcididae.

Pteromalus deplanatus, Nees., Sept. 16th, 1926, July 29th and October 23rd, 1919, etc., sometimes in abundance (It is probable that the insect is only hibernating in the nests; Mr. Waterston told me this is the same species one finds in houses, behind pictures, etc.).

Proctotrupidae.

The following species of *Proctotrupidae* have been taken in *brunneus* nests at Windsor. It is impossible to say if they have any real connection with the ants. In certain genera a number of species in each have been found with ants, and it is possible they are parasitic on the ants, or some of the guests; but in the present state of our knowledge, a bare list must suffice:—*Trichacis didas*, Walk. (abundant); *Aphanogmus tenuicornis*, Th. (twice); *Aclista scotica*, Keif.; *Belyta nigriceps*, Cam. (three times, once in numbers); *Conostigmus lucidus*, Kief. (twice); *C. alutaceus*, Th.; *C. leptothorax*, Keif. (twice); *C. innotatus*, Kief.; *C. dubiosus*, Kief. (twice); *C. sp.?* near *wasmanni*, Kief. (several times, both sexes); *Ceraphron scoticus*, Kief.; *C. terminalis*, Först., ♂ (July 29th, 1929, 1st record for Britain), *Ceraphron sp.?* ♀; *Synacra brachialis*, Nees.; *Acropiasta rufiventris*, Kief., and *A. striolata*, Th.

DIPTERA.

Apiochaeta aequalis, Wood, many imagos and puparia in two *brunneus* nests September 3rd 1924 (I have found it in numbers on various occasions with *fuliginosus*, in other localities). *Atrichopogon lucorum*, Mg. It is perhaps uncertain if the fly has any real connection with this ant; never the less its larvae were found in numbers in the cells of the ant in wood in the centre of the tree among the ants (and their brood) of a very populous colony in January, 1925. Many male and female imagos emerged in April.

HEMIPTERA.

Pilophorus perplexus, D. & S. On June 25th, 1924 young larvae of this bug were observed running about on the trunks and dodging in and out of the cracks in the bark, among the ants, of oak trees inhabited by *brunneus*. Later in July perfect insects were obtained by beating the branches of these trees. This insect is frequently to be found on *brunneus* trees.

APHIDIDAE

Stomaphis quercus, L.—On October 1st, 1925 specimens of this Aphid were observed to be attended by workers of *brunneus*. As we have seen this species is usually attended by *fuliginosus*. *Stomaphis longirostris*, F.—This species was new to Britain when I first discovered

it in Windsor Forest in 1924. On April 24th a number of very young green *Stomaphis* were found under the bark of an oak tree in the "runs" of *brunneus*, and a cluster of large egg-like cases, from which young plant lice hatched later. The ants were carrying some of the aphids about, and when disturbed they hurried off with them into safety. These insects were continually met with under the bark of various trees inhabited by *brunneus*, and on June 6th, I found many very fat, large examples, grey in colour and swollen with young. My friend Mr. Laing identified these as the above species. These plant-lice generally have the end of their very long proboscis buried in the wood of the tree, and however large they may be the ants drag and jerk at them unmercifully to make them leave go, so as to carry them into safety when danger threatens.

DIPLOPODA.

Proterojulus fuscus, Am. Stein, often occurs in great profusion among the ants in the frass and in the wood of trees inhabited by *brunneus*.

PSEUDOSCORPIONINA.

Chelifer wideri, C.L.K. occurs in the same situations and under the same condition, often in numbers, as the last mentioned creature.

ARANEINA.

Tetrilus arietinus, Thor.—The egg-sacs, young and adults of this myrmecophilous spider are frequently met with in *brunneus* nests. The egg-sacs are fastened to the walls of the galleries and passages of the nest.

Harpaetes hombergi, Sep. This spider preys on ants and I have frequently met with it in, and in the neighbourhood of, *brunneus* nests.

Microneta 'riaria, Bl.—October 16th, 1926. (I have taken this spider with other species of ants on many occasions and in different localities).

ACARINA.

Antennophorus, sp?

On June 25th, 1925, many of the ants in a *brunneus* colony were found to have a mite of this genus fastened on their chins. Some of these mites were sent to Father Wasmann who considered them to belong to an undescribed species. These interesting creatures are partly true guests being fed by the ants, and partly ecto-parasites being always attached to the ants bodies. Sometimes two, or more, will be found resting on a single ant. There are four other British species of *Antennophorus*, each being found with a different species of ant.

Laelaps (Cosmolaelaps) cuneifer, Mich.

On July 20th, 1926, examples of this species were found in the *brunneus* nest mentioned above. This mite is found with a number of species of ants; it is a scavenger in their nests, feeding on the dead bodies of ants, etc.

DIPLOPODA.

The millepede *Proterojulus fuscus*, Am. Stein, sometimes occurs in great numbers in *brunneus* nests in Windsor Forest.

Both the Collembolid *Cyphodeirus albinos* and the Isopod *Platyarthrus hoffmanseggi* are found with this ant. *Acanthomyops (Chthonolasius) flavus*, F.

The little yellow turf ant is very widely distributed, it chiefly nests in fields, under stones, etc., and raises the well known earth-mounds which resemble mole-hills covered with grass. On August 12th, 1926, males were present in some numbers, and also the Collembolid *C. albinos* and the aphid *Forda formicaria*, C. Heyd, in a colony situated under a large flat stone. The Collembolid also occurred and the millipede *Polyxenus lagurus*, L., in a large colony nesting in the centre of an old hawthorn tree. Most of the workers in this nest were very small and pale in colour. On August 14th, 1930, winged females were swept off grass in the evening.

Acanthomyops (Chthonolasius) umbratus, Nyl.

This is a larger, more brightly coloured, ant than *flavus* and its workers are more uniform in size. It is widely distributed in Britain, but always uncommon, with usually isolated colonies. It nests in the earth, and also in trees and stumps, and under stones, etc., and often its Colonies are very large. I have demonstrated that it constructs carton, though in a much less degree than *fuliginosus*. The newly fertilized females found their colonies in nests of *A. (L.) niger*.

I have found *umbratus* nesting at the foot of, but also in, various trees in Windsor Forest. I know of a very large colony in a large oak tree, the ants entirely occupying the wood mould with which the lower half of the tree is filled. In this nest the curious round yellow mite *Sphaerolaelaps holothyroides*, Leon., was found to be in abundance on June 13th, 1928. Another strong colony was found in the stub of a felled poplar on October 26th, 1927. The mite *Antennophorus uhlmanni*, Hall., occurred in some abundance in this nest, as many as 3 or 4 specimens being found on many single workers. *Uropolyaspis humeratus* also occurred on the femora of various workers, its usual situation. A round red mite (unidentified) was found on the gasters and tarsi of some of the workers, and one example was observed fastened to the foreleg of an *Antennophorus*! Another small mite (also unidentified) was crawling free about the nest, and *Cyphodeirus albinos*, Nic., was present in numbers. On August 4th, 1926, in a strong colony nesting in the root of an oak tree, workers of *A. (L.) niger* were found to be present, thus proving that an *umbratus* female had originally founded her colony in a *niger* nest, and most of the original *niger* workers had died off. Many males of *umbratus* occurred in this colony.

Perhaps the most interesting discovery made in connection with this ant at Windsor was the finding of a joint colony of *umbratus* and *brunneus* (referred to above under *brunneus*) in an ash tree on June 25th, 1924. Workers of both species were placed in a small tube together and were found to be quite friendly. It was evident that an *umbratus* queen had founded her colony in a *brunneus* nest. This, as far as I am aware, had never been observed before.

This tree was felled a year later when the *brunneus* workers were

found to be in smaller numbers, but the *umbratus* were in greater numbers in cells with their larvae in the soft wood and frass at the base of the tree.

On August 1st. 1930,* at about 10 a.m. (summer time) *umbratus* females both winged and dealated, were observed in the town of Windsor, and later further afield, crawling about hunting for *niger* nests, etc., in which to found their colonies. This showed that a marriage flight had taken place in the afternoon and evening of the day before.

Acanthomyops (Chthonolasius) mixtus, Nyl.

This species, which is slightly more widely distributed, though somewhat rarer than *umbratus*, is intermediate between *flavus* and *umbratus*. Its habits are similar to those of the latter species. I have demonstrated that the females found their colonies in nests of *A. (D.) alienus*.

On April 10th, 1928, a young dealated female *mixtus* was taken in a sandpit in Windsor Forest. In my book on *British Ants* (2nd Edtn. p. 279) I record finding a number of young freshly very active dealated females (together with males and winged females) in a *mixtus* nest situated in a juniper root at Box Hill in September, 1913, and I suggested that such young females may have already been fertilized in the nest, and as the females of this species do not lay till the following year, and as only one queen occurs in a nest, these young queens may leave the nests in the spring, which would account for the isolated females found on roads, etc., at that time of the year.

Formica rufa, L.

This species is known as the "Horse Ant," "Wood Ant," etc., and it constructs the well known hillocks of pine needles in fir woods, and also of other materials according to its surroundings. It is widely distributed in England, but its range is peculiar in Scotland, and it is scarce in Ireland. Its range at Windsor is considerably less than it was formerly. When the late W. G. Blatch collected Coleoptera in *rufa* nests at Windsor in September, 1887, he found their hillocks in the Great Park; now one has to go much further afield in the Forest to find *rufa* nests. A winged female was taken in a sand pit on May 28th, 1930.

We have taken a number of myrmecophiles with this ant in this locality:—

COLEOPTERA.

Oxygoda formiceticola, Märk., *O. haemorrhoea*, Sahl., *Thiasophila angulata*, Er., *Dinarda märkeli*, Kies., *Notothecta flavipes*, Gr., *N. anceps*, Er., *Atheta analis*, Gr., *Atheta sodalis*, Er. (on several occasions), *Quedius brevis*, Er., *Xantholinus atratus*, Gr., *Leptacinus formicetorum*, Märk., *Othius myrmecophilus*, Kies., *Phloeocharis subtilisima*, Mann. (on several occasions), *Pteryx suturalis*, Heer. (in numbers on several occasions), *Trichopteryx montandoni*, All., *Ptilium myrmecophilum*, All. (Blatch IX. 87), *Cephenium thoracicum*, Müll. (on several occasions, I have also taken it with this ant at Weybridge, etc.), *Dendrophilus*

* On the same day males and winged females of *brunneus* were swept off grass, and winged and dealated females were observed crawling about in Windsor Forest.

pygmaeus, L., (Blatch IX. 87), *Myrmetes piceus*, Pk., *Monotoma conicicollis*, Aub., *M. formicetorum*, Th. (this species was abundant in a *rufa* nest on September 17th, 1926, but has not turned up again since then).

HYMENOPTERA—*Proctotrupidae*.

Tropidopria fuliginosa, Wasm.

DIPTERA.

Scatopse transversalis, Lw.

COCCIDAE.

Newsteadia floccosa, Westw.

COLLEMBOLA.

Cyphodeirus albinos, Nic.

DIPLOPODA.

Proterojulus fuscus, Am. Stein, in considerable numbers, several of the extremely rare male on two occasions.

Polyxenus lagurus, L., often abundant.

ARANEINA.

Thyreosthenius biovatus, Camb.—always present.

Formica sanguinea, Latr.

The blood-red "Robber ant" is the only slave-making species in this country. Its distribution is scattered stretching from Dorset to Worcester, and reappearing in Westmoreland, and in the Highlands of Scotland where I discovered it in several localities.

It nests in the ground and also in stumps, and it covers its nests in the summer with a low layer of vegetable débris.

This is not the place to deal with the slave-making habits of *F. sanguinea*, but a full account of this interesting instinct will be found in *British Ants* (2nd Edtn., p. 323).

It occurs in several areas in Windsor Forest chiefly occupying the stumps of the Scots pine, but we have found it nesting in banks on several occasions.

On May 31st, 1927, Miss Kirk captured a fine male of the spider *Linyphia furtiva*, Camb., which was running in company with and very closely resembling, the workers from a colony of *sanguinea* situated in a large Scots' pine stump. The little ant *Leptothorax acervorum*, F., was living in this nest, and the millepede *Polyxenus lagurus*, L., occurred in the débris of the nest.

On May 27th, 1929, the day after a heavy thunderstorm which had extinguished a forest fire in this area, a number of *sanguinea* workers was observed in a sand pit. They were toiling up the steep side of the pit, carrying their fellows, their slaves, and their prey. Two examples of the beetle *Dinarda dentata*, Gr. (the regular guest of this ant) were captured, when climbing up the side of the pit in company with the sanguineas. A newly constructed *sanguinea* nest was found situated in the ground at the top of the sand pit. It was evident that the ants had moved their nest to this spot, either on account of the fire, or the thunderstorm. This nest was dug up on

the 29th, but the only insect found other than ants, their slaves, and brood, were one example of *Atemeles emarginatus*, F. (rather a surprise as it is the regular guest of *Formica fusca*, L., and *Myrmica* species), and one example of *Atheta linearis*, Grav.

Formica fusca, L.

This species is widely distributed in the British Isles and is a common species; but it is not abundant in Windsor Forest, where we have found it nesting under bark, in stumps, and in banks, etc. It is a cowardly ant, and is the species upon which *F. sanguinea* most frequently makes slave raids.

Males were taken in a sandpit on July 29th, 1930, and by evening sweeping on August 13th.

On May 19th, 1927, a female of the Myrmecophilous fly *Microdon eggeri*, Mik., was captured in Windsor Forest, which was depositing eggs in a Scots pine stump inhabited by this ant.

INTRODUCED SPECIES.

MYRMICINAE.

Monomorium pharaonis, L.

This species has already been dealt with (see p. 2).

DOLICHODERINAE.

Iridomyrmex humilis, Mayr.

This is the well-known "Argentine Ant," which is rapidly becoming cosmopolitan. Its natural habitat is the Argentine and Brazil, whence it has been transported by commerce, etc., to New Orleans (extending to the Gulf of Mexico, over five thousand square miles); California, Louisiana, Cape Colony and Basutoland. It now occurs in the Canary Islands and Madeira, and has been observed in Portugal, Guernsey, the centre of France, Belgium, Hamburg, and I discovered it at Palermo in Sicily in 1926.

In Britain it has been recorded from, Exeter, Plymouth, Devon; Eastbourne, Sussex; Enfield, Middlesex; Tring, Herts; Manchester, Lancashire; Broadbottom, Cheshire; Edinburgh and Belfast.

On August 17th, 1927, this species was observed running about on the dinner table at my house at Putney on the evening of my Entomological Club supper. I naturally concluded that they had been brought up from Windsor with the flowers and grapes, which had been so kindly given to me. Consequently on August 30th a visit was paid to the Royal gardens, and the Argentine ant was found to be present in profusion in all hot-houses. I was informed that it had occurred there for many years. Though a nuisance in many ways, at Windsor at any rate it does not hurt the flowers, fruit, cucumbers, etc., etc., which are all exceptionally fine; and it has at least killed off all other ants and insect pests.

ADDENDA.

To page 3. *Myrmica lobicarinis*, Nyl.

This ant, though by no means common, is widely distributed in Britain. Its colonies are usually small, and it nests under stones, in banks, etc., and is fond of sandy districts. A dealated female was taken in a sand pit in Windsor Forest on May 6th, 1930.

To page 4. *A. (D.) fuliginosus*, Latr.

On May 28th, 1930, a dealated female was found in a sand pit in Windsor Forest. The insect no doubt was hunting for an *umbratus* nest in which to found her colony, but the date is rather early for a female which had presumably only recently been winged.

On May 14th, 1930, a Chrysopid larva with its body covered with the remains of its prey was taken with *fuliginosus* in Windsor Forest. In my book "*Guests of British Ants*," I record taking the same larva with this ant at Oxshott, but unfortunately I stated it was a *Hemerobius* species. In that genus the larvae do not possess the habit of covering their bodies with the remains of their prey.

Two specimens of the Coleopteron *Cephenium thoracicum*, Müll., were taken with this ant on May 14th, 1930.

A *Xenotoma* species occurred with *fuliginosus* on October 11th, 1927. Mr. Nixon (to whom I am indebted for the name of the genus of this Proctotrupid and other species mentioned later) tells me that it is not in the British Museum collection, and may be new.

Exallonyx ligatus, Ners., was found with *fuliginosus* on June 14th, 1929.

To page 8. *Acanthomyops (Donisthorpea) brunneus*, Latr.

The beetles *Euplectes nitidus*, Fair., and *Microglossa gentilis*, Märk., were taken in nests of this ant on June 11th, 1930.

Rhyncolus truncorum, Germ., this rather rare weevil occurred in some numbers in a *brunneus* nest on July 15th, 1930, and subsequent dates. The beetles were in the cells with the ants and their brood; some even resting on the ants' larvae. I find that on every occasion when I have taken this beetle in Windsor Forest it has always been in company with this ant—such dates are July 31st, 1925, October 14th, 1925, July 14th, 1926, June 27th, 1927, and subsequent dates, in some numbers in a nest in an ash tree; February 16th, 1920. Sir Guy Marshall tells me that the species of an exotic genus allied to *Rhyncolus* always live with ants.

Teredus nitidus, F., is parasitic on wood boring beetles and has never, as far as I am aware, been recorded with ants before; nevertheless as it occurred in such numbers in the workings of, and with, this ant in Windsor Forest this year, the fact must be put on record. The other beetles which had, or were inhabiting the oak tree in which this nest occurred were *Anitys rubens*, *Dorcatoma chrysomelina*, Stn., *Rhyncolus truncorum*, Germ., *Atomaria pulchra*, Er., *Euryusa sinuata*, Er., and *Batrisodes delaportei*, Aubé.

The Dipteron *Apiochaeta brevicostalis*, Wood, occurred in the galleries of the above mentioned nest.

The Proctotrupid *Conostigmus lucidus*, Kieff., was found in a *brunneus* nest on November 16th, 1927, February 1st and 15th, 1928. I have recorded this species with *brunneus* before and it is evidently associated with it.

Caliceras reitteri, Kieff. A ♀ of this little Proctotrupid, which is new to Britain, which Mr. Nixon tells me is a very distinct but rare species was taken in a *brunneus* nest on June 8th, 1929.

A small Cynipid *Alloxysta ullrichi*, Giraud, which Mr. Ferriere has kindly named for me, was taken with *brunneus* on July 8th, 1930. This belongs to a section which does not make galls but is parasitic on *Aphidae*. Hence no doubt its presence in a *brunneus* nest.

The small moth *Borkhausenia pseudospretella*, Steph. ? was observed in some numbers in a tree inhabited by *brunneus*. The tree was apparently solid, but when cut down it was found to be hollow in the lower portion. The moths were with the ants in this hollow, and as it seemed entirely shut in, and must have been living on the débris, etc., of the nest for some time, possibly for years.

This brings these short notes on the ants and myrmecophiles of Windsor Forest to a close.

Of course space has not permitted much description of the habits of these interesting insects and their association together, but anyone who wishes to go more fully into the subject will find it dealt with in all its details in my *British Ants*, 2nd edition, 1927, and *Guests of British Ants*, 1927.

NOTES

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By HY. J. TURNER, F.E.S.

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The Entomologist's Record & Journal of Variation.

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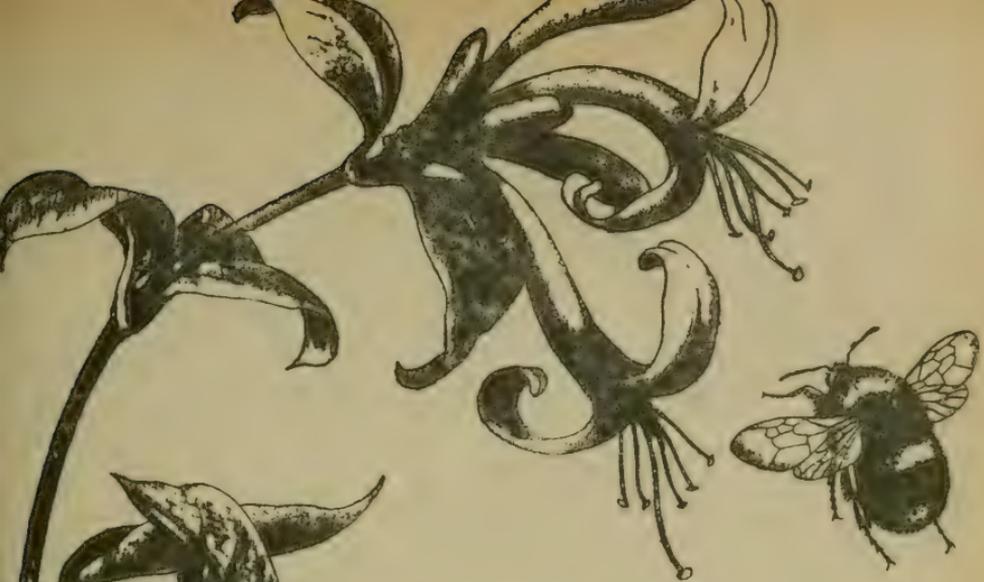
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CORRECTIONS

- p. 61 line 15 from bottom for *pygmea* read *pygmaea*.
 p. 93 line 18 from bottom for *Macroglossums* read *Macroglossum*.
 p. 141 line 15 from top read *Gentiana pneumonanthes*.
 p. 141 line 16 from top delete (*russata*).



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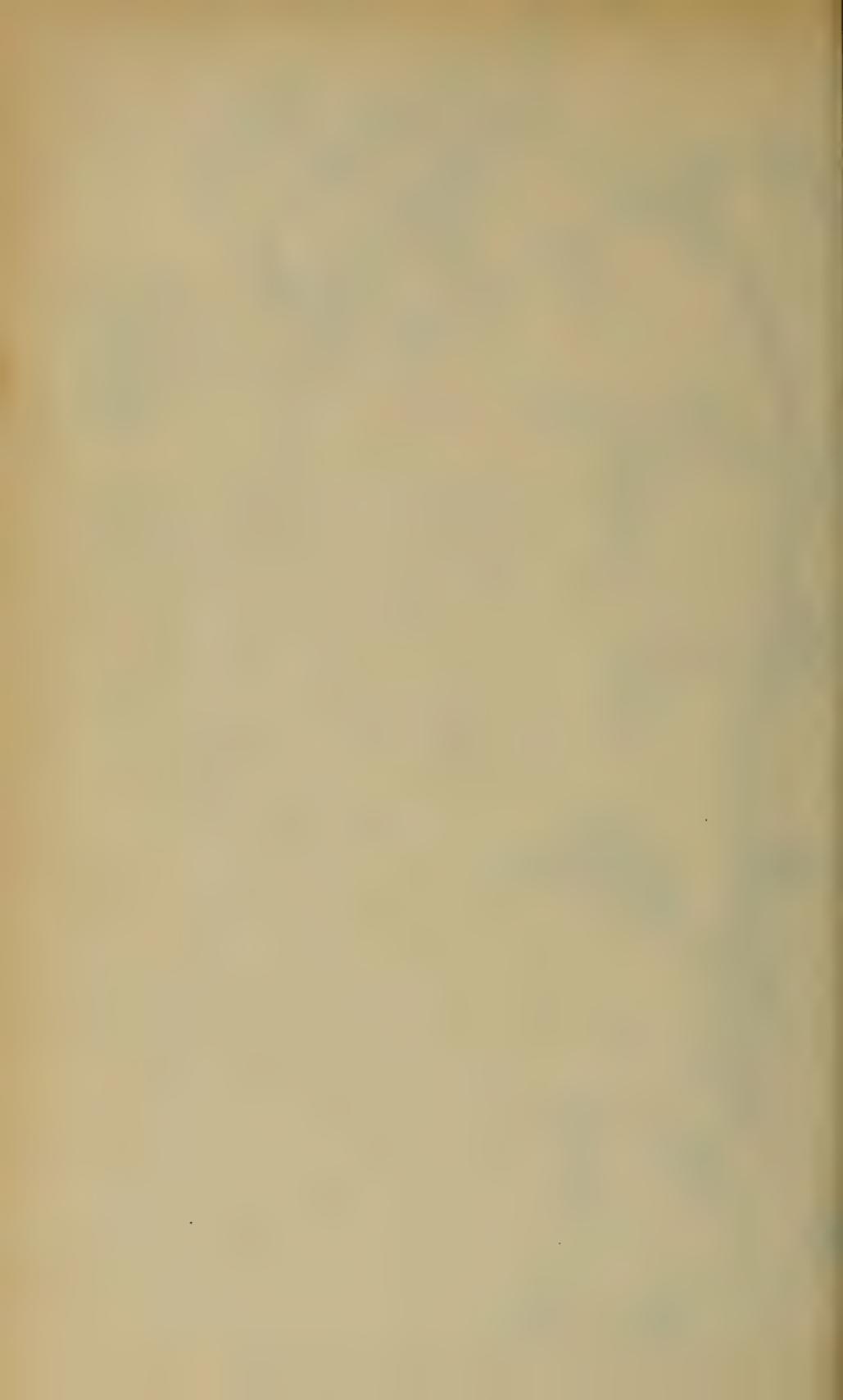
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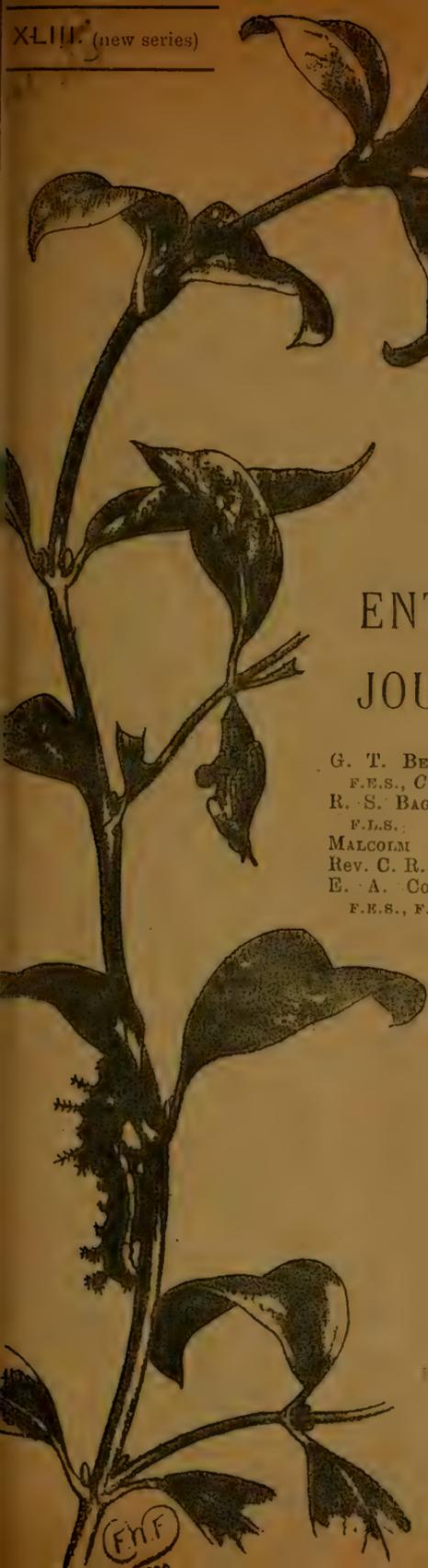
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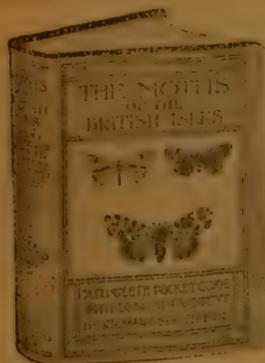
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The Entomologist's Record.

Photo:—G. Wheeler.

LA GRAVE FROM THE ROMANCHE.

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AND

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JANUARY 15TH, 1931.

Notes from the French Alps of Haute Savoie, Isère and the Hautes Alpes. (With Plate I.)

By REV. GEORGE WHEELER, M.A., F.E.S.

The results of the accident which in 1921 compelled me to resign the Secretaryship of the Entomological Society of London, have obliged me to spend the greater part of my holiday at Aix-les-Bains each year from 1924 to 1930, with the single exception of the year 1928. The "cure" does not leave one much opportunity for butterfly hunting, but in the neighbourhood of Aix, and on the various expeditions which can be taken by char-à-banc from that centre, I have come across a considerable number of species; after escaping from bondage I have twice visited la Grave and once spent a few days at Uriage, both of which localities have added to the number of species met with. In the other years I have made two expeditions to Corsica, and have also paid three short visits to Digne and spent a day at Clelles, but I am not including these in the following notes, as these localities have already been written about in the *Entomologist's Record*.

"Aix" must here be taken to mean the roadside on the way to, and a little beyond, the "Tir aux Pigeons" and the fields in that immediate neighbourhood. The latter are prolific until the grass has been cut—and there are footpaths through most of them—but afterwards produce nothing but *E. jurtina* and *M. galathea*.

Pugny is a station on the Mt. Revard railway, and is best reached by train, returning on foot by the path skirting the railway. Hautecombe, on the other side of the Lake, is reached by boat, and the fields just beyond the Abbey provide plenty of sport. Chindrieux is the first station on the rail to Culoz; the best hunting ground is reached by following the main road back towards Aix for 3 or 4 kilometres. La Chambotte is the shortest of the daily char-a-banc expeditions. It overhangs the lake at a considerable altitude and affords very fine views, and a fair number of butterflies—(also first-rate hot scones for tea). The Col du Chat is at the opposite side of the Lake; one or two of the char-a-banc expeditions stop there for tea, and there is a small but good hunting-ground just opposite the hotel. The Grande Chartreuse is the end of a magnificent expedition; the chars stop there for about

an hour and there is a good hunting-ground just above the convent. The Col de Cucheron and the Col du Granier are both passed on the return journey, about three quarters of an hour is allowed for tea at the latter, and there is very good hunting-ground all round the little hotel. It would, I feel sure, be worth while to spend a day or two there towards the end of June. The chars do not stop at the Col de Cucheron, unless one can make up a party of seven, which fills one of the smaller chars, at the same price for tickets as the larger ones, and enables one to stop when and where one wishes. I once had the opportunity of doing this, on June 1st, 1927, and I believe it would prove a very prolific spot. It is the only place in the neighbourhood where I have seen *Pararge hiera*. Aiguebellette is the goal of another of the char-a-banc expeditions. From an entomological point of view it is not to be recommended, as the time allowed is too short and the hour too late to be of much use to the net.

With regard to the places further afield, La Grave, the Col de Lautaret and Uriage, the first two are very highly to be recommended, but I found the last disappointing. *Chrysophanus dispar* var. *rutilus* is said to be found there, but though the Giant Dock certainly grows there I saw no sign of the existence of the insect. Indeed beyond *Brenthis dia*, *Adopaea lincola* and *A. acteon* there was nothing that one could not have taken almost anywhere. At la Grave I was specially anxious to find *Melitaea deione*, and as Mr. Lowe took it there, worn, at the end of July 1909, I thought that my visit this year in the middle of the month ought to be about the right time. I had always wondered what the caterpillar could feed on there, as it is too high for the ordinary toad flax and too low for the beautiful "dragon's tongue" (though I did see a small plant of the latter there to my great surprise), but I found a considerable quantity of another *Linaria*, quite a new plant to me, growing about 10 ins. to a foot high, with beautiful small pale mauve blossoms with a pale yellow lip, which I conclude must be the food-plant here; but, though I searched diligently for it, I never came across *M. deione* here.

At la Grave there is a small field on the left, just after the first tunnel, in which a good many species flew, more especially in June, and there is also good hunting ground on the right side of the road going down towards les Féaux, and on the left side going up towards le Lautaret, also on the left bank of the Romanche going down the valley; doubtless there are other good spots as well but these are all I had time to explore on my two short visits, especially as this year the weather was for the most part very unpropitious, though there were two ideal days, one of which was spent chiefly at le Lautaret, and the other on the banks of the Romanche.

At le Lautaret on July 17th this year *Melitaea cynthia* race *pallida*, was in great numbers, in both sexes; the underside of both ♂ and ♀ has a very washed-out appearance, reminding one forcibly of *M. aurinia*, the ♀s vary greatly, some of them having irregular bands of a whitish colour, but not so pronounced as the white of the ♂s. I was much struck by the very great scarcity of Erebias; one *E. epiphron*, of the *cassiope* form, one *E. tyndarus*, and two or three larger ones which I was not near enough to recognise being all I saw. *E. curyale* was common enough at la Grave this year in July, and I took one *E. goante* on the last day of my visit there, the 22nd; *E. ceto* was

not scarce in June 1927, one rather ancient ♀ being all I saw of the species this year. *Colias phicomone* comes down as far as la Grave, as I took a specimen there on June 16th, but it does not seem to be common; I only saw four specimens at le Lautaret on July 17th this year. *C. palaeno* was far commoner.

The following is a list of the species seen in these localities, with dates, 93 in number:—

- Callophrys rubi*, Aix, v.30,'29; la Grave, vi.13,'27.
Klugia spini, Chindrieux, vii.8,'30.
Heodes virgaureae, la Grave, vii.22,'30.
Chrysophanus hippothoe, la Grave, vii.21,22,'30.
Heodes (Loweia) dorilis, Aix, v.30,'24; v.19,'27; v.30,'29; Hautecombe, v.20,'24; Pugny, v.20,25,'27.
Rumicia phlaeas, Aix, v.30,'29.
Glaucopsyche cyllarus, Mt. Revard, vi.26,'26; Col du Granier, vi.1,'27; vi.8,'29; la Grave, vi.13,14,16,'27; le Lautaret, vi.20,'27.
Cupido osiris (sebrus), Aix, v.22,'24; v.30,'27; Pugny, v.20,25,31,'27; v.24,'29; Hautecombe, v.30,'24; la Grave, vi.13,14,16,'27; le Lautaret, vi.20,'27.
C. minimus, Mt. Revard, vi.23,'25; vi.26,'26; Aix, v.22,'24; Hautecombe, v.17,20,'24; vi.30,'25; vi.22,'26; Col de Cucheron, vi.1,'27; la Grave vii.22,'30.
Polyommatus eros, la Grave vii.22,'30, (not uncommon, ♂ s only).
P. icarus, Aix, Hautecombe, Pugny, from v.22 to vii.4; la Grave vii.16-22 (mostly worn).
P. escheri, la Grave, vi.21,22,'30 (common).
P. hylas, Aix, v.22-30,'24; v.30,'29; Pugny, v.31,'27; Hautecombe, vi.21,'27; vi.30,'25.
P. (Agriades) thetis, Aix, v.22-29,'24; Pugny, v.20,25,'27; v.24,'29; Hautecombe, v.20,'24; Col du Granier, vi.8,'29; la Chambotte, vi.30,'30; Chindrieux, vii.8,'30.
P. (A.) coridon, la Grave, vii.17,21,22,'30.
P. (Hirsutina) damon, la Grave vii.22,'30 (abundant, ♂ s only).
P. (Cyaniaris) semiargus, Aix, v.19,'27; Hautecombe, v.17,20,'24; Pugny, v.22,'27; Mt. Revard, vi.23,'25; Chartreuse, vii.1,'25; la Chambotte, vi.22,'26.
P. (Aricia) eumedon, Mt. Revard, vi.23., vii.1,'25; vi.26,'26; vii.4,'30; le Lautaret, vi.20,'27.
P. (A.) medon, Hautecombe, v.17,20,'24; vii.4,'30; Aix, v.22,30; vi.3,'24; v.19,'27; Pugny, v.20,'27; la Grave, vii.17,21,'30.
Plebeius (Latorina) orbitulus, le Lautaret, vii.17,'30 (very few, ♂ s only).
Plebeius aegon, Aix, v.22-30., vi.3,'24; la Grave, vii.16-21,'30.
Plebeius insularis, Aix, v.28,'24; vi.13,'25; Hautecombe, vi.23,'26 (one ♂ on each occasion).
Hamearis lucina, Pugny, v.31,'27; v.24, vi.5,29; Aix, vi.10,'29; la Chambotte, v.28,'27; v.29,'29; Chindrieux, v.27,'27; Chartreuse vii.16,'25.
Papilio machaon, la Grave, vii.16,'30.
Iphiclides podalirius, Hautecombe, v.17,20,'24 (common).
Parnassius apollo, la Grave, vii.17,22,'30 (a few only).
Aporia crataegi, Hautecombe, v.20,'24; Aix, v.23,29., vi.3,'24, etc. (common), la Grave, vii.16,'30 (common but small).

Pieris brassicae, not always common round Aix, a few at la Grave '30.

P. rapae, at all localities except Chartreuse and le Lautaret.

P. napi, not very common; Pugny, vi.5,10,'29; vii.4,6,'25; Aix, v.30,'24; vi.22,'25; Chartreuse, vi.16,'25; Chindrieux, vii.8,'30; almost as large as *brassicae*, Aix, vi.28,'30.

Anthocharis simplonia, La Grave, vi.13,'27 (not uncommon); le Lautaret, vi.20,'27.

Euchloë cardamines, Aix, v.28, vi.4,'27; Pugny, v.20,'27; Hautecombe, v.20,'24; Chindrieux, v.27,'27; la Grave, vii.22,'30.

Leptosia sinapis, Aix, v.19,22,vi.4,'24; Pugny, v.20,'27; vi.24, vii.4,'25; Chindrieux, vi.30,'26, vii.8,'30; la Grave, vii.22,'30.

Colias phicomone, la Grave, vi.16,'27; le Lautaret, vii.17,'30.

C. hyale, Aix, v.22,30; vi.3,'24; vi.22,'25; Pugny, vi.9,'27; la Grave, vi.14,16,'27; vii.16,'30.

C. palaeno, le Lautaret vii.17,'30, (not uncommon, and not nearly so difficult to catch as in Switzerland).

C. croceus (edusa), Aix, June 17,26 (1 ♀); Chindrieux, vii.8,'30 (1 ♂).

Gonepteryx rhamni, fairly common round Aix; worn at Mt. Revard vii.4,'30; common and fresh at Chindrieux vii.8,'30.

Dryas paphia, Chindrieux vii.8,'30.

Issoria lathonia, la Grave, vii.21,'30.

Argynnis aglaia, la Grave, vii.22,'30.

Brenthis dia, Pugny, vi.24,'27; vii.4,'25; Hautecombe, vi.30,'25; Chindrieux, vi.30,'26; Uriage, vi.21,22,'27 (very common).

B. amathusia, la Grave, vii.22,'30 (2 ♂ s only).

B. pales, le Lautaret, vii.17,'30 (1 ♂ only).

B. euphrosyne, Mt. Revard, vi.1,'24; vii.1,'25; vi.26,'26; vii.4,'30; Col de Cucheron, vi.1,'27; Pugny, vi.5,'29.

Melitaea cynthia race *pallida*, le Lautaret, vii.17,'30 (abundant).

M. aurinia, Aix, v.22,29,'24; vi.13,'25; Col du Granier, vi.1,'27.

M. parthenie, Aix, v.22-30, vi.3,'24 (very common); vi.28,'30 (a few); Pugny, v.31, vi.9,'27; Chindrieux, v.27,'27; la Chambotte, vi.30,'30; Mt. Revard, vii.1,'25 (abundant but ♂ s only).

M. helvetica (pseudathalia), Aix, v.22,28,'24, vi.4,'29; Pugny, v.24,'24; Chindrieux, vi.30,26, vii.8,'30 (abundant); Hautecombe, v.17,'24; la Chambotte, v.28,'27, vi.30,'30; Aiguebelette, vi.17,'30.

M. dictynna, Aix, v.30,'24; Pugny, vi.24,'27; vi.25,'30; Mt. Revard, vii.1,'25, vii.4,'30.

M. cinxia, Aix, v.22,29,'24; la Grave, vi.16,17,'27; vii.16,'30; le Lautaret, vi.20,'27.

M. didyma, Aix, vi.30,'25; vi.28,'30; Pugny, vii.4,'25; v.20,'27; Chindrieux, vii.8,'30.

M. phoebe, Aix, v.29,30,'24; la Grave, vi.16,'27; vii.17,21,22,'30. (very common.)

Aglais urticae, everywhere, very fresh and bright at la Chartreuse, vi.29,'30.

Pyrameis atalanta, Chartreuse, vi.29,'30 (1 only, very fresh).

Limenitis virularis (camilla), Chindrieux, v.27,'27; vii.8,'30 (worn); la Chambotte, vi.30,'30.

Apatura iris, Pugny, vii.6,'25 (1 only).

- A. ilia*, form *clytie*, Aix, vi.22,'25 ; Chindrieux, vii.8,'30 (on each occasion 1 only).
- Pararge megera*, Aix, vi.4,'24 ; Hautecombe, v.22,'24 ; Pugny, v.24,'29 ; la Chambotte, v.28,'27.
- P. hiera*, Col de Cucheron, vi.1,'27.
- P. maera*, Aix, v.28-30,'24 ; Mt. Revard, vii.1,'25 ; Pugny, vi.21,'26 ; Chindrieux, vi.30,'26 ; v.27,'27 ; vii.8,'30 ; la Chambotte, v.28,'27.
- P. aegeria*, Pugny, v.28,'27 ; la Chambotte, v.28,'27.
- Satyrus alcyone*, Chindrieux, vii.8,'30.
- S. cordula*, la Grave, vii.17,22,'30.
- Aphantopus hyperantus*, Pugny, vii.4,6,'25.
- Coenonympha iphis*, la Grave, vii.16,22,'30.
- C. satyrion*, Mt. Revard, vi.23, vii.1,'25 ; vii.4,'30.
- C. arcania*, Pugny, vii.4,'25 ; Hautecombe, vi.23,'26 ; vii.3,'27 ; Chindrieux, vi.30,'26 ; vii.8,'30.
- C. pamphilus*, everywhere.
- Epinephele lycaon*, la Grave, vii.22,'30.
- E. jurtina*, everywhere up to la Grave.
- Erebia epiphron* race *cassiope*, le Lautaret, vii.17,'30 (1 ♂ only).
- E. ceto*, la Grave, vi.13-16,'27 ; vii.21,'30. (worn.)
- E. oeme*, Mt. Revard, vii.1,'25 ; vii.4,'30 ; Chartreuse, vi.28,'26 ; vi.29,'30.
- E. euryale*, la Grave, vii.17-22,'30.
- E. goante*, la Grave, vii.22,'30 (1 ♂ only).
- E. tyndarus*, le Lautaret, vii.17,'30 (1 ♂ only).
- Melanargia galathea*, everywhere up to la Grave.
- Nisoniades tages*, Mt. Revard, vi.26,'26 ; la Grave, vi.16,'27.
- Cartharodus lavaterae*, Chindrieux, vi.30,'26.
- Spilothyrus althaeae*, la Grave, vii.22,'30.
- Hesperia carthami*, la Grave, vi.m,'27.
- H. malvae*, Hautecombe, v.20,'24 ; Pugny, v.27,'27 ; vi.5,'29 ; v.24,'29 (a very fine ab. *taras*) ; Mt. Revard, vi.1,'24 ; vi.26,'26 ; vii.4,'30.
- H. malvoides*, le Lautaret, vi.20,'27 ; vii.17,'30 ; la Grave, vi.16,'27 ; Chartreuse, vi.16,'25.
- H. serratulae*, Mt. Revard, vi.23, vii.1,'25 ; Pugny, v.25,'27.
- H. carlinae*, le Lautaret, vii.17,'30 (1 only).
- H. alvens*, la Chambotte, vi.22,'26 ; la Grave, vi.14,'27.
- Powellia sertorius* (*sao*), Aix, vi.4,'24 ; v.5,'27 ; Hautecombe, vi.17,'25 ; vi.3,'27 ; Pugny, v.25,'27 ; la Grave, vi.13, 16,'27.
- Augiades sylvanus*, generally common, e.g., Pugny, vi.24,'27 ; Aix, vi.4,'24 ; Chartreuse, vii.8,'30 ; Uriage, vi.21,'27.
- Adopaea flava*, generally common, e.g., Aix, vii.2,'26 ; Pugny, vii.4,'25 ; vi.24,'27 ; Chindrieux, vi.30,'26 ; vii.8,'30.
- A. acteon*, Chindrieux, vii.8,'30 (worn) ; Uriage, vi.21,'27.
- A. lineola*, Uriage, vi.21,22,'27 ; Hautecombe, vi.30,'25.
- Carterocephalus palaemon*, Pugny, vi.5,'29 ; Chindrieux, v.27,'27.

Melitaea varia, Meyer-Dur.

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

In recent times there has been an inclination to disparage the value of morphological work among certain Zoologists; but as was practically inevitable, this tendency seems to be passing, if one may judge by the Inaugural Address, and that of the President of the Zoological Section, at this year's Meeting of the British Association. This disparagement, however, has been of use as a warning to workers in morphology, that it is absolutely essential to exercise the greatest care in putting forward statements, purporting to be based on morphological data; for in the event of such statements happening subsequently to be proved inaccurate, morphology is apt to be discredited, whereas it may be the worker rather than the data that is responsible.

For these reasons it is necessary to make some comment on the statements respecting *Melitaea varia*, in Dr. Verity's recent article on the *Melitaecidi* (*Ent. Rec.* March-October, 1930).

I have had some correspondence with Dr. Verity on the subject, and I understood he was going to add some qualification at the end of his article, but the footnote in the October number (p. 135) does not alter the rather misleading nature of his earlier statements.

In the May number (p. 73) concerning *M. varia*, he writes:—"The question as to whether this is a distinct species or not, which has been raised on the strength of the differences in the genitalia, could, it seems to me, only be solved by finding them on the same grounds or by breeding experiments; *differences which simply consist in two successive degrees of development due to climatic causes are no proof of specific distinctness and varia and parthenie might stand very naturally to each other as the Glacial and the Temperate exurge of one species.*" (Italics mine).

First one must point out, that in systematic work on a group of extremely closely related insects (such as the *Melitaea*) before a worker can gain the necessary knowledge to appreciate the value (specific or otherwise) that can be attached to the structural deviations in a given form, it is absolutely necessary that he should be familiar with the structural variation to be found, not only in each species of the genus, but in most of the principal subspecies as well. This naturally necessitates a great deal of work; and in the case of species or subspecies that show much variation, means that a large number of mounts must be made; for it is only by data so acquired that the correct value of the variations found in the given insect can be recognised, and a reliable estimation of its standing in the genus be arrived at.

To the best of my knowledge, there is no entomologist living, who has done the necessary work to attain this familiarity with the structural variation existing in the *Melitaea*. Of past workers, Prof. Reverdin was by far the best qualified to judge, for he had done a great amount of work on the European species, but lack of material prevented him from completing his work. He, however, had mounted many hundreds of specimens of *Melitaea*, which in the European branch gave him quite sufficient data, provided that in the fewer

Asiatic forms that he had dealt with, there was nothing revealed to contradict the facts derived from European sources. He dealt, among others, with *varia*, and sums up his work with the following:—"Il n'y a donc pas le moindre doute que ces deux *Melitaea* sont deux unités spécifiques distinctes." (The two species being *varia* and *parthenie*.)

From this point we return to the paragraph of Dr. Verity's, already quoted. The lines I have placed in italics are those requiring qualification. To the reader they can only convey the impression that Dr. Verity has been led to these conclusions by facts derived from his anatomical work; facts which either disprove those given by Reverdin, or were not known to the latter. In point of fact this is not the case, and the lines are merely a speculation on Dr. Verity's part; for which, so far as I can ascertain, there is no corroboration to be derived from anatomical sources. Indeed the statement that the differences in *varia* are "due to climatic causes," is not merely unsupported, but actually in opposition to the existing data; for some of the structural features which separate *varia* from *parthenie*, occur in other lowland species of the genus, and therefore cannot be attributed to the influences of climate in an alpine habitat.

One must also remember that Dr. Verity is working under the great disadvantage of not mounting his own dissections, and has therefore to rely on a few mounts of various species which are made for him, a method which practically excludes the possibility of obtaining a sufficient material in the present case.

At the end of his article Dr. Verity adds a footnote (*Ent. Rec.* Oct. p. 135) which I alluded to before, stating; "The question as to whether there exists a specific distinction between *varia* and *parthenie* must remain open until it can be ascertained that they do not, or that they do, interbreed, possibly, by discovering a locality where they fly together."

So far as anatomical data are concerned, one cannot admit that there is any such question, for Dr. Verity has produced no fresh data; and in regard to breeding, he has ignored the manuscript note by Guénée, which Reverdin got from Oberthür, and published in his paper (*Bull. Soc. Lep. de Genève*, V. p. 170). In this note Guénée states that he found both larvae and pupae of *varia* at Zermatt in 1864, and from them concluded that *varia* was a good species.

Perhaps the most interesting point in Dr. Verity's article, is the establishment of *britomartis* as a species, but in writing to me he takes the fact, that Reverdin stated on the strength of his examination of the genitalia, that *aureliaeformis*, Vty. and the specimens Reverdin called *kenteana*, were forms of *athalia*; and uses this as an argument for questioning Reverdin's conclusions on *varia*. Both *aureliaeformis* and *kenteana* must now be placed with *britomartis* (accepting Dr. Verity's separation of the latter); but this in no way affects the soundness of Reverdin's other conclusions, for on the limited material at his disposal, no writer, who had the least regard for the reputation of his work, could have come to any other conclusion. On the other hand, the separation of *britomartis* as distinct from *athalia*, is a further very strong argument in favour of *varia* being distinct also, for the structural differences between the two former are nothing like so striking as those which distinguish *varia* from *parthenie*.

It must not be thought that I am personally claiming any knowledge of the anatomy of the *Melitaea*, for I have not worked in that group, but there are certain facts applying to all morphological work which cannot be ignored; and of these, one holds good in every field of work; *i.e.*—when working in any group of *really closely related* subjects, the value attaching to any particular structural development can only be taken at one standard, in each, and every form where it occurs. To treat a certain development as only a varietal element, that is found in two forms of one species, in one instance; and to take the same development as separating two forms as distinct species in another, is merely ignoring facts, and adopting a form of classification which makes structure subservient to superficial appearances.

The question therefore is, whether the details of anatomical deviation, cited by Reverdin (and others) are of sufficient value to be held as specific, or not. Dr. Verity has given no facts which oppose Reverdin's (but rather supports them in the separating of *britomartis*) so personally I feel no doubt about accepting the carefully considered statements of the latter; and I think it likely that the majority of anatomists will do likewise. It must, however, be clearly noted, that if for any reason one refuses to accept *varia* as a distinct species on anatomical grounds, then it follows that considerable readjustment of the present division of species in the genus will be necessary, for one could not maintain that *athalia* and *parthenie*, and even *aurelia* or *deione* were distinct species either; for judging from the published photographs of the genitalia of these species (some of the best photographs have appeared in this magazine illustrating an article by Mr. Sheldon in 1916) the differences which separate *varia* and *parthenie* are developments essentially homologous with those separating the other species mentioned, from *athalia*; and are as markedly, or even more developed.

[It must not be thought that these remarks by any means apply solely to the points raised in Dr. Verity's paper; for the converse is unfortunately a frequent occurrence, and we find writers who having dissected some specimens of two insects considered co-specific, without the least knowledge of the anatomical variation evolved in the genus, asserting that any differences observable are of specific value. In such cases while very pronounced deviations might legitimately be accepted as proof, slight ones are of no value whatever; not because they are slight but because of the lack of knowledge which underlies these short cut methods.—B.C.S.W.]

In far Argentina.

By CAPT. K. J. HAYWARD, F.E.S., F.R.G.S.

We came up here in August and as the estancia house had not been occupied for over two years it, and the garden, were in a state bordering on ruin! Ruin is rather too strong a word, but the garden was a mass of weeds and all the trees "gone to seed" as they say, and the house in sad need of repairs. For six weeks we worked from sunrise to dark and squared things up. The soil is sandy—sand would almost better describe it—so the cleaning of the garden went rapidly as such

soil is easy and clean to work. I took the trees under my wing and cut and pruned for nearly a fortnight, several hundred trees from fruit to big forest tree and tamarisk hedges. The garden more or less ready and a man planting seeds, etc. (for the season was well advanced) we got going on the house. To me fell the role of carpenter, plumber, electrician, blacksmith, painter, and mechanic, and it was a great pleasure to do the work I had for years done for bread and butter, for pure love. We decided that we had officially finished our task about the tenth of September and then went to La Rioja to arrange, and catalogue the Calchaqui Indian antiquities in the nice little museum of the Monastery of San Francisco (de Solano). This took us about a week, and since then I have returned for a further period of six days, living with the monks, and have camped out collecting in the Mogotes, about three hours on horseback from here. The Mogotes is a great fault of red sandstone, comparable only to the Canyon Colorado of the States, but on a smaller scale. The first time I went there we spent a whole day looking for a path up one of the cliffs in order to rediscover an Indian cemetery but without luck. The earthquakes which are of frequent occurrence here have probable destroyed it. There was only a single track up, the latter part of which necessitated the use of a rope. As the fault is about ten mile long and every half kilometre, more or less, there is a deep gorge running back into it, we had to explore all the most likely of the latter. The rock formations are fantastic and the whole place covered with thorny scrub and giant candelabra cactus. Eight hours in the saddle riding through this mess left us in rags and with hands, face, and legs above our boots a mass of bloody scratches. In many places No. 1 in the Indian file had to cut a way through, and often in the gorges there was so little room to pass fallen rocks, many weighing hundreds of tons, that one had to draw ones knees up to get through. The last gorge we entered had perpendicular walls running four or five hundred feet skywards and we rode along the dry bed of a stream, a square trough cut in stone, till suddenly in one of the many bends we found ourselves confronted with a solid wall of rock, unscalable except by ladders, nearly 100 feet high. Massive rocks balanced on needle points are everywhere, with natural bridges, curious face or animal like sculptures, and over all vegetation. Looking South is a sea of low forest as far as the eye can see, level, and shading in the distance to the blue of a sea. On another occasion I went into the Sierras behind La Rioja and found a spot where the vegetation is not the vegetation of this Province, but a more sub-tropical vegetation reminiscent of that of Salta and Jujuy, a spot where *L'hyciodes* arose in their dozens every step one took along the damp mountain paths, where *Pyrameis* covered the flowers till they almost drooped under the unusual weight.

In a few days I am returning there to spend a week collecting. Every stone had beetles and other insect life under it. I have never seen such profusion anywhere before; it is of the tropics rather than of this arenaceous province. I make a lot of excursions around and have mentioned only the two most interesting so far. At the end of this month or in early December, before we go down to Bs. Aires, I am probably going to collect for a few days on Mt. Fanatina up North behind Chilcito, a mountain we can see from here on clear days that rears its head some 20,000 feet. I want to collect as high as

mountain sickness and my little mountaineering skill will permit, as it has never been collected as far as I know above the 2000 m. line. Since September 15th I have set about 4000 insects, as apart from what I catch we get parcels sent from collectors in other parts of the country. There are now 1000 beetles due from Misiones and there is still a great part of a collection of 7000 made in the '90s to come along. The latter collection of beetles—almost all unprepared—were packed in sawdust and so beautifully and freshly preserved that after one or at most two days relaxing they were ready for setting.

I rise daily at 5 a.m. and bathe in one of our tanks which is about 11 yards diameter and 4 ft. deep, and continue working in the laboratory or collecting till 6.30 or 7 p.m. We have breakfast under the trees at about seven, lunch about 11.30 and then dinner outside at 7.30 p.m. Play cards, etc., after and bed between 9 and 10. My working day averages 12 hours net, and I wish it was longer. But I am perfectly free to work or play as I like and am more in the position of a guest than of an employee. For this reason one works with much more "ganas" as they say in this country, and I grudge every minute I cannot be at it. Naturally one gets through a great deal of work every week.

The country here is sandy, covered with low scrub of thorns with a few bigger trees such as quebracho blanco (no red quebracho here as in the Chaco), algarobo, a few tala, etc. The main bush in the "open" is a resinous one called "jarilla" (*Larrea divaricata*) which gives out a pleasant resinous odour in the early mornings, whilst in the more scrubby parts there is much "lata" (*Mimosa carinata*), "chañar" (*Gourliea decorticans*), "albaricoque" (*Ximenia americana*), and a luxuriant bush called "Pub-puch." The most beautiful from a colour point of view is the pale pea-green trunk of the "brea" (*Cercidium praecox*). All these trees have yellow flowers which is the predominant flower colour here. The flowers of the cactus immediately around here are whites, or creams, or pink-tinged white, except one which is palest lemon yellow, and further afield another of the same group with deep flame orange flowers which I brought in only last Tuesday. A form of tobacco plant grows in great profusion and its scent makes the air heavy and sickly at times, whilst in the gardens we have hedges as well as many trees, of *tamariscus*, which with a few "paraiso" or Persian lilac, are now in flower and overpoweringly scented. About 95% of the wild bushes are heavily and brutally spined and forest riding is painful and no pleasure, when amongst such thick undergrowth as we often have to traverse. It is a country without water except after a heavy rain when the numerous dry river beds become foaming torrents. This estancia has sweet water piped from the springs about 2 miles off in the "salitre," whilst brackish water from the same source is run in a small ditch for no less than 20 Km. through the estancia, and coming from springs (almost certainly from an underground river whose source can be traced throughout the republic from Preú to Sth. of Bs. As.) never fails. The "salitres," which abound, are curious areas of ground completely covered with salt crystals so as to appear like snow, even the bushes and such like that manage to grow there are rimed with these crystals as with hoar frost. Anything left lying about soon becomes crystal covered and walking over such salitres is

like walking over grass that is heavily covered with hoar frost, the salt crunching underfoot and one's footprints remaining. In our own personal "salitre" there runs a stream from some of the many untapped springs that are found there, and it shows black like a stream in snowtime. Growing on this white expanse are many bushes especially a primitive species that has no leaves but is built up of a series of cells, and on the ground in what appear at a distance like patches of blood is a small ground plant of deep red colour. There are other wild flowers such as various convolvulus, yellow daisies, a small white ground flower that sometimes grows to profusion and attracts *Pyramis*, Malva, an occasional petunia, and a few others I do not know. At the estancia we have a good deal of alfalfa which produces *Colias lesbia* in sufficient numbers, and many moths. I have started a personal collection of the micros and pyrales, two groups as yet uncollected in this country.

It is a wonderful life without a worry: Insects all day and all night if I wish. Travelling in strange parts, riding, living all day and sleeping most nights either under the sky, or if within, in the airiest of rooms. Never a coat or collar except on the rare occasions we enter a town, and absolute freedom.

La Rioja, is a wonderful old town, partially destroyed some years ago by a disastrous earthquake, it still retains the charm I have always associated with the villages of Southern France. Quiet and sleepy, never any hurry, either in speech or deed; the quaint old streets lined with orange laden trees, with apricot in flower, mingled with the quaint "samuhi" or "palo broacho," and always a vista of tall blue mountains to close the gap. Water runs in a trough down the cobbled avenida, and peasants in bright coloured garments ride in on their donkeys to sell their chickens and vegetables. Motor-cars have made their appearance but are few, and the old "cocher" still plies a fairly lucrative trade. Living in the monastery and feeding with the Brothers was a thing not easily to be forgotten, the quietness of the cloisters around the coloured garden where St. Franciscano planted the famous orange tree that died but in 1916, and from which a single cutting was persuaded to grow, now a flourishing tree before the door of the cell that the Saint himself built with his own hands and occupied in the early days of the Spanish regime.

Some American Immigrants.

By J. W. SAUNT, A.L.S.

The periodic occurrence in American Ash of quantities of larvae of the two American beetles, *Neoclytus erythrocephala*, Fab. and *N. capra*, Say., especially the former, bring forcibly to our notice the huge amount of destruction caused to this timber, and consequent loss to the Motor Manufacturers of this country, which, at a very modest estimate must run into hundreds of pounds per annum, not only in the actual loss of the timber itself but also in wasted labour owing in many instances to the damage not revealing itself until after the coach pillars have been operated on several times. Naturally the borings of these beetle larvae have a weakening effect, which often renders the material quite useless for what it was intended, maybe a

hinge or a shut pillar of a Saloon Car, in consequence it is usually scrapped, as no Motor firm, with a reputation to maintain, would sanction its use. It is not unusual to find living larvae, pupae, and perfect beetles in one piece of timber, curiously enough the latter vary considerably in size, and although on some occasions they may be found wandering about the sawmills on their emergence there appears to be no sign of them getting established in this country.

Another American beetle of very much rarer occurrence is *Tylonotus bimaculatus*, Hald. Fortunately the larva of this species is not of a real destructive nature, it does not penetrate the interior, but usually feeds between the bark and the solid wood.

We occasionally meet with borings in the Ash, which remind us of our familiar *Cossus* workings; several times I have met with empty pupae cases and twice I have had the living moths brought to me just after their emergence. These turned out to be ♂ and ♀ of the North American Goat Moth, *Prionoxystus robiniae*, Boisd. On one occasion I had a pupa of this species brought to me that had been clean cut through with a tenoning machine as it lay in its gallery, only the abdominal segments being left. Being a bit disappointed I simply put it aside in a tin box and forgot about it for the time being; however, the next morning the man came along to see if it was still alive. Imagine my surprise to find on moving the box that it was still alive; although gradually getting less each day, reflex action was shown for nearly six days and to my certain knowledge for 140 hours.

Once I found some larval termites tenanted a hole in a piece of American ? Oak.

Another surprising find some years ago was living specimens of the bee *Nylocopa virginica* ready to emerge from their chambers in pieces of American Whitewood.

Some weeks ago I met with another immigrant I had not seen for a year or two, *Camponotus herculeanus*, L. subsp. *pennsylvanicus*, Retz. On this occasion there were 14 living ♀s. A week ago I took 2 soldiers and 3 ♂s. Donisthorpe "British Ants," 2nd edition goes into details of its occurrence here in numbers in 1922-24, also the occurrence of *Camponotus (Myrmentoma) caryae*, A. Fitch, subsp. *rasilis*, Wheeler, var. *parvidus*, Wheeler. *Pheidole megacephala*, F., var. *punctulata*, Mayr. and *Cremastogaster lineolata*, Say.—"EPPERSTONE," 119, BULLS HEAD LANE, STOKE, COVENTRY, November 13th, 1930.

Some Unusual Collecting Grounds, or Queer Collecting Places.

By T. F. MARRINER, F.E.S.

I remember once reading in a book written for young collectors that "you can find beetles everywhere," but not even the author of that book would think of looking for them in some of the strange places in which they at times turn up. I was at lunch one day in a café in a north country town, and tried a dish called 'Apple Charlotte' on the menu. I can recommend it. While I was busy over it I came across what I took to be an apple pip, which I pushed to one side. But I was stuck by the shape of that pip and finally after regarding it for some minutes, I idly turned it over. Looking more closely I felt

sure it was a weevil, so I tubed it. Later on when cleaned of the sugar, etc., it turned out to be a beautiful perfect specimen of *Anthonomus pomorum*, the apple weevil, only once previously recorded for that county. I told the proprietor I had found a beetle in my food, and he at once became profusely apologetic, but when I expressed pleasure, the poor fellow burst into a hearty laugh of amusement and relief that I was not making a complaint. Inquiry showed that the apples had come from Hereford, and apparently this particular insect had taken up winter quarters inside one of them.

I once accompanied a party of ladies and gentlemen on a day trip to the famous gully at Ravenglass. There were other naturalists in the party but I happened to be the only coleopterist and some of the curious ones became interested in my sweeping, etc. But the sight of some of the creatures in my net was enough to make them keep a respectable distance from me. The ladies, especially one, were horrified at anyone collecting beetles, or handling them. Later in the day some of the party went for a trip by the tiny railway up the Eskdale Valley, where Fowler records finding, *Phyllotreta sinuata* (E.M.M., 1912), the only Cumberland record. As the tiny train moved along the lady to whom insects were such an abhorrence put out her hand to point out something of interest when 'THWACK' her hand closed mechanically, she looked, and fainted. One of the gentlemen present opened her hand and took out a fine specimen of the cockchafer *Melolontha vulgaris*, which was afterwards handed over to me in a match box. The lady never really saw what she had caught until months later when she was persuaded to view it mounted and labelled.

Some years ago along with Mr. James Murray, I was collecting in Dumfriesshire. Wishing to know what had been recorded for the area, I wrote to my friend Mr. Bertram McGowan, of Dumfries, who is busy compiling the County Lists. He sent me the Coleoptera List as far as it was completed and on opening it I found almost the third entry read:—(*Carabus granulatus*: found one specimen in an empty whisky bottle!) Now would anybody but a Scotchman ever think of looking into a discarded whisky bottle? Why did he do so? What did he expect to find? not a *Carabus*, certainly. Again "what was *granulatus* doing there?" Have the Scottish *Carabidae* become the victims of the vice so often imputed to their country? Truly, "beetles can be found everywhere."

Our Editor prints this small contribution at his own risk. There must be many such curious experiences, but somehow collectors seem very chary of telling about them, lest they be deemed frivolous. Is it the presence of specimen boxes filled with corpses, which seems to cast a gloom over so many Natural History Meetings? Or is it that we take ourselves too seriously to permit those little touches of humour, of which nature is full, to peep out now and then? I was once called to order by a Rev. naturalist in a reply he made about a happy meeting we had left, for stating "Yes, your true naturalist is only really happy when he looks really miserable."

Coleoptera found in the " Birch-bracket " fungus, *Polyporus betulinus*.

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

Having read with considerable interest Dr. Nicholson's account of the capture of *Enicmus consimilis*, Mann. in *Polyporus betulinus* in Sherwood Forest, etc., I endeavoured to find it in the same situation at Windsor. In this I was not successful, although there are several places in Windsor Forest where old birch trees and this fungus occur in abundance. A number of other species of beetles, however, was taken, and it seems worth while to record them here:—

Oxyptoda alternans, Gr., *Phloeopora reptans*, Gr., *P. angustiformis*, Baud., *Atheta cuspidata*, Er., *A. aquatica*, Th., *A. reperta*, Shp., *A. inoptata*, Shp., *A. humeralis*, Kr., *Agaricochara laevicollis*, Kr., *Epipeda plana*, Gyll., *Leptusa fumida*, Er., *Homalium vile*, Er., *Phloeochæris subtilissima*, Man., *Orthoperus mundus*, Mat., *Adalia bipunctata*, L., *Dacne humeralis*, F., *D. rufifrons*, F., *Ditoma crenata*, F., *Rhizophagus bipustulatus*, F., *Enicmus minutus*, L., *Cryptophagus dentatus*, Hbst., ab. **major**, n. ab. considerably larger than the typical form and of a bright chestnut colour. Long 2.5-2.8mm. It was rather common in " birch brackets " and I have also found it in " sulphur bracket " *Polyporus sulphureus* and other fungi; Edmonds has also taken it in the Totnes district. In the field it looks very distinct. When my friend Colonel Deville was with me at Windsor, we took this form in some fungus, and even he was taken in, and thought it was a very rare species. When he had it to examine, however, after it had been set, he informed me that he could not separate it from *C. dentatus* by any definite characters. *Litargus bifasciatus*, F., *Cis bidentatus*, Ol., *C. fuscatus*, Mel., *Rhopalodontus fronticornis*, Pz., *Ennearthron cornutum*, Gyll., *Octotenus glabriculus*, Gyll. and *Tetratoma fungorum*, F., rather abundant. Earlier in the year we found over a dozen *Carabus catenulatus*, Scop., crowded together under a " birch bracket " on a fallen birch.

It seems curious that the " birch-bracket " beetle *Thymalus limbatus*, F., does not appear to occur in Windsor Forest.

On the Generic Names used by Freyer in the *Neuere Beiträge*.

By L. G. HIGGINS, F.E.S.

In the November number of this Magazine, page 145, Mr. Warren raises the question of the validity of Freyer's generic names in a note on *F. eriphyle*, Fr. His conclusion is of considerable importance as it affects the nomenclature of all the numerous species described by Freyer. As there is certainly another point of view I do not think his note should be allowed to pass without comment.

Freyer's nomenclature is certainly rather confusing but at least it is consistent. The heading to the description of *eriphyle* is written as follows:—

GEN. VIII HIPPARCHIA

325 Pap. eriphyle

This principle is adopted throughout the *Neu. Beiträge*. A " genus " is cited which is that used in the *Systema Glossatorum Europae* of Oehsenheimer, but in the binomial terminology, *i.e.*, the combined generic and

specific names, the ancient genera are employed practically identical with those used by Fabricius in the *Systema Entomologiae*.* On the Plates and in the indices and Supplements the Fabrician genera *only* are introduced; all the Butterflies including the Hesperids are included under *Papilio*. The more up-to-date terminology of the period, with Ochsenheimer's generic names used binomially in association with the specific names is only found in a few supplements where Freyer published letters received from his correspondents, principally Fischer von Roslerstamm. In these cases of course the nomenclature used is that employed by the author in question for which Freyer was not responsible. With these exceptions there is positively not a single instance in the book of any binomial including Ochsenheimer's generic names.

From these considerations I am led to regard Freyer's use of *Hipparchia* in the example given, not as properly generic but as closely analogous to that of the Linnean phalanx, and further that as the word is not found anywhere in the book combined as a binomial with the specific name, but that on the contrary the older *Papilio* is always used, that this action was intentional on Freyer's part. It follows therefore that *Papilio* is the genus under which *eriphyle* was described, and in this case the name must fall to *P. eriphyle*, Stoll, 1782 as a homonym. It is very unfortunate that Freyer used such an old-fashioned terminology but the facts cannot be ignored.

Newly described forms of British Lepidoptera.

Melitaea cinxia, L. ab. *jubilans*, Cab. nov. ab. Bonlieu, Belgium *Lamb.* (1930) 122. On the underside of the hindwings, the black dots in the yellow median band are so much developed as to form an almost continuous wide line of spots and very striking in appearance.

Aporia crataegi, L. race *fert*, Trti. nov. r. In the male the nervures of all the wings are shaded at their extremities with black forming obscure elongated triangles, but not so extreme as in the *augusta* of Sicily. In the lower wings the nervures are more thickly covered with black than in *augusta*. The female differs from those of all the other forms of *crataegi* by having all four wings hyaline, semitransparent, and of an obscure brownish colour with yellowish green powdering at the apex of the forewing and costa, as well as along the dorsal margin, the scaled portion of the hindwings is decidedly of a yellow colour above. *Mem. Soc. Ent. Italiana.* (1930) IX. 197. I. of Rhodes.

Argynnis aglaia, L. ab. *ovalis*, Dr. Mezgeri nov. ab. Warchenne, Belgium. *Lamb.* (1930) p. 179. On the upper-side of the forewings the lower median black spot (along the inner margin) is produced, widened and of an oval shape.

Papilio machaon, L. ab. *cellacircinata*, Mezger. nov. ab. Urals. *Lambill.* (1930) p. 179. The inner costal spot forms a perfect circle of an intense black, and thus becomes more conspicuous than the exterior costal spot.—Hy. J. T.

* The chief difference is that *Geometer* is used in place of *Phalaena*.

SCIENTIFIC NOTES AND OBSERVATIONS.

"EVIDENCE THAT BOMBI SEEKING THEIR NEST ARE GUIDED BY THE RECOGNITION OF LOCAL FEATURES."—I don't know why the above heading is put in quotation marks by Mr. Donisthorpe on p. 153, but the fact that not only *Bombus* but also *Vespa* and *Apis* are also dependent on sight for finding their nests is well-known to students of the habits of these groups. Beekeepers know quite well that if a hive be moved only a few feet from its usual place its inhabitants will have great difficulty in finding it, and in some cases cannot find it at all, on their return home. This is because its position relative to the other hives, if any, or other adjacent objects has been altered. In the case of *Vespa*, when the queen has found a cavity suitable for her future nest, the first thing she does on emerging from it is to familiarise herself with its surroundings in order to be able to find it again. This she does by flying to and fro in front of it in ever-widening axes with her face to the entrance, finishing up by a general survey of the surroundings. Every wasp that emerges subsequently from the nest for the first time has to go through the same process. Similarly if one removes a wasp-nest from its original site, whether under or above ground, and instals it in the garden, say, for convenience of observation, the wasps on emergence at once appear to recognise the change and go through the usual "study-routine," as I have repeatedly observed in the case of those nests I have brought home from time to time and established in boxes in the garden. When taking the nests I have often noticed, when I have had to clear away sticks, stones, tufts of grass, or other obstructions, that the returning wasps were just as perplexed as Mr. Donisthorpe found the bees were under similar circumstances and they had to search about for some little time before they found the entrance to the nest, and even then it was obviously only by accident that some of them succeeded.

I wonder if any of the Dipterous larvae Mr. Donisthorpe found in the bees'-nest were those of *Volucella*. *V. pellucens* larvae are very common in the cavity below the nests of wasps and I have a list of some 150 other species of various Orders that have been found in these nests.—C. NICHOLSON, Tresillian, Cornwall.

NOTES ON COLLECTING, etc.

EPIONE PARALLELARIA IN SUSSEX.—I took one specimen of *Epione parallelaria* at Storrington on September 29th, 1930, surely the date is unusual. The long-horned grasshopper *Pholidoptera griseoptera* was very common here at the end of July and during August. *M. thalassinum* and *L. punctatissima* also occurred, but were much less common.—(Geo. S. ROBERTSON (M.D., M.R.C.S.) Struan, Storrington, Nr. Pulborough.

[South gives July and August and notes that "the species is a northern one," although odd specimens have been recorded from Arundel (Sussex).—Hy.J.T.]

CURRENT NOTES AND SHORT NOTICES.

Will Fellows of the Entomological Society please note that the date of the Annual Meeting has been wrongly given in all publications. It should be Wednesday January 21st and not as advertised. It is rather unfortunate that the Verrall Supper and the Annual Meeting will not this year come on successive evenings.

A meeting of the Entomological Club was held at Durandesthorpe, 19, Hazlewell Road, Putney, on October 14th, 1930, Mr. H. Donisthorpe in the Chair. Members of the Club present in addition to the Chairman, were Mr. Robert Adkin, Professor E. B. Poulton, Mr. J. E. Collin and Mr. W. J. Kaye. Visitors present. Major E. E. Austen, Messrs. R. B. Benson, K. J. Blair, Dr. K. Jordan, Mr. F. Laing, Mr. G. C. Leman, Capt. N. D. Riley, Dr. Hugh Scott and Mr. W. H. T. Tams. The guests were received by Mr. and Mrs. Donisthorpe at 6.30 p.m. and tea and light refreshments were served in the drawing room. The Chairman's collections were on view and the special exhibits consisted of:—Myrmecophilous insects, Entomological Albums and Pilot files showing the system of recording all the Windsor captures of coleoptera made by the Chairman. Supper was served at 8 o'clock, and a most enjoyable evening was spent.—H.W.-E.

A meeting of the Entomological Club was held at the Museum, Tring, on Saturday, November 15th, 1930, Lord Rothschild in the Chair. *Members present.*—Lord Rothschild, Mr. Robert Adkin, Mr. H. Donisthorpe, Professor E. B. Poulton, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin and Mr. W. J. Kaye. *Visitors present.*—Major E. E. Austen, E. C. Bedwell, K. G. Blair, W. T. Calman, Dr. E. A. Cockayne, Dr. F. A. Dixey, S. S. Flower, J. C. F. Fryer, Philip P. Graves, E. Ernest Green, A. Hall, Capt. A. F. Hemming, Dr. A. D. Imms, Dr. K. Jordan, G. C. Leman, John Levick, Sir Guy K. A. Marshall, Dr. S. A. Neave, William E. F. Nelson, Louis B. Prout, W. Rait-Smith, Capt. N. D. Riley, W. H. T. Tams, Hy. J. Turner, Com. James J. Walker, C. J. Wainwright and Rev. George Wheeler. The guests arrived throughout the morning and those who did not come by car were met at the station and conveyed to the Museum where a magnificent show of certain sections of Lepidoptera were on view. Lord Rothschild had two exhibits:—(1) On the tables of the bird room the Noctuids of the British collection were displayed in 137 drawers containing some 25,500 specimens. The British collection of low-set Lepidoptera is kept separate from the general collection, but the latter contains additional British specimens, all-high-set. The Lepidoptera are accompanied by their hexapod parasites. Many of the parasites have actually been bred from the specimens with which they are placed; others have been put in because they are known to infest the respective species. The parasites as a whole must not be regarded as records. (2) In the Insect department the "swallow-tails" comprising the genus *Troides*, Hubn. 1820, usually called *Ornithoptera*, Boisd. 1832, were exhibited in 147 drawers, the collection consisting of 2,960 imagines, 41 pupae and 27 larvae. The genus is confined to the Oriental Region, occurring from Ceylon, Kumaon and China to the Solomon Islands and in Australia southward to the district of Brisbane. The black and yellow species are essentially Malaysian while the species with metallic green or blue forewings and

golden hindwings are Papuan, recalling the Birds of Paradise of the some subregion. Luncheon was served at 1.30 after which the guests again retired to the Museum. This very enjoyable and instructive meeting of the Club came to a close in the late afternoon, when those guests who required it were conveyed to the station and the remainder left in their own cars.—H.W.-E.

A meeting of the Entomological Club was held at the Junior Carlton Club, Pall Mall, S.W. on Tuesday, December 2nd, 1930, Mr. H. Willoughby-Ellis in the Chair. *Members present.* Mr. H. Willoughby-Ellis, Mr. H. Donisthorpe, Mr. J. E. Collin, Dr. H. Eltringham, F.R.S. *Visitors present.* Major E. E. Austen, Mr. K. G. Blair, Dr. E. A. Cockayne, Mr. E. Ernest Green, Capt. A. F. Hemming, Dr. A. D. Imms, F.R.S., Dr. K. Jordan, Mr. G. C. Leman, Mr. R. W. Lloyd, Sir Guy A. K. Marshall, F.R.S., Dr. S. A. Neave, Capt. E. Bagwell-Purefoy, Mr. W. Rait-Smith, Capt. N. D. Riley and Mr. W. H. T. Tams. The members and visitors were received at 6.30 p.m. in the large ante-room adjoining the dining room where a conversazione was held until dinner was served at 8 o'clock in the Parliamentary Library on the historic round-table at one time used by Lord Beaconsfield and his Cabinet. The meeting broke up at a late hour.—H.W.-E.

On December 5th a portion of the long projected extension of the Natural History Museum, South Kensington was formally opened. The money for its erection, over £20,000, has been given by the Empire Marketing Board to form an additional section to afford increased facilities for entomological research. It consists of four floors and is approached by a corridor commencing near the whale room, access to the departments being by stairs and a lift. The "other orders" which hitherto have been housed along the southern basement west, have already taken up their new quarters, and the section devoted to the lepidoptera which has been so over congested of late years, will be extended along the whole western basement. These extensions will necessitate increase of staff for which, we understand, financial arrangements have been made to begin in the present year. The building has been carried out by the Office of Works. At the opening ceremony Dr. Tate Regan, F.R.S., Director of the Museum, explained the aims and main business of the museum and its usefulness to the whole empire; Mr. Ormesby-Gore M.P., representing the Empire Marketing Board, showed how much the empire depended even for its existence, upon entomological research, and Sir Lionel Earle, representing the Office of Works, said that the time had now come when further building developments were essential for the proper carrying out of the functions of the museum. The Archbishop of Canterbury, in accepting the gift on behalf of the Trustees of the British Museum, expressed their thanks to the Marketing Board for their gift and to the Office of Works for their help.

A publication came to hand at the beginning of last year which we unfortunately overlooked, and that was the Jubilee Number of the *Mitt. Münch. Ent. Gesell.* It consists wholly of original articles with 28 black and white plates and numerous text figures, all dealing with Lepidoptera, by members of the Society, and many new species and forms of the Palaearctic Region are described and mostly figured. The Society are to be congratulated on this record number. We would

particularly like to call attention to the very fine work done by Dr. F. Heydemann in his Monograph of the sub-genus *Dysstroma* of the genus *Cidaria*, with nearly 150 figures of imagines and a large number of morphological details.

In the *Ent. News*, 1930, p. 258, our valued correspondent Capt. K. J. Hayward contributes a series of records made by himself of the "Night Flight of Diurnal Butterflies," some sixteen in number. The writer urges that in addition to the name of the species, the date and time, the record should contain details of atmospheric conditions prevailing at the time and the recorder's suggestions as to any possible causes of such unusual behaviour.

In the same number p. 277 is an obituary of Mrs. Anna Botsford Comstock perhaps the greatest of women entomologists of the United States. She was 76 years of age and for many years had illustrated the volumes which Prof. Comstock brought out, having acquired the art of engraving expressly for that purpose.

Fascicule II. of vol. VIII. of the *Mem. Soc. Ent. Italiana*, contains a monograph of the Italian species of the genus *Pterostichus*.

Fascicule II. of vol. IX. of the *Mem. Soc. Ent. Italiana* contains some interesting and useful articles. Count Turati contributes an article dealing with a collection of Lepidoptera made in the Island of Rhodes and describes several new forms. The long and well illustrated article by Paoli on the association of Ants with the Acacia is concluded. Other articles deal with the *Halictus* (Hym.) species of N. Africa and with a new species of *Mymaridae* from the same region.

A series of articles on the variation in *Colias croceus* (*edusa*) which has been going on in the more recent numbers of the Belgian magazine *Lambillionia*, is now concluded.

The ab. *melanira* described in 1922 to *Brenthis aphirape*, Hb. has now been met with in the f. *havercampfi*, also at Hockai, Belgium.

The concluding part of the *Stett. Ent. Zeit.* for 1930 has a comprehensive article dealing with *Nonagria neurica* from all points of view, clearing up the uncertainties which have accumulated around it for many years among collectors. A plate is given of the various forms but unfortunately the white transverse crest the critical marking only shows distinctly in one of the 4 figures of typical *neurica* which are given. The article would have been more useful if the writer, Dr. Urbahn, had stated in tabular form at the end, the exact relationships of the various names, as we did in our Notes on the British Noctuae.

SOCIETIES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquitt Street, Liverpool, Tuesday, 21st October 1930, Mr. R. Wilding, *Vice-President*, in the chair. In conformity with the usual custom the first Meeting of the new session was devoted to an exhibition of the results of the past season's collecting and the number of species represented in the various exhibits was unusually large.

Mr. B. H. Crabtree alluded to the continued extension of the range of *Polygonia c-album* and brought a nice bred series of the insect from Wye. He also shewed specimens of *Euchloë cardamines* from the same

locality and *Papilio machaon* (bred) from Norfolk; from the New Forest a series of *Brenthis selene* including two very fine varieties of the female sex, *Coenonympha pamphilus*, *Eulype hastata*, *Cochlidion testudo* and a bred series of *Lymantria monacha*; a series of *Zygaena minos* from Abersoch and of *Caenonympha davus* from Whixall.

Mr. R. Tait exhibited—from the New Forest bred series of *Lymantria monacha*, *Calymnia trapezina*, *Catocala sponsa* and *Zephyrus quercus* and captured series of *Eulype hastata* and *Cochlidion testudo*. From Monkswood series of *Aplecta advena*, *Cymatophora* or and *Thecla pruni*. *Dianthoecia albimacula* bred from Sussex pupae, *Clostera reclusa* from Tilgate Forest and *Cucullia verbasci* bred from Church Stretton larvae.

Mr. W. Mansbridge exhibited—*Euchloë cardamines*, a small race from Dovedale. From Formby, bred specimens of *Cerura furcula* and *C. bifida*, *Lophopteryx camelina*, *Notodonta tremula*, *N. dictaeoides*, *N. dromedarius*, *N. ziczac* and also *Spilosoma fuliginosa* bred from hibernated larvae; *Noctua umbrosa*, *Agrotis cursoria*, *Luperina testacea* (melanic variety), *Plusia chrysitis* and a specimen of *Xanthia fulvago* var. *flavescens*, all from ragwort, Formby. A series of *Tephrosia punctularia* from Cannock Chase. *Perizoma flavofasciata* (*Emmelesia decolorata*, a specimen bred from birch*, Formby, and from the same locality *Eupithecia rectangulata* and var. *nigrosericeata*, *E. pygmeata* and *Coremia unidentaria*, purple banded form; also, from Freshfield, a specimen of *Amphudasis betularia*, an intermediate variation.

Mr. H. W. Wilson exhibited—a bred series of *Plusia moneta* from his garden at Crosby. From the Lancashire sandhills bred series of *Lasiocampa trifolii*, *Cosmotriche potatoria*, *Cerura furcula*, *C. bifida*, *Pheosia dictaeoides*, *Saturnia pavonia*, *Dasychira fascelina* including a male specimen with almost scaleless wings, *Notodonta ziczac*, *Crocallis elinguaris* and *Elloppia prosapiaria*, and specimens of *Chaerocampa porcellus*, *Epunda lichenea* and *Epione apiciaria*. From Delamere Forest a bred series of *Geometra papilionaria*. From South Devon a series of *Melanargia galathea*, specimens of *Aphantopus hyperantus* var. *caeca*, *Acontia luctuosa*, *Craniophora ligustri*, *Euphyia picata*, *Acidalia immutata*, and from the same county bred series of *Lobophora rivetata*, *Mesoleuca ocellata*, *Xanthorhoe rivata*, *Selenia bilunaria* (3 generations), *Celastrina argiolus* and *Noctua c-nigrum*.

Mr. R. N. Snell exhibited a bred series of *Gastropacha quercifolia* from Wicken. From Devon a bred series of *Aporophylla australis*, specimens of *Polyommatus icarus*, showing underside colour variation, from Beer Head, a series of *Bombycia viminalis* and a specimen of *Agrotis lunigera* also from Devonshire. From Bromborough series of *Abrostola triplasia* and *Lygria associata*. From the New Forest a series of *Amphipyra pyramidea* and examples of *Catocala nupta*, *C. promissa* and *Asphalia diluta*. From Dolgelly *Taeniocampa miniosa*, *T. rubricosa* and *Xylocampa areola*. From Formby *Hydriomena impluviata*, and bred specimens of *Xanthorhoe galiata* from Caldý, Cheshire.

Mr. A. H. Williams showed series of *Colias edusa* and *Agriades thetis* (*bellaryus*) from Beer Head and two fine bred examples of *Lasiocampa quercus* variety *olivaceo-fasciata* from Wallasey.—H. W. WILSON, Hon. Secretary.

* Surely this is a slip.—E.A.C. and Hy.J.T.

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MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. January 21st. February 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. January 22nd (Ann). February, 12th, 26th.—Hon. Secretary, Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. Visitors admitted by ticket which may be obtained through Members or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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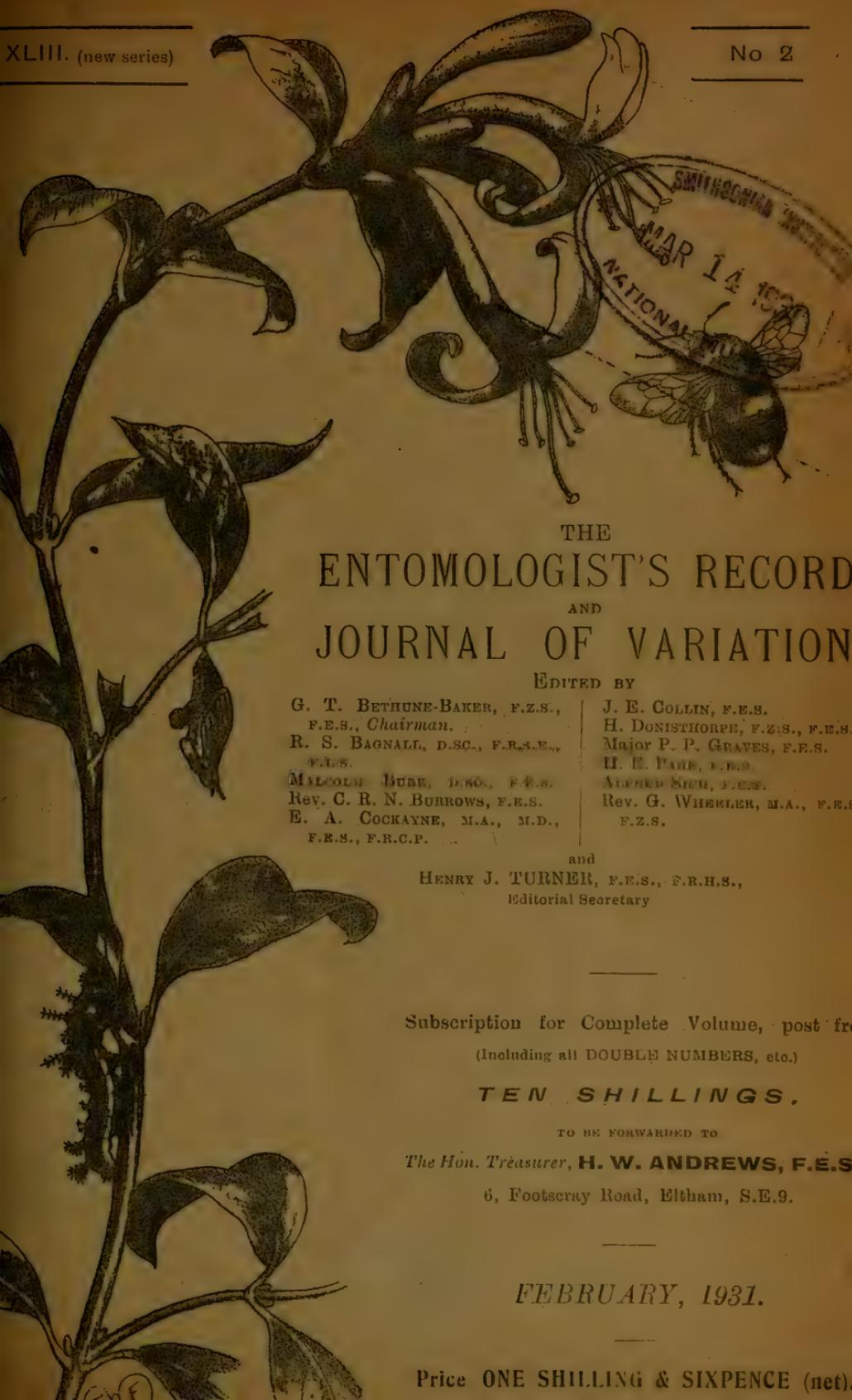
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The Cumberland Aleurodes.

By T. F. MARRINER, F.E.S.

The following list of the Cumberland County ALEURODES is the result of somewhat spasmodic work done at odd times in the intervals of other work since 1918. As all the records are my own, and as I have confined my attention, so far as the particular work is concerned, to the Northern portion of the County, the list cannot be looked upon as complete for the whole area. Again, my interest has been rather in the insects themselves and their life-histories than in their distribution, and once having obtained the necessary material, I noted the locality, but did not make a point of seeking out further localities.

Until quite recently all the species were classed under the one genus *Aleurodes*, and no little confusion has resulted from their separation into other genera. I have followed here a List very kindly supplied to me by Mr. Laing of the Natural History Museum, London.

ALEURODES.

A. brassicae, (Walker).—Fairly common in some years in gardens around Carlisle, but I have never known it to be so common as to be regarded seriously as a pest.

A. fragaria, (Walker).—Found a small colony of this on an old strawberry bed at Heads Nook, near Carlisle, in 1921, but have not come across it since.

A. loniceræ, (Walker).—Although I found this on honeysuckle just north of the Scottish Border line some years ago, it was only during this last summer, June, 1930, that I came across it on the same plant just within the Cumberland border near Longtown.

A. proletella, (Linné).—The imago is very similar to that of *A. brassicae* but there are great differences in the earlier stages. It is found on the greater celandine (*Chelidonium majus*). With me it has proved to be somewhat spasmodic in appearance, though when it does occur it seems usually to be in very big numbers. In 1927 it was very abundant wherever the plant occurred around Rockcliffe and Todhills, some three miles north of Carlisle, but in 1928, when wanting more life-history material, I could find no trace of it in either locality though I came across it at Burgh-on-Sands to the west of Carlisle, and at Wetheral to the east.

A. quercus, (Signoret).—This was first introduced to the British List by Dr. Harrison of Newcastle in 1918. I have records of it from Brampton, Naworth, Gilsland, and Corby; and there are Northumberland records from Corbridge and Hexham. One might almost conclude that the insect has spread from west to east, or from east to west via the Tyne Gap.

(I have recorded migrations of *Coccinellidae* from east to west in this way).

A. vibium, (Douglas).—I got sufficient material from some ancient currant bushes in a garden at Cumwhitten, near Carlisle, to identify this species, but have not come across it since 1925.

A. rubi, (Signoret).—This is one of the species found on bramble. It is not in the list sent me by Mr. Laing, but is so markedly different from the other species that one is not likely to mistake it. I have

taken it twice, 1921, and 1923, in each case at the same spot near Wetheral.

A. rubicola: (Douglas).—This is probably the most widely distributed species in the County.

S. spiraeae, (Douglas).—Not uncommon on the meadow-sweet (*Spiraea ulmaria*).

At present no two authorities seem agreed as to the placing of the next two species, and I give them under *Aleurodes*.

A. carpini, (Koch.).—Douglas places this under genus *Aleurodes*; the standard work, Quintance and Baker, does not classify it at all. Dr. Harrison of Newcastle, in the *Vasculum*, 1920, puts it under *Aleurodes* and then, in the same Journal, in 1921, he puts it under a genus *Asterochiton*. This last is probably a slip, as this is a South European genus, no species of which, so far as I can learn, has been recorded north of the Riviera area, and, except in the very mildest parts of the south country, it is not likely to be found out of doors in these Islands.

A. avellanae, (Signoret).—In the *Vasculum*, 1920, Dr. Harrison places this species under genus *Aleurodes*, and one month later in the *Entomologist* he gives it under *Asterochiton*. (See note above). This is the smallest of the known British species. The imago is a very pretty little insect. The larva and pupa are very difficult to detect on the leaves of the hazel, its foodplant. There is a lane some five miles south of Carlisle with almost a full hedge of hazel along both sides of it. It is one of the all too few remaining lanes not spoiled for the naturalist and the artist by the mutilations which seem to be the hobby of road surveyors, who cater for the speeding motorist. Here I have found this pretty little aleurode quite plentiful whenever I have looked for it.

The next two species on my list have been placed in genus *Siphoninus* by Mr. Laing. Others class them under *Aleurodes*. I follow Mr. Laing's classification.

S. immaculatus, (Heegen).—Is associated with ivy, and I have two records of it, one from Tarn Lodge, near Castle Carrock, and the other from the ivy covering of an old church wall in Carlisle.

S. phillyreae, (Halliday).—This will probably be our commonest species, for, except for life history material, I have never gone out to look for it specially, and have had no difficulty in finding it when wanted. I hope later to publish some notes on the life-history of this species.

The next genus on the list is represented by one species, and this and *A. brassicae* are the only two species which have claimed much attention in this country until quite recent years. This prominence was due to the fact that they forced themselves into notice as pests.

Trialetrodes vaporariorum, (Westwood).—This is a pest in the tomato house. Its sudden appearance in any place is probably due to its introduction on plants brought from other areas. I have had experience of this. I have several records of its occurrence around Carlisle. It is sometimes found on cucumber.

Tetralicia ericae, (Harrison).—I have some material got from cross-leaved heather near Croglin, at the foot of the Pennines, in 1926, which will probably turn out to be this species, but as no description has, so far as I know, been published, I cannot yet say.

Aleurochiton acerum, (Kirk). *aceris*: (Geoffrey).—This was fairly common on sycamore in three localities in 1928.

This list must only be regarded as tentative. I have material as yet unidentified, but which does not agree with any species description I have been able to find. There is a species I have found on the fig-wort (*Scrophularia aquatica*). This was very common in a locality near Carlisle in 1921, but as is, I think, often the case with the *Aleurodes* I could not find it there again until 1925, when it was again quite common. Before venturing upon a description of this species, I prefer to have fresh material, but venture to give the name *Aleurodes scrophulariae* for it. The same remarks apply to a species I have found abundant on elm (*Ulmus campestris*), both to the east and the north of Carlisle. On my first acquaintance I took it to be *A. avellanae*: (Signoret), but a later examination showed distinct specific differences, and the name *Aleurodes ulmi* will probably be found most suitable for it.

Notes on *Zygaena clorinda*.

By T. H. L. GROSVENOR and H. R. HEWER, M.Sc.

During a visit to Spain in June, 1927, Mr. Hugh Main collected some *Zygaena* in fields close to the railway station at Blanes, a small town about half-way between Barcelona and Palamos. He very kindly brought back and handed to the senior author (T.H.L.G.) two females and three males, which having been kept for breeding, were in a very dilapidated condition. Although many of the larvae were dead, sufficient numbers remained for breeding purposes. They were first thought to be *Z. trifolii* in one of its southern forms, but the peculiar behaviour of the larvae led to doubt as to its real identity.

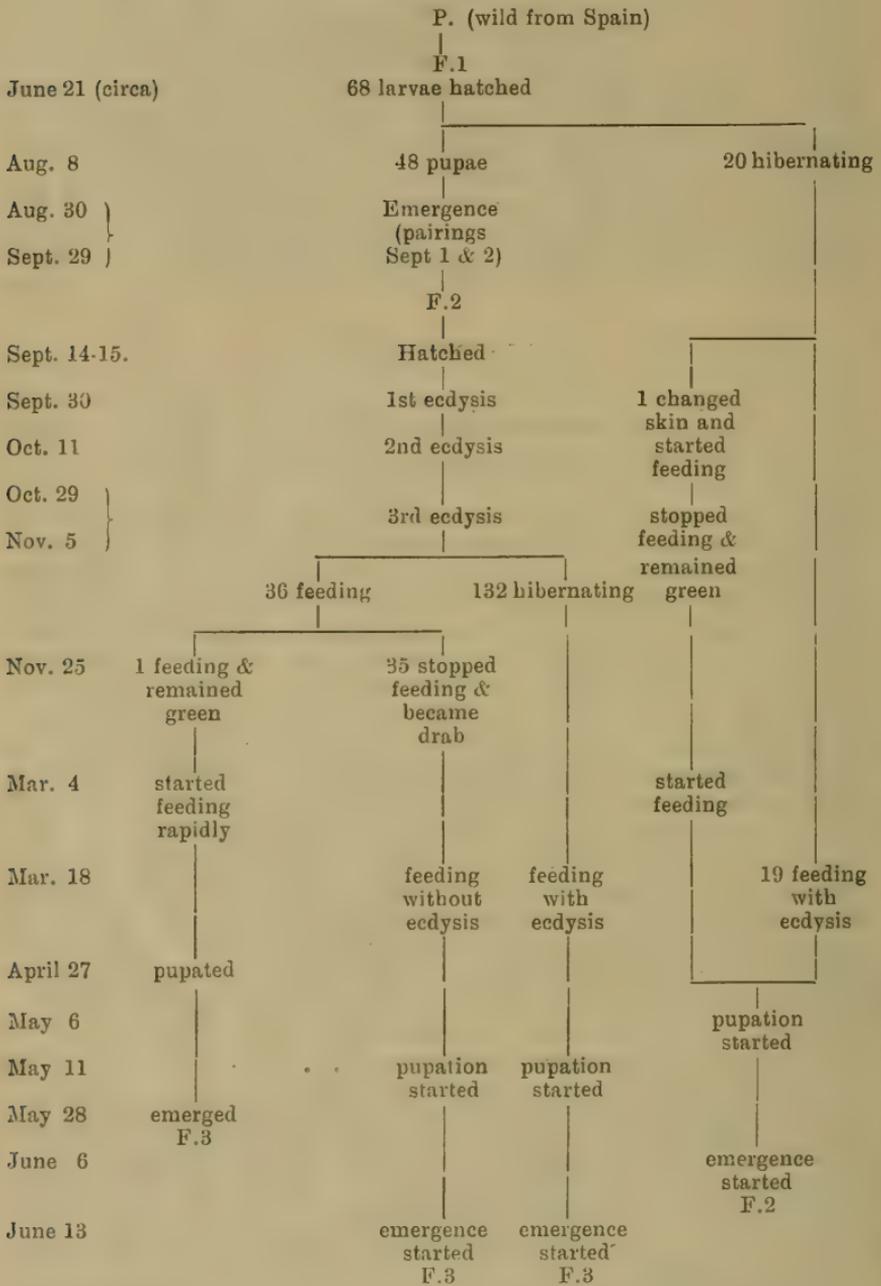
In the late autumn of 1925, Sr. Querci took some *Zygaena* at a locality referred to as Llobregat. These were described by Mr. Bethune-Baker (*Ent. Rec.* Vol. XXXVIII. 1926, p. 84.) as *Z. clorinda*, n.sp. Comparisons between the original specimens handed to Mr. Bethune-Baker and those bred from Mr. Hugh Main's specimens have led us to the conclusion that they are one and the same insect. The information derived in the course of this work adds considerably to the knowledge of this species and is detailed below under the appropriate headings.

DESCRIPTION OF LARVA (T.H.L.G.).

The larva is pale green generally, with a pale yellow dorsal stripe. A row of large double black spots is present dorso-laterally on each side with a tuft of black hairs between them on each segment. Just ventral and touching these spots runs a yellow lateral stripe, the colour much accentuated intersegmentally. Ventro-laterally there are a further row of double black spots and another row of black lines just above the legs.

Thoracic legs, brownish; prolegs, green; anal pair, yellow. A black ventral line between the legs runs the whole length of the body.

DIARY OF BREEDING EXPERIMENTS, 1927-28.



BREEDING RESULTS (T.H.L.G.).

The accompanying diary gives the main outlines of the breeding experiments. Several points are worthy of comment.

1. The high percentage of F. 1 larvae pupating and emerging the same season is very unusual in this genus. It is true that *Z. stoechadis* from S. France frequently gives rise to second-brood individuals, but these rarely exceed 5 per cent. of the total number of larvae.

2. Although 132 larvae of F.2 hibernated, some 36 continued to feed and as shown by one individual this must be interpreted as an effort to feed rapidly and produce a third brood within the season. It was probably individuals of this last brood (which occurs in nature) that were taken by Sr. Querci in October, 1925.

3. There was a general resumption of feeding about the middle of March by all larvae of F.1 and F.2. Measurements of the various groups on March 4th are:

F.1 (hibernated from August)	8.5mm. × 3.0mm.
F.2 (" " " October)	6.8mm. × 2.0mm.
" (" " " November)	4.9mm. × 2.0mm.
" (no hibernation)	14.0mm. × 4.0mm.

Full-fed larvae and the pupae of all four groups were all more or less of the same size:

	LARVAE	PUPAE
F.1 (hibernated from August)	20mm. × 4mm.	20mm.
F.2 (" " " October)	19mm. × 4mm.	21mm.
" (" " " November)	18mm. × 4mm.	25mm.
" (no hibernation)	18mm. × 4mm.	20mm.

Efforts to cross *Z. clorinda* and *Z. trifolii* were abortive, although pairing took place readily *inter se* under similar conditions.

THE GENITALIA (H.R.H.)

Mr. Bethune-Baker in his description of this new species makes reference only to the male genitalia. In unpublished work I have shown that the female genitalia may be used in this genus for specific differentiation, and sometimes appear to be more reliable than the male. This point aside however, Mr. Bethune-Baker compares the male genitalia of *Z. clorinda* with those of *Z. meliloti*. The only points in common between these two species as regards their external features are their size and the fact that there are five spots on the forewings, although some continental *Z. meliloti* have six. In their genitalia the two species are very distinct and the description given by Mr. Bethune-Baker for *Z. clorinda* actually applies equally well to *Z. trifolii* and *Z. lonicerae*. In fact *Z. trifolii*, *Z. lonicerae* and *Z. clorinda* are very similar and in the male grade into one another.

MALE ORGANS.

Except for one character apart from absolute size, these are identical with the male organs of *Z. trifolii* and *Z. lonicerae* (as found in Great Britain).

The *uncus* consists of two triangular flaps armed with bristles with no trace of the horns found in *Z. meliloti*, *Z. filipendulae*, *Z. achilleae*,

Z. rhadamanthus, *Z. fausta* and *Z. carniolica*. I have found the truncated form in *Z. trifolii*, *Z. loniceræ*, *Z. transalpina*, *Z. scabiosæ* and *Z. hilaris* as well as in *clorinda*.

Similarly the dorsal and ventral rasps are identical with those found in *Z. trifolii* and *Z. loniceræ* except for minute individual variations which occur in all three species.

In the *penis* and *oedeagal duct*, however, I find more or less diagnostic characters if sufficient specimens be examined. This duct is armed with spines in the more posterior part and with a peculiar pad of hairs in the anterior region. In all three species the spines are three in number; one long stout spine with 4-6 points on its sub-terminal edge; one long slender spine with 1-4 points at the tip; and one small spine consisting of one point only and no shaft. The first two spines vary to the same extent in all three species as regards the number of points. The single spine in *Z. trifolii* (British) is circular or oval in section, smooth and in all respects "thorn-like." In *Z. loniceræ* (British) it is laterally flattened and "blade-like," the tip being curved over and the concave edge, so produced, heavily serrated. In *Z. clorinda* I have found five specimens with a "thorn-like" spine and four specimens with a "blade like" spine. This is not diagnostic for *Z. clorinda* as I have found a similar variation in *Z. loniceræ* taken at Digne, Basses-Alpes, France.

The pad of hairs in the duct is poorly developed or entirely absent in *Z. trifolii* (British) but is fairly well developed and *always* present in *Z. loniceræ*. *Z. clorinda* agrees with *Z. trifolii* in having no pad (3 specimens) or only a poorly developed one (6 specimens). There is no high correlation between spine and pad as shown below, although this may be due to the small numbers available.

PAD	SPINE	
	THORN-LIKE	BLADE-LIKE
Present	4	2
Absent	1	2

The claspers of all three species appear identical within fairly narrow limits and conform to the description given by Mr. Bethune-Baker for *Z. clorinda*.

FEMALE ORGANS.

A full description of the female genitalia in this genus is in the course of preparation and will appear elsewhere, but sufficient can be said here to show that *Z. clorinda* is distinct from *Z. trifolii* and *Z. loniceræ*.

All three species have a broad but dorso-ventrally flattened *ductus bursæ*. The *ostium* or external opening is also broad but slit-like. In *Z. clorinda* the ostium is particularly broad and straight; in both the others it is considerably curved. In the posterior part of the ductus bursæ, that is close to the ostium, there are pockets on each side into which fit the oedeagal spines of the male during copulation. These pockets are well marked in *Z. trifolii* and in *Z. clorinda*. A diagnostic feature of *Z. clorinda* is found in the length of the ductus bursæ separating the ostium from the pockets. This is long (up to a quarter of the length of the ductus bursæ) in *Z. clorinda*, but quite short in the other two species.

The outside of the chitinised wall of the ductus bursae also shows specific differentiation. In *Z. loniceræ* it is quite smooth; in *Z. trifolii*, rough with chitinised ridges and peaks on it; while in *Z. clorinda* this roughness is grossly exaggerated particularly in the region of the pockets.

Both *Z. trifolii* and *Z. clorinda* have a dorsal ridge on the ductus bursae running longitudinally, but it is more marked in *Z. clorinda*.

The spermiduct connecting the ductus bursae and the oviduct is visible only in *Z. loniceræ* where its origin from the ductus bursae is almost lateral. In *Z. trifolii* and *Z. clorinda* its attachment is dorsal and so thinly chitinised as to be practically invisible among the ridges and waves of the wall of the ductus bursae.

The bursa offers characters only in connection with the spines on its wall. In *Z. loniceræ* there appear to be usually more than forty spines; in *Z. trifolii* there may be as many as in *Z. loniceræ*, but many specimens I have examined have none at all. *Z. clorinda* resembles *Z. trifolii*; five specimens have no spine but the other four specimens examined have 14, 20, 37 and 40 respectively.

A summary of the female characters is given below:

	SPINES IN BURSA	SURFACE OF DUCTUS	SPERMIDUCT	DORSAL RIDGE	POCKETS	OSTIUM TO POCKETS
<i>clorinda</i>	0-40	very rough	dorsal & invisible	present	strong	long
<i>trifolii</i>	0-40+	rough	„	„	„	short
<i>loniceræ</i>	40+	smooth	latero-dorsal & visible	absent	weak	„

WINGS. (H.R.H.)

Mr. Bethune-Baker in his original description says that *Z. clorinda* is "rather more densely scaled" than *Z. meliloti*. This is true, but he does not compare *Z. clorinda* with *Z. trifolii*, and although he mentions the dull black appearance and faint bluish tone in very fresh specimens he does not state how the estimate of freshness is made. I have examined the specimens in the British Museum and they do not appear to be very fresh. The specimens bred from Mr. Hugh Main's material exhibit the blue tone to a high degree and this was at first responsible for our regarding the moths as Spanish *Z. trifolii*. The difference between our specimens and those in the British Museum is somewhat marked but we do not regard this as significant owing to the different methods of obtaining the specimens.

THE POSITION OF *Z. CLORINDA* (T.H.L.G. & H.R.H.).

Owing to the vagueness of the original description of *Z. clorinda* it was difficult to be certain that we were dealing with the same species. One of us (H.R.H.) has examined the specimens deposited in the British Museum and there is no doubt that they are the same. By the courtesy of Mr. Tams, a preparation of the genitalia of one of the

females was made and this showed the distinctive characters outlined above.

As far as we can estimate at present the species is very close to *Z. trifolii*. The strong resemblances found between them in the female genitalia leave no doubt that they must be nearly related. The male genitalia are also very similar to those of *Z. trifolii* and *Z. loniceræ*. Wing-form and pattern also suggest *Z. trifolii* rather than *Z. loniceræ*.

The only fact against this conclusion is in connection with the larva. The black ventral line found in *Z. clorinda* is present only in *Z. jilipendulæ* among the *Zygaenæ*. This however must not be too much stressed, as larval characters (particularly colour) are commonly subject to "discontinuous" variation. Clear-cut structural features occurring in a number of species are often no indication of close relationship but rather of "parallel mutation." A reference to the two groups of *Zygaenæ* separated on the character of the uncus shows that this method of classification may lead to anomalies. (E.g., *Z. hilaris* and *Z. fausta*).

We therefore conclude that *Zygaena clorinda* is closely related to *Z. trifolii*, and is a distinct and true species.

Two Months in North Africa.

By COMM. WYNDHAM FORBES, R.N., D.S.O., F.E.S.

March 2nd, 1930, was too early for Ain Draham (800 m. above sea level); there were only a few hibernated large tortoiseshells and brimstones and an odd large white to be seen. Moreover it rained—it *did* rain. When the sun showed the woods were a delight of white heath, rejoicing both the eyes and the nose; and a few flowers of *Iris stylosa* and violet crocus, daisies, and a little *Cytisus*. There is a pleasant inn there, not too luxurious or expensive, which I marked for a future visit, and took the bus for La Calle, on the coast.

The road is interesting, cork forests, sprinkled with other sorts of oak, alternating with cultivated land and a village or two; but the wild predominating; the distant hills partly hidden in fog and rain. Ain Draham is said to boast of a rainfall of about 90 inches a year, most of which falls in November, February and March, very little or none in the late spring and summer months. The coast, though rainy, does not have nearly as much.

At La Calle we found sufficiently comfortable, though not luxurious, quarters. It is a pleasant little town, with a past, but I doubt if it has much future. There is a boat harbour, well protected, but closed by a bar in bad weather, and a certain amount of fishing goes on. Some cork is also sent away by rail, and a little wine grown, but that is about its limit. There is a cinema where we saw a film of unknown antiquity; I am not sure that the audience, who were enthusiastic did not interest me more than the film. I spent a very pleasant quiet fortnight there.

There are several places where the cork woods are within easy reach; I found *Callophrys rubi* race *ferrida*, Stgr. in some numbers. The males are not brighter than those I have from Spain, southern France, and Sicily, all of which are markedly brighter than my Greek examples, which latter are much the same as the English. The females are

however, notably paler and more brilliant than my European specimens. All these southern forms, except the Greek, seem to be a trifle larger than the English, but the material at my disposal is insufficient to draw a definite conclusion. *Pieris rapae*, *Pararge aegeria*, *Lycaenopsis argiolus*, *Gonepteryx rhamni* f. *meridionalis*, and *Anthocharis belia*, Lin. (= *eupheno*, Auct.) were also flying. *Rumicia phlaeas* and *Coenonympha pamphilus* very worn.

On March 15th I took one *Zerynthia (Thais) rumina* and three more during the following week; they are all pale yellow in ground colour, and have all a red spot at the base of the hindwing, which is not always developed in Spanish specimens. *Polyommatus icarus* race *celina*, Austaut, also appeared about this time, the female blue to the margin.

On the 17th I began to find *Thestor ballus*; they were never numerous; I took four of each sex, and saw no others.

I paid another short visit to Ain Drabam, where winter still reigned and thence west to El Kantara on the 1st of April and stayed till the 13th. The hotel there is good and comfortable but the food monotonous and inclined to be overcooked. It is chiefly used as a luncheon halt for tourists between Biskra and Constantine, few stay more than one night. There could be no greater contrast than between the forest-land of the north and the dry hills of El Kantara, which have a few bushes along the water-courses, and on their northern slopes, varied by tracts of halfa grass, and bare cliffs to which the caper plant clings in places. Butterflies are not numerous and require searching for. I found *Glaucopsyche melanops* race *algerica*, Ruhl., *A. belia*, Lin., *A. crameri*, *Syntarucus theophrastus*, *Gonepteryx cleopatra*, *R. phlaeas*, *P. aegeria*, *P. icarus*, *P. astrarche* and one *C. rubi* [which may be *C. avis*, I am not quite sure which, not having yet dissected it. But I am inclined to think it the latter]. In the valley south of the gorge *Anthocharis charlonia* was flying, but was hard to catch in the strong wind which often prevailed. *Scolitantides abencerragus* was common there too, and *S. theophrastus* mixed with a proportion of *S. mediterranea*. *S. abencerragus* varies a good deal as to the amount of blue on the upperside, the presence or otherwise of a row of almost white lunules at the margin, especially of the hindwings upperside (in one the discoidal spot up. s. f.w. is edged with white) and on the underside forewings the fifth spot of the median row, counting from the costa, is sometimes in a line joining the sixth with the fourth, sometimes in a line joining the sixth with the discoidal spot, or else in an intermediate position. The size varies from 17 to 22.5mm., the average of 19 specimens being 19.7mm.

On April 10th *Melanargia ines* was seen in the halfa grass, and on the 12th I took nine, all males. Their black markings are narrower than in those from Albarracin.

I stayed three days at Biskra, where I took nothing but a worn *Papilio machaon*, and then took a motor 'bus to Mtounes, about 2 hours distant to the east, an oasis and village where a stream breaks through a fine gorge in the hills, and where there is a rest house at which I stayed. In this gorge I caught ten *Teracolus noua*, mostly worn but four of them good specimens. A hunt in the caper bushes produced a number of green caterpillars, one of which was ready to

pupate. I kept it in a matchbox; it pupated on the 18th, and on the 5th of May a fine specimen of *Pieris rapae* emerged.

I got back to Ain Draham on April 25th, but the weather there was still wet, or cloudy, for the most part. I went to a place I had noted as likely for *Calophrys aris*, and sure enough it was there. I took three on the 26th, four on the 29th, four on May 1st, the intervening days being cloudy or raining. They were all taken feeding on a sort of wild lavender, and all at the same spot: four of them are females.

On May 2nd I went to Tabarca, on the coast below Ain Draham; it is not nearly so good a place as La Calle. And on the 7th I left Africa for Palermo on my way north. I took a day out in the Roman Campagna on May 16th where I caught *Chrysophanus thersamon*, *Melitaea didyma*, *Melitaea phoebe* and some others, but was chiefly charmed by the wild roses and nightingales, and the scent of the white clover in the hay.

On May 19th I arrived at Locarno and on the 20th went to Reazzino to look for *Melitaea wheeleri*, which I found to be just hatching out. On this day and the 25th, the intermediate days being wet or cloudy, I took 21 males and one female. What seemed to me to be the noticeable difference between it and *Melitaea dictynna* is that in the darker specimens of *M. dictynna* it is usually the submarginal row of spots on the upper side of the hindwings which remains longest visible, the marginal and central rows, which are sometimes buff, fading into the dark ground colour, while the submarginal row, which is more orange, is more persistent. In *M. wheeleri*, however, the central row is the one that lasts longest. I have since been comparing the specimens of *M. dictynna* at the South Kensington museum. The Pyrenean specimens from Cauterets are like the Rhone valley *M. dictynna*—those from Gavarnie more like *M. wheeleri*—while the Vernet race has the characteristics of *M. wheeleri* still more marked than in *M. wheeleri* itself. All these, however, seem to be July. Looking further east the *M. dictynna* from Dervend and Maglaj, both in Bosnia, appear to be *M. wheeleri*, and were caught in June whereas those from Yaitze (Jaice), both at the museum and in my own collection, are like the Rhone valley *M. dictynna* and were caught in July. *M. wheeleri* does not seem to have been found further north, if one rejects the ambiguous label "Austria." One specimen from Rilo Dagh and a small group from the Rosengarten near Bolzano in what was the Austrian Tirol may, however, belong to this race.

The generic names used in the *Neuere Beiträge*.

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

Mr. Higgins mistakes my meaning if he thinks I was in any way questioning the validity of the generic names in the *Neuere Beiträge*. In the article he referred to I was merely correcting a slip I had made previously (*Ent. Rec.* p. 59, 1930) when I stated *eriphyle*, Fr. would fall as a primary homonym. This mistake was the result of a faulty copy of the original description I was then working from. As to

Freyer's work, he included all the butterflies in *Papilio*, as Mr. Higgins notes, and then divides the latter into genera according to a then recognised system. As there is not the least indication to show that he intended in any way to change the order of the system, I do not see how we can question the fact that he adopted these names and inserted them with the intention of dividing the *Papilio* into genera. Had this not been the case, it is, to me, impossible to account for his including them at all.

I understand that this view is accepted by many better qualified to judge than myself; and these genera are included as such by Sherborn in his great *Index*.

[I do not think that Freyer entered into the question of nomenclature at all. He merely took the thing as it stood in his time. Adopting Ochs. and Treit. nomenclature for his own work, and bowing to the conservation of the time he used the old generic names as class names for "the man in the street" so to say. In the preface to vol. I. of his *Beiträge* he speaks of Ochs. and Treits.' work as "above all other works up to our present time it is the most perfect," after stating that he has arranged his insects under their genera. With regard to *eriphyle* he placed his newly described species with its congeners, as he judged, in Genus VIII. *Hipparchia* of Och. and Treit. with *melampus*, *cassiope*, *pyrrha* and *pharte*. (This was "Fam. E of *Hipparchia*.")—Hv.J.T.]

The Rose-coloured Pastor and Locusts.

By P. S. NAZAROFF.

In a recent important work on destructive locusts (*Locusts and Grasshoppers, A Handbook for their Study and Control*, Moscow, 1927, in Russian), B. P. Uvarov refers to the services rendered by certain birds in the struggle with this pest, and in particular to the Rose-coloured Pastor (*Pastor roseus*), which is well known for its fondness for these insects. The author considers that we have little real basis for an estimate of the amount of help which these birds afford mankind in this respect and recommends a census of the contents of the stomachs.

This, it is true, would enable us to form an idea of the quantities killed and eaten by these birds under given conditions, but the figures would be misleading, for such a census would take no account of the much greater quantity undoubtedly killed but not actually eaten.

I have often observed the destruction of locusts by these handsome starlings in the Kirghiz Steppes and in Turkestan. I use the word "destroy" with intent, because it is not only a case of the birds feeding on the locusts but of a strange instinct on their part to continue to kill them off when their appetite is sated. This fact is not generally known either to ornithologists or to entomologists although it is perfectly familiar to the natives of Turkestan and to people engaged there in the struggle with locusts, the worst offender among which is the so-called Moroccan Locust (*Dociostaurus maroccanus*, Thunb.).

In years when this insect swarms the rose-coloured pastor appears in immense flocks, no one knows whence. As a general rule this bird

nests in small colonies in stony places and is met with in the cultivated belt of Turkestan in small flocks. Clouds of them fly into the valleys of Turkestan, where locusts appear and energetically set to work to exterminate them. Locusts have plenty of enemies among birds, and one of the chief is the domestic fowl, which the natives often mobilise to give battle with the insects. But whereas other birds devour locusts only as a dainty, the rose-coloured pastor carries on the good work and continues to kill even when it can eat no more. We may safely say that places where this bird comes to the rescue in force will be rid of the locusts. The pastor is in fact such an efficient ally of man in this struggle with these destructive creatures that when they appear all other measures against the insects are stopped.

There is, however, a limit to their capacity for usefulness. A necessary condition for the success of their operations is the presence of water. This is indispensable for them, not merely to drink, but periodically to wash their beaks. For as a result of their vigorous pecking at the creatures their beaks become covered with a pasty mass and stick together. The birds then fly off to the nearest water, wash their beaks thoroughly and then return to the fray. When it happens, as it often enough does, that the locusts appear in waterless places, the pastors are handicapped seriously in their work. In this case, if it is possible, the natives dig special canals to bring water for them to wash their beaks, sometimes over a distance of several miles.

There are two surprising things in the behaviour of these birds. First, the intense eagerness to destroy the locusts, apparently without any need, for the sheer love of killing, even when their hunger is satisfied, and, secondly, their concentration in enormous flocks at the scene of action not at the time of their migration.

The rose-coloured pastor is by no means commonly met in Turkestan at ordinary times. Many inhabitants of the country have never seen one. The concentration therefore of small isolated flocks into enormous masses must take place over an area of many hundreds, and indeed, thousands of square kilometres. In the Orenburg district, for instance, the pastor is quite a rare bird in normal times, but in locust years great flocks of them fly as far north as the 51st parallel. Such a phenomenon would be comprehensible if the birds followed flights of locusts on the wing, but the most important part of the work is done at the time when the locusts are not yet capable of flight and move on the ground, which is just the period when they are most damaging to agriculture.

When the pastors have done with the locusts, flocks of them make devastating attacks on cherry orchards and so arouse the wrath of Russian gardeners. But the natives of Turkestan regard this more philosophically and reasonably, for they think that the damage they thus do to the fruit is insignificant compared with the benefit which they confer by the destruction of the locusts, and by no means grudge a little payment in the form of fruit to these beautiful and useful allies of mankind.

Hydnobius spinipes, Gyll., a species of Coleoptera new to the British List.

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

"*Anisotoma spinipes*: oblongo-ovatum, rufo-brunneum, antennarum clava 5-articulata nigricante, elytris punctato-striatis, interstitiis transversim rugosis, femoribus postitiis dente valido acuto armatis," Gyllenhal *Ins. Suec.* 3 709 (1813).

Reddish brown, labrum, antennae and legs yellow, eyes and club black.

Head transverse, sparsely but distinctly punctured; *mandibles* powerful, sharply pointed, *labrum* slightly emarginate anteriorly, strongly semicircular posteriorly. *Thorax* transverse, considerably narrowed in front, broadest before base, then narrowed to posterior angles, which are rounded forming an acute angle with base of elytra, distinctly punctured throughout, surface smooth between the punctures.

Elytra oblong rounded to a blunt point at apex, side margins distinct, strongly punctured in regular rows and with very distinct cross striation throughout.

Scutellum with a few small punctures at base.

Tibiae very spinose, explanate at apex. ♂ with a large sharp tooth on posterior femora, broad at base, very slightly curved inwards at apex

Long—1.8-2.5mm.

Taken at Cannock Chase by Mr. S. O. Taylor of Leicester on August 24th, 1930, by evening sweeping.

This insect can be separated from *H. strigosus*, Schmdt., by its stronger punctuation, larger size, and black club to the antennae of which the last joint is distinctly narrower than the penultimate; from *A. punctatissimus*, Steph., by its light brown colour, and from the latter and *A. punctatus*, Strm., by its stronger punctuation, and especially by the very distinct cross striation all over the elytra.

Fowler stated that *spinipes* had been considered by some authors to be the female of *punctatus*, but as will be seen by Gyllenhal's description his insect was a male.

Reitter gives *spinipes* as a variety, and *punctatissimus* as a dark aberration of *punctatus*. He also gives two aberrations to *spinipes*—*ab. strigosus*, Th., with a large hooked tooth in the ♂, and *ab. intermedius*, Th., with a small triangular tooth in the ♂.

I prefer to treat *H. spinipes*, Gyll., as a distinct species; there being good characters to separate it by.

Spermophagus sericeus, Fourc., Ent. Paris, 1 112 (1758), a British Insect.

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

This species was first recorded as British in the *Handbook of the British Association at Leeds* in 1927; it was also mentioned in the *Ent. Mo. Mag.* for 1927, but only by name in both cases. Mr. W. D. Hincks has now sent the specimen to me, and has asked me to bring it forward correctly.

I may mention that I have compared it with the specimens in the

rather long series in the general collection of Coleoptera at the British Museum, with which it agrees in every way.

As the descriptions in the literature are neither very full, nor accurate, I have drawn up the following careful description:—

Head round, deflexed, finely punctured; eyes oblong oval, not prominent; *antennae* narrow at base, thickened towards apex, broadest in middle, joints 6-10 serrate. *Thorax* arcuately narrowed to apex, broadest at base with acute posterior angles, base considerably produced towards scutellum, closely punctured with larger and smaller punctures, the larger punctures distinctly longer than broad. *Elytra* rounded, about as broad as together long, widely separately, rounded at apex, with shallowly engraved punctured striae, interstices finely punctured. *Pygidium* with double puncturation, the larger punctures round shallow but more deeply impressed in front than behind. *Legs* fairly stout; *posterior femora* curved, not toothed behind; *posterior tibiae* armed with two nearly equal, movable black spurs. *Long*, 1.5-3.2mm.

The genus *Spermophagus* [(Steven in litt?) Schönh. *Gen. Spec. Curc.* 1 102 (1833)] differs from *Larva*, Scop. (= *Bruchus*, L.) and allied genera in that the head is deflexed and not constricted behind the eyes into a neck, and the spurs to the hind tibiae are movable. A specimen of this beetle was taken by Mr. J. R. Dibb, when in company with Mr. W. D. Hincks, by shaking leaves from a hedge bottom at Blackmoor, near Shadwell, Leeds, in April, 1924.

The insect is found on the Continent on *Cisti*, *Convolvulus sepium*, etc., and *Crataegus*. The European Catalogue gives "Europe" as its distribution, and Reitter says it is widely distributed in Central Europe.

Notes on three insects bred from Galls on Juniper.

By WM. FASSNIDGE, M.A., F.E.S.

I spent the Easter holidays of 1930 in France, in the Department of the Drôme, at Dieulefit, a small town some fifteen miles east of the Rhône at Montélimart. As the season was a late one and the weather not always very favourable for collecting by day, I gave a certain amount of attention to searching for the larvae of several species of *Aegeriidae*, with quite gratifying success. I found without great difficulty larvae, and pupae too, of *Aegeria sphaeriformis*, Gern., in young alders, larvae of *A. respiformis*, L., in stumps of evergreen oak, of *A. ichneumoniformis*, Fb., in roots of *Anthyllis vulneraria*, and capped mines of *A. andrenaeformis*, Lasp., in stems of *Viburnum lantana*. None of these species was new to me in the larval stage so that I was pleased to discover signs of the presence of larvae in swellings in twigs and stems of the stunted juniper bushes that grew so abundantly all over the barren dry slopes of the arid hills and mountains all around the town. From a little distance one could see quite easily the withered brown branches and twigs that betrayed the presence of some insect or fungoid enemy, and closer examination revealed lower in the stem the damage that at last had killed the branch and caused the juniper needles to turn a lighter or darker brown according to the age of the injury. I examined a large number of swellings, and cut open a great many in an attempt to satisfy myself as to the cause of the

galls. In many cases, where the dead twigs and leaves were one or more years old and of a very dark brown, I found only the old traces of larval borings, mostly just under the bark and rarely going into the middle of the stem; and often, owing to the shelter afforded by a thicker bush than usual, there would still be abundant frass to prove that the borings were the work of larvae. Where the leaves were lighter brown in colour I usually found a rough knotty swelling not very far down the stem, a gall of variable size and shape, just a thickening of the stem for an inch or two of its length. Inside these galls were at least three different species of larvae feeding in tunnels and borings of varying size and depth. Two or three larvae, sometimes more, were present in each gall, but so far as I could see no two different species lived together in same gall. The first larva found was that of an Aegeriid and I at once jumped to the erroneous conclusion that this larva was the cause of all the swellings and was therefore fairly common in this locality. When however I began to search more patiently and systematically, I soon discovered my mistake, for I found that a coleopterous larva was far more often present than that of the clearwing. Lastly I discovered that some of the swellings contained larvae and occasionally pupae of a Tortrix. I ought to add here that I found also numerous galls on the juniper in which there were no traces of larval borings, but these galls were more regularly spindle shaped, and I decided that they were caused by some species of *Gymnosporangium*.

I am not in a position to state definitely that the larvae found in the swellings were the sole cause of the galls, though I consider this to be highly probable. When however such a great authority as the Abbé de Joannis in his "Révision critique des espèces de Lépidoptères cécidogènes d'Europe et du Bassin de la Méditerranée," published in the *Ann. Soc. Ent. de France*, XCI., 1922, gives it as his opinion, on the evidence available, that we have here gall-eaters and not gall-makers, it behoves a modest field-worker like myself to be excessively careful. Of course I brought home a certain number of tenanted galls, in spite of the fact that I destroyed many larvae by opening up their borings during my investigations. I forced these larvae as is my usual custom with wood-boring insects, and bred out during May a dozen specimens of the clearwing, five of the Tortrix, and five of the Coleopteron. It remained now to identify these insects. The beetle proved to be *Poecilonota festiva*, L., a beautiful green Buprestid, which is said to be rather rare. The Tortrix is probably *Grapholitha duplicana*, Zett., or a closely allied species—I hope the question will soon be settled by the experts. The clearwing I assumed to be *Aegeria spuleri*, Fuchs, a species very close to our own common *A. tipuliformis*, Cl.; but I am informed that Monsieur Le Cerf, who is a very great authority on the group, is unable to find any constant difference between the two species and therefore considers *A. spuleri* to be a form of *A. tipuliformis*. Fuchs' account of his new Aegeriid bred from swellings in juniper is to be found in the *Int. Ent. Zeitschr.* 11, 1908, pp. 38, 39, and though it seems at first sight very improbable that this clearwing should be *A. tipuliformis*, considering the great difference of habitat and foodplant, yet it is perhaps best to leave the question to those qualified to deal with it. Is it too much to hope that some

reader with opportunities for investigation and study will devote some time during 1931 to this problem of the galls to be found on juniper in France? It is even possible that they may turn up somewhere in England.

Early Stages of *Eudamus undulatus*, Hew.

By CAPT. K. J. HAYWARD, F.E.S., F.R.G.S.

On March 27th (1926) during the early afternoon, I had the pleasure of watching a specimen of the above butterfly ovipositing on a bush of *Cassia corymbosa*, Lam. (locally known as "Sen del Campo" or "Rama Negra"). I at first supposed I had found *Eudamus catillus*, Cr., laying on a fresh foodplant (having but recently identified the same as *Rhynchosia senna*, Gill.—locally "Sen del zorro"). However, even a cursory glance at the eggs showed this was not the case as they differed materially in colour if in nothing else. I was able to collect a great number, many of which were obligingly laid whilst I waited. I regret that few of these were brought through, many proving sterile, and the difficulty of obtaining sufficient fresh foodplant due to the bushes shedding their leaves, and to their scarcity, accounted for several larvae. The operation of laying was in no way specialised, the imago fluttering quickly from leaf to leaf to deposit with a bend of the abdomen an egg here and there on the upper side of the leaves and in no particular position.

The eggs are in appearance at first hedge-sparrow blue and somewhat transparent, rapidly becoming greyish and more opaque, being smooth and round of 0.8mm. diameter. About the fourth to fifth day the egg becomes much whiter and the larval head appears as a black spot, the young larva hatching out shortly afterwards.

On emergence the young larva is 1.2mm. in length with a deep brownish black head and a thick saddle of this same colour across the dorsum on the 1st thoracic segment, the remainder of the body being transparent yellowish with the alimentary canal showing darker greenish, and with a few short grey hairs, especially along the margin. The life stages of this larva correspond very closely to those of *Eudamus catillus*, Cr., which have already figured in these notes. The larva immediately on emergence forms for itself a tent, not as in the case just cited by turning down a leaf corner, but by drawing two leaves together, edge to edge, and fastening them in this position. As to whether the larva leaves this tent for feeding or other purposes I cannot say as I have always failed to find the larva outside, and although the bushes on which larvae are found always appear clean and uneaten, whilst the inner cuticle of the "tent" leaf is eaten away when the larva moves to fresh quarters, yet the "fitting" is so infrequent as to make it seem impossible for other to be the case. In its final stages the larva is some 2.3mm. in length, of 6mm. height, and in breadth at the first abdominal segment 7mm. Head rough, very deep brown, with a small chestnut spot on either side just above the mouth parts. Body greenish appearing grey, being closely speckled with this colour, alimentary canal darker. Lower lateral area yellowish on a lighter greenish ground with a yellow marginal stripe, oblique downwards posteriorly on each segment. Beneath greenish.

Spiracles khaki, that on the first thoracic segment larger.

Tubercles almost indistinguishable, but X20 magnification shows posterior and anterior trapezoidals and two larger laterals on each segment. The body is freely sprinkled with whitish hairs that under the magnification mentioned appeared cone like with the apex at the body. Greater magnification that I cannot at present obtain is required to clear up the number and position of the tubercles and form of the setae.

Larva remained in the pupal state 13 days. This brood was certainly the third, if not the fourth of the season, the first appearing in September, another in February, and several fresh specimens being seen between these broods that may have been either late spring or early summer strays, or a separate brood.

Imagines, pupae cases, etc. have been sent to the South Kensington Nat. Hist. Museum in accordance with my usual practice.

Pupa, 15 to 16mm. in length spun up amongst loose earth and leaves at the foot of the food-plant. Deep dark brown on a lighter ground of dark khaki, the latter showing at all segmental folds, etc. The whole with a somewhat lustrous appearance. Head darker, eyes and mouth parts black, shiny. Wing cases showing two light spots corresponding to white markings on forewing. Described from a pupa that emerged August 4th after having been 128 days in the pupal state.

SCIENTIFIC NOTES AND OBSERVATIONS.

INSECTS AND THEIR SENSIBILITY TO PAIN.—To what degree are insects susceptible to pain? This question was brought vividly to my mind in June last on my vacation at Cortina in the case of an unfortunate cockchafer. I was lazying on the grassy slopes behind the hotel, whiling away the idle hours very pleasantly, when my eye caught sight of what appeared to be the head and thorax of one of these beetles lying at the foot of an outjutting rock, which appeared to have met the common fate of this species. This fragment, however seemed to me to move, but as there were some small ants running about I thought they might be the cause of such movement, as I could hardly credit that this unfortunate and truncated specimen, minus body from the thorax downwards could possibly be still alive. I continued, however, my observation and, as the movement seemed due to something more than disturbance by ants, I picked it up and placed it in a glass topped box to examine it more closely and I was satisfied that the unfortunate beetle was not only still alive, but able to prop itself up momentarily upon its two remaining anterior legs. To verify this however from an independent source, I took it back to the hotel and showed it to my wife and sister-in-law and they also saw it make the same movements with its two legs. This covered a period of over two hours since I captured this unfortunate beetle and then uncertain in my mind whether it might be suffering pain I put it in the laurel bottle. I brought the mangled remains back to England.—G. C. LEMAN (F.E.S.).

NOTES ON COLLECTING, etc.

A LOCALITY FOR *PLEBEIUS AEGON* (ARGUS) NEAR GUILDFORD.—It may be of interest to entomologists in the South of England to know that the blue *Plebeius aegon* (*argus*) occurs over a large tract of ground between Brookwood and Farnborough near Guildford, Surrey. I found it there some 15 years ago in abundance in the summers of 1915-16, at end of June and early July. The locality is not far from Brookwood Station, near some golf links—I used to cycle there from Guildford passing through Stoke. *Lycaenopsis* (*Cyaniris*) *argiolus* was common also in many of the chalk pits at Guildford and *Polyommatus coridon* swarmed on the Hogsback in August. It would be of interest to know how the spread of house building of recent years has affected these butterflies. I should like to know if these species are equally abundant in these localities to-day as they were then.

Pieris rapae and *P. napi* each produced a variable race along the banks of the Wey.—(Miss) L. M. FISON, Hotel du Djinjura, Michelet, Algeria.

SYNANTHEDON FLAVIVENTRIS IN KENT.—While collecting in a wood near Ashford in August last, I spent a short time examining sallows for traces of this species. Although the sallows were in leaf I had no difficulty in finding a gall, from which the moth had hatched, on the first bush examined, and a little search soon revealed others.

In *Ent. Rec.* XXV. p. 30, we learn that Mr. L. W. Newman exhibited at the South London Society, on November 14th 1912, twigs of sallows extensively attacked by Tits for the larvae of beetles and mites in the nodules caused by those larvae.

Saperda populnea does of course, sometimes feed in willow, forming a gall usually, but not always, to be distinguished with ease from that of *S. flaviventris*. Certain flies also form galls on the twigs. In a certain place Dr. Cockayne and I, last Easter found galls of *S. flaviventris* in great abundance, but at that date very large numbers of them had been attacked by Tits and the larvae destroyed. I believe Mr. Newman's galls of 1912 came from Kent and although that should have been an "off" year for *S. flaviventris* I think that a search for the species in Kent next winter will probably prove very remunerative to anyone who wants the species.—HAROLD B. WILLIAMS (LL.D., F.E.S.), Esher, Surrey.

CURRENT NOTES AND SHORT NOTICES.

Our Hon. Treasurer is anxious to call attention to the fact that
"Subscriptions are now due"

and that new subscribers would be most welcome to which the Acting Editor adds "especially if they will contribute notes of their doings, interesting items of news and other entomological matters."

It has been noticed of late that the "Honeysuckle and Bee" design on the cover has been getting very mixed, and the editors have decided to return to a cover somewhat resembling that which was used eight or ten years ago. The paper of the cover will also be improved and its colour will be an easily recognisable blue. At the same time it is intended to have a better paper for the matter of the magazine. These changes will of course mean extra expense, and we trust that the suggestions made in the previous paragraph will not have been made in vain.

In the preface to *A Synonymic Catalogue of Lepidoptera Heterocera (Moths)* compiled by the late W. F. Kirby, one finds the following paragraph. "The M.S. of the whole of the remainder of the present work has been in an advanced state for some years; and it is proposed to issue it as follows:—Vol. I., Sphinges and Bombyces (now published); Vol. II., Noctuae; Vol. III. Geometrae and Pyrales; Vol. IV., Micro-Lepidoptera; Vol. V., Appendix and complete Indices to both Generic and Specific Names to the whole." Of this Vol. I. is the only one published. Does anyone know what became of the MS. "in an advanced stage" which is referred to above? It would be of great use if it were obtainable and some workers could continue it on Kirby's lines with thorough research in the older literature. Much of Kirby's work done over 50 years ago, which our innate conservatism prevented adoption at the time, is being justified at the present time. For instance he pointed out in 1871 that we should read *Parnassius phoebus*, Fabr. and not *P. delius*, Esp. By still more references Bryk in *Lepidopterorum Catalogus* has supported this action of Kirby's. It was Kirby who called attention to the priority of *thetis*, Rott. over *bellargus* and over *adonis*.

REVIEWS AND NOTICES OF BOOKS.

The *Supplement to Seitz Palaearctic Butterflies*:—This has now reached parts 17 and 18 in the English edition concluding the additions to the *Nymphalidae*, giving the additions to the *Erycinidae* and commencing those to the *Lycaenidae*. *Argynnis adippe* is dealt with at length and the large accession to its varietal names suggests that there can be very few if any further additions. It is pointed out that the name *cydippe* has now practically replaced *adippe*. The additions to the *Nymphalidae* are enormous, when one sees that the mere list of references occupies no less than 7 pages. In the introductory note to the *Lycaenidae* the late M. Courvoisier comes in for a share of commendation in that "without encroaching on denominations already given, created an orderly classification by giving the same name for similar forms of aberration in all species. Further he has utilised names that are comprehensible without special elucidation." Tutt, our revered late editor, who through this magazine and elsewhere began the modern method of studying and registering variation in the Lepidoptera, also comes in for remark. "Tutt has also made a systematic study of the aberrations, but has gone so far in subdivision that even specialists will find their requirements supplied by an excessive number of names." *Callophrys rubi* is considered as well as Chapman's new *C. avis*. In *Chrysophanus (Heodes) virgaureae* the very recent work of P. P. Graves is included. *C. dispar*, of which there seems to be "much ado about nothing" in Britain, receives rather scant notice. *C. (H.) alciphron* and *Rumicia phlaeas* are dealt with at great length; and in the latter species the aberrational names of Tutt are classified "as systematically as possible." Under *Zizera (Cupido) minima* is the curious remark: "The name *noguerae* established by Verity is a nomen nudum. Verity indicates that

minima is very rare in Spain, he has seen a specimen marked 'Sierra Nevada' in South Kensington Museum and he has named the race *noquerae*. This procedure designates better than any words what one must think of Mr. Verity and his new 'races.'" The omnibus genus *Lycæna*, as Staudinger conceived it some decades ago, is commenced with *L. (Plebeius) aegon (argus)*. Surely some of the great advance in our knowledge should be indicated in whatever treatment is accorded to the "blues," and the existence of the great sections which are so obvious to many of us, mentioned, if not further dealt with. Commendation is due to the compilers of these two parts, M. Gaede (*Nymphalidae* and *Chrysophanus*) and Chr. Bollow (*Lycæna*) on the success they have attained in the arduous task of welding so much detailed and often conflicting and uncertain material into a whole for the digestion of the future students of the Palaearctic Rhopalocera. The matter fills 32 pages and with it are two plates: plt. 10 has 30 figures of Satyrid forms and plt. 14 has 35 figures of Brentiid and Argynnid species, all being extremely well portrayed.—Hy.J.T.

Three further parts 4, 5, 6, of the *Minen-Herbarium* by Dr. Hering have just been received from the publishers, Messrs. Weigel of Leipzig. In them are specimens of the mines of 43 species of Lepidoptera, 15 of Diptera and 2 of Hymenoptera. No microlepidopterist, who is at all keen on getting a knowledge of the habits of the smaller fry, can make satisfactory progress without these splendid aids. He may have figures of the mines and depredations, but no illustration can give such valuable information as the actual things. We know that these are what they are labelled, for none would dispute the judgment of such a talented entomologist as Dr. Hering. With infinite pains he has gathered these mines and with equal skill mounted, named, dated, and localised them. In many instances the specimen does not consist of a single example, but several leaves each with mines at different stages are given. One might suggest that these species which do their feeding or spend a portion of their feeding-life in a case, might have a case included even if it be pressed flat. With the naturally flat cases like those of the *Nepticula* species this would be particularly easy. The micro-student has to breed most of his examples and here on these sheets he has exactly the information he wants to get forward. Each part contains 20 double sheets, of 20 species. And each folded sheet has on the outside particulars such as that of sheet 101—*Corylus avellana*, L. Betulaceae. *Nepticula microtheriella*, Staint. Lepidoptera. Berlin-Finkenkrug. VIII., 1930, and inside is a beautifully mounted leaf showing a perfect characteristic mine.

Where possible mines on the leaves of the same tree or plant are placed on neighbouring sheets, e.g. sheets 101-105 contain examples of five different species on the leaves of the hazel, *Corylus avellana*. Each part of 20 sheets is enclosed in a small cardboard portfolio with a printed list of the contents on the outside, of which there is a duplicate inside. At the price of four shillings and sixpence each part, the publication is exceedingly low-priced and ought not to deter students from obtaining it.—Hy.J.T.

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

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

Reprints of articles may be obtained by authors at very reasonable cost if ordered at the time of sending in MS.

Articles that require ILLUSTRATIONS are inserted on condition that the AUTHOR defrays the cost of the illustrations.

EXCHANGES.

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

Duplicates.—S. *Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection: list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), gothicina forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—A. J. Wightman, "Aurago," Bronfields, Pulborough, Sussex.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—C. Zacher, Erfurt, Weimar, Street 13, Germany.

DUPLICATES.—Indian Butterflies.—A. F. Rosa, M.D., 4, Bellevue Crest, Edinburgh.

CHANGE OF ADDRESS.—J. F. Bird, "Eastholm," Churchdown, Glos.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. January 21st. February 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. January 22nd (Ann). February, 12th, 26th.—Hon. Secretary, Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. Visitors admitted by ticket which may be obtained through Members or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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All communications should be addressed to the Acting Editor, *Hy. J. TURNER, "Latemar," West Drive, Cheam.*

IMPORTANT

TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXVI.)

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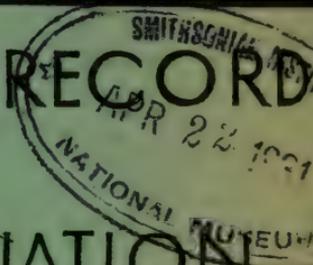
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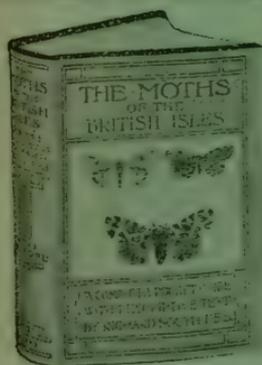
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ENGRAMMA TAYLORI, SANTACHI, n.sp.

A Note on the Fauna of Mangrove. (With Plate.)

By JOHN SNEYD TAYLOR, M.A., D.I.C.

Mangrove trees occur commonly in the bays and estuaries of the East African coast, growing on the shore, often just below high tide mark. On the seaward side numerous, erect, aerial roots project through the muddy sand for a considerable distance from the trees. These, especially at high tide, remind one of *Equisetum* growing in a bog hole at home.

On the island of Inhaca, at the entrance to Delagoa Bay, where the writer spent a camping holiday in the winter of 1929, a species of mangrove, probably *Ceriops candolliana*, Arn., is to be found in considerable numbers, lining the shores of the bays, or inlets, of the island. The bark of the trees, which grow to a considerable height, is used by the fishermen and natives for dyeing their nets.

During the intervals between fishing expeditions, some little time was spent in searching the mangroves for any creatures that could be found. Although not the best time of year for collecting quite an interesting mixture of marine and terrestrial forms was obtained. Of the latter, insects predominated, and of these, ants comprised the large majority. In the dead branches and stumps, four species of ants, all of which occurred in large numbers, were taken, viz., *Camponotus maculatus*, Fab. race *liengmei*, Forel, *C. grandidieri*, Forel, race *mendac.*, Emery, *Crematogaster (Acrocoelia) gerstaeckeri*, D. T. var. *pubica*, Sants., and *Engramma taylori*, Sants. n. sp. Four species of Coleoptera were also found in the dead wood, none of which were represented in the British Museum collections. They were as follows:—*Trypopytis* sp. (*Anobiidae*); *Gyponyx* sp. (*Cleridae*); and two species of *Pentarthrum* (*Curculionidae*). The Curculionids were fairly numerous, boring in the dead wood, but only one individual of the Clerid, and two individuals of the Anobiid, were found. A species of Termite, which occurred in some numbers, was likewise obtained in the dead wood. One Lepidopterous larva was found feeding upon the leaves, but unfortunately escaped from the matchbox in which it was placed. In addition to the insects, a species of Centipede, and a species of Isopod, were also obtained in the dead wood. Two species of spider were taken, one of which, a sluggish species, occurred in the galleries of *Camponotus grandidieri*. Mention should also be made of a species of lizard belonging to the *Gekkonidae*, two individuals of which were found hiding under loose bark.

The marine portion of the mangrove fauna consisted in the main of molluscs belonging to the Gasteropod class. *Pyrazus sulcatus*, Bon., a fairly large species with a spiral shell some $1\frac{1}{2}$ inches in length, was found in large numbers on the muddy sand among the aerial roots; *Cerithidea decollata*, Linn., another species with a spiral shell, slightly over an inch in length and with the apex of the spiral flattened, was found clinging to the trunks; and a species of *Planaxis*, with a shell resembling that of the familiar periwinkle, only somewhat smaller, which was found on the trunks and branches to a height of seven feet, and also crawling upon the leaves. It seemed rather incongruous to find a marine mollusc and a caterpillar upon the same branch. On the bases of the trunks, and on the aerial roots, acorn barnacles were numerous.

From the foregoing it will have been seen what a varied and abundant fauna these mangrove trees support. During the summer months a more extensive fauna would probably be found, but one should have to put up with sweltering heat, and myriads of mosquitoes. For the collector seeking new species, particularly insects, Inhaca should be a fruitful field.

In conclusion the writer would like to express his indebtedness to Drs. Santschi and Arnold for determining the ants, and to the former for describing the new species, and also to Mr. G. J. Arrow for determining the beetles.

TRANSLATION BY MRS. H. HOWARD, BARBERTON.

Engramma taylori, n.sp.

O. Long: 3.5 to 4mm. Of a chestnut brown, more or less deep. Gaster blackish brown. Funiculi, end of the scapes and tarsi russet. The remainder of the appendices of a russet brown. Somewhat shining or submate. Very finely reticulated, with a short pubescence extended and adpressed, not turned back on the scapes. Some long hairs towards the mouth, on the face of the declivity of the épinotum and on the end of the abdomen.

The head is as long as broad, the two posterior thirds of the sides are subparallel, the anterior thirds converge somewhat, the posterior edge straight or slightly concave. Eyes in the middle of the sides. A rounded impression in place of the frontal ocellus. Depression of the epistome deep, curved at the bottom. The mandibles of 12 or 13 teeth, the first, second and fourth apical ones longest. The scape extends beyond the posterior border of the head by one and a half times its breadth. Joints two to five of the funiculus a little longer than broad, the others scarcely so. Promesonotal suture feebly imprinted on the profile. Posterior third of the mesonotum descending somewhat abruptly.

The epinotum much lower than the promesonotum. The lower face is more convex than that of *E. ilgi*, For., and the thorax more elongated than that of this species to which *E. taylori* most nearly approaches. *E. ilgi* has also a larger head.

Mozambique, Isle of Inhaca in Delagoa Bay. In decaying branches of mangrove trees (J. S. Taylor).—DR. F. SANTSCHI.

Ten Years in North East Surrey.

By HAROLD B. WILLIAMS, LL.D., F.E.S.

I came to live in North East Surrey at the end of the war, and it has been suggested to me that some notes on the Lepidoptera of the district may be of general interest. I lived for 3 years at Croydon and since then at Claygate and Esher, in what is generally known to entomologists as the Oxshott district.

The whole area is very well known to the Entomologists of South London and many notes on its entomological fauna have been published. The occurrence of chalk downs, extensive woodlands, heaths and marshes, all readily accessible, provides a wide range of collecting grounds suitable for a great variety of species. I do not

propose at present to attempt a list of the Lepidoptera of North East Surrey, but simply to give a few notes on such matters as come under the notice of a resident.

RHOPALOCERA.

Euchlœ cardamines formerly abounded. In May, 1923, for example, it was very common in my garden at Claygate, where abs. *citronæa* and *minoræ* were taken. May, 1924, was uniformly cold and dull. I saw the first specimen, a ♂, on the 17th, and few appeared. Since then the species has been rare at Oxshott, though it is increasing in numbers again in the Dorking district and elsewhere. I have little doubt that the cold dull spring of 1924 was very unfavourable to the species.

Melitæa aurinia is generally supposed to have been extinct in N.E. Surrey for many years. Indeed I suppose it is not widely known that it occurred there in modern times. However, Dr. E. A. Cockayne once saw a specimen taken at Oxshott and I think it possible that a colony still exists somewhere in the valley of the Mole, though I have been unable to find it. There is no lack of suitable places.

Limenitis sibilla. I first saw this species in Surrey in 1917, at Holmwood. It is now well established in many of our larger woods and I think is increasing both in range and in numbers.

Polygonia (Grapta) c-album. The spread of this species has been commented on by many observers and I only add that it has been noticed this summer in the typically suburban locality of Surbiton.

Eugonia polychloros is a regular spring insect in the Oxshott district, where it may be found in two or three places almost every spring on the first warm and sunny days towards the end of March. I have only once, in 1927, seen freshly emerged specimens in summer, and those were flying high around elm trees late in the afternoon. I have failed to find larvae and they probably feed high on elm.

Rumicia phlaeas occurs generally, and I have taken ab. *radiata* in two places in the district.

Plebeius aegon is an insect to which I have not devoted sufficient attention. A very fine, large and dark form occurs at Byfleet, and I have met with ab. *inaequalis*, Cockayne, at Esher.

Hesperia malvæ. On June 6th, 1930, about 6 p.m., a little butterfly flew across the road just in front of me. It seemed unfamiliar, and investigation revealed a fresh ab. *taras*, which was successfully boxed. I have not been able to find others, but the species was not common at the particular place this year.

SPHINGIDÆ.

Mimas tiliæ is omitted from many Oxshott lists and it may be as well to note its occurrence at Claygate and Esher.

Hemaris fuciformis. A moribund specimen at rest on nettles at Oxshott, in a place where scabious grows freely.

ÆGERIIDÆ (SESIIDÆ).

Synanthedon speiciformis. On June 9th, 1919, I took a specimen on flowers of guelder rose near Oxshott. Workings of the larvae in alder have since been found rather freely.

S. tipuliformis, *S. respiformis* (*asiliformis*), and *S. culiciformis* appear to be quite common in all suitable places.

ZYGAENIDAE.

Zygaena trifolii occurs in suitable places quite freely. At Fetcham and Dorking good confluent forms occur. *Z. trifolii* subsp. *palustris* occurs in most marshes and in one locality also produces good confluent forms, though less commonly.

BOMBYCES.

Sarothripus revayana. In August, 1923, Dr. Cockayne and I met with the interesting larva of this insect. In subsequent years larvae have been taken more freely in June. Almost all the imagines bred have been black. I have two which have a costal blotch but the insects are so nearly black that this is only just distinguishable. I find the larvae most commonly on the smaller oaks, and they must be sleeved if not full-fed.

Lithosia deplana, *L. lurideola*, *L. complana* and *L. griseola* occur in suitable places. *L. griseola* I have met with in marshy places, with a good proportion of ab. *stramineola*.

Trichiura crataegi is a regular species in the Oxshott district, and larvae are to be beaten from hawthorn, birch and aspen. A very pretty banded form of the larva occurs.

Cosmotriche (*Odonestis*) *potatoria* is common in all marshy places. Breeding this species from larvae obtained in a very restricted area has given remarkable results. I obtained some 50 larvae in 1929 and 200 in 1930, in each case from an area of only a few square yards. These have given me 3 yellow males, 4 entirely brown females, one female without markings and a large number of pale buff females, with other interesting forms.

Pygaera curtula is not common, but is worth attention; the local form being a fine dark and well-marked one.

NOCTUAE.

Leucania conigera, *L. lithargyria*, *L. comma*, *L. impura* and *L. pallens* are garden insects, apart from their usual haunts.

L. turca occurs in at least two localities.

L. straminea has I fear been exterminated by an act of vandalism, the burning of the entire reed bed on which it, with *Senta maritima* and *Nonagria geminipuncta*, used to occur.

Nonagria typhae was discovered in September, 1928, in a very small pond, completely overgrown with *Typha latifolia*, on one of the Commons, and has occurred there very commonly since. No ab. *fraterna* have appeared among the large numbers bred. In this pond there is now no open water, and the pupae are not dug out by moorhens(?) which appear to destroy numbers in the more open ponds.

Xylophasia monoglypha. Deep brown forms have appeared during the last three summers in my garden at Esher, those taken this summer being darker than any previous captures.

Dipterygia scabriuscula appears to be a moth of very uneven distribution. It abounds in my garden at Esher, but I had not previously met with it for many years.

Apamea leucostigma. Both the type and ab. *lumina* have occurred in marshy spots at sugar. I am not aware of previous records in this part of Surrey, and am glad to have taken the species in two localities, miles apart, in two distinct river valleys.

Miana literosa. It may be worth while to record the capture of this species in my garden at Esher and at Wisley.

Agrotis vestigialis. The fine dark form of this species recorded from Aldershot (*Entom.*, XLI. 275) by Col. Tulloch, is also found in at least one spot in N.E. Surrey, and will, I think, be found to have a wide distribution on the older heaths.

Noctua augur was a common garden species until a few years ago, but has completely disappeared for the last three or four years.

Dyschorista suspecta occurred in some numbers at Esher in 1928. It was recorded from Effingham in *Entom.* XLII. 66.

Tethea retusa is not uncommon in one or two localities.

Xanthia fulvago ab. *flavescens* has occurred in two localities, the specimens being of a deeper colour than Scotch examples.

Calymnia pyralina. I have devoted some attention to this species almost every year. I recorded (*Ent. Rec.* XXXVIII. 110) the capture of a larva on hawthorn and to this record I have to add that in 1929 and 1930 I have taken a number on blackthorn, in the latter year the larvae being quite small. The normal pabulum is undoubtedly the common elm and I am quite satisfied that the larva is not to be found, otherwise than quite exceptionally, on large trees. I take it most commonly on a row of small bushes which consist of a few strong shoots from old stools, and in this restricted locality I have found the larva abundantly for some years. This year some friends astonished me by taking 40 larvae from one branch and four of us took nearly 300 in some two hours.

When its habits are known this species is very easy to obtain and I am satisfied that it is an abundant species, far commoner than any of its congeners, in the whole of North-east Surrey.

By breeding and at sugar I have obtained an interesting series, and a few notes on the variation may be of interest. The most noticeable point is the occurrence, in very limited numbers of the true *pyralina*, View., which is a deep brown insect. The majority of the specimens, and almost all those I have seen from elsewhere, are the reddish ab. *corusca*, Esp.

There is a most noticeable divergence in size in both bred and captured specimens. Variation in marking occurs both in *pyralina* and ab. *corusca*. The most interesting forms in a picked series are perhaps the following:—

(a) Typical ground colour with the outer line clearly outlined in bluish white, by an extension from the normal costal spot. The whitish marking in this case is continued across the wing to the inner margin. I have ab. *corusca* in which this line is outlined, but not to the same degree.

(b) Examples of both forms with a well developed dark spot on the inner margin, between the first line and the base, and all the normal markings intensified, giving the insects a mottled appearance.

(c) Two examples of ab. *corusca* with the whitish markings near the apex practically obsolete.

C. affinis is quite common, though less so than *C. pyralina*, and *C.*

diffinis is certainly rare. Both these species appear to me to frequent the larger elms, on which *C. pyralina* is so rarely to be met with.

Miselia oxyacanthae is of course common, but I have noticed that wherever I have collected the ab. *capucina* occurs only in the proportion of about 5% of the total number. In Epping I think the numbers of the typical form and the aberration are about equal.

Aplecta nebulosa is common, of a blue-grey, rather dark form, which I have not met with elsewhere.

Hydrelia uncula is found in at least three of the marshes of the district, and I think has a wide distribution in Surrey.

GEOMETRAE.

Ptychopoda sylvestraria (*straminata*) occurs at Oxshott. I do not recollect seeing this species recorded for the district.

P. trigeminata (*scutularia*) occurs as a common garden insect in Claygate and Esher, in both of which places I have found it to be attached to privet hedges.

Acasis viretata also occurs freely in privet hedges.

Lobophora halterata occurs singly all over the district where aspen grows. In 1927, however, in one clump of aspens, it appeared in great numbers and I took a long series. In this year on every visit while the species was out, 6 or 8 specimens were found on every tree; since then single specimens only have been found, as elsewhere.

Mysticoptera seralata occurs rather freely on sallows in one very restricted locality. I have not met with it elsewhere.

Operophtera brumata. A very dark form occurred in my garden at Claygate. I have met with this form also in Epping Forest, from which place I have obtained ova this winter.

Calocalpe undulata is a species well-known in the district, but which I am unable to find there. It has certainly vanished from some of its known haunts.

Angerona prunaria. Both plain and banded forms occur. I have bred the species on several occasions, but have never succeeded in obtaining a fertile pairing between examples of the same brood.

Erannis marginaria is of course common. I have bred very beautiful series from ova supplied by my friend Mr. J. C. Haggart of Glasgow some of which are very dark indeed. In the case of this species and *Asphalia flavicornis* I have found no difficulty, but with other species I have met with trouble. *Acrionicta menyanthidis* from Scotland, for example, I can do nothing with, or with *Spilosoma menthastri*, and with *Boarmia rhomboidaria* I have very great difficulty in getting good imagines from Scotch ova, bred side by side with southern forms which thrive amazingly.

Mr. Haggart, who is an expert at rearing larvae, which I am not, meets with similar difficulties with some of the species I send him and with which I have no difficulty, for example with *A. prunaria* and *O. sambucaria*, the larvae of which I have sent after hibernation.

It appears that the conditions of climate, which govern the distribution of a species in nature, are not to be trifled with when the species is in captivity.

Boarmia rhomboidaria. I have devoted a great deal of attention to the genus and to this species in particular and have reared from ova broods of what I am compelled in the present state of my ignorance

to call the type and ab. *perfumaria*, Newm. I have no idea what *perfumaria* really is, though I possess dark forms of the species from London, Kent, Surrey and many other places. The very beautiful deep grey North Kent form (quite similar to some of my Claygate series) is however the form, so far as I can ascertain, which has been used in the experiments of Adkin and Newman to show that the black ab. *rebeli*, Aign., is a recessive, a conclusion with which my only experiment with these two forms inclines me to agree. I find it convenient to call this grey Kent form "*perfumaria*" whatever it may really be. Few entomologists, I find, realise that this species is as variable as *repandata* in its habit of developing a distinct facies in almost every locality.

In 1927 Mr. Haggart sent me two ♀ ♀ of a very distinct pale dirty yellow form of *rhomboidaria* and later in the year very kindly obtained ova for me. This form is found in a locality, to the best of our knowledge very restricted, on the Ayrshire coast. I ought to say that the species occurs in Glasgow, a magnificent very dark form, and that a more ordinary form occurs at Forres, quite like many London and Surrey specimens. A form not unlike *perfumaria* is also found in the Ayrshire locality.

I found Mr. Haggart's form difficult to rear but in July, 1928, I bred four small light ♂ ♂, one of which I paired with a ♀ ab. *rebeli* from North Kent. My hope was that this very vigorous strain would enable me to breed a series of the Ayrshire form in 1929 and recover the black form in the F₂ generation.

From this pairing I reared in 1929, 35 ♂ ♂ and 27 ♀ ♀, all black, a completely surprising result. I had, however, seen the parents *in cop.* and I decided to carry on. Several pairings were obtained, of which I kept 3 broods and sent others away. On July 11th, 1929, a wild Esher ♂ flew into my room ("sembled"?) and by a lucky inspiration I paired this with one of my F₁ black ♀ ♀.

One of my F₂ broods was a complete, and one a partial, failure. The third was a complete success. I bred the following;—

1st F ₂ brood.	17 light ♂ s }	= 20·85%.
	17 light ♀ s }	
	61 black ♂ s }	= 79·15%.
	68 black ♀ s }	

Until near the end the proportion of light forms was exactly 25%.

2nd F ₂ brood.	1 light ♀ = 16·65%.	
	2 black ♂ s }	= 83·35%.
	3 black ♀ s }	

The light ♀ in the second brood, and some half dozen (certainly no more) of the *females* of the first, were like my original Ayrshire specimens. *All* the males, and most of the 1st brood females, were light typical *rhomboidaria*, in no way resembling either the very light Ayrshire forms or *perfumaria*.

From the black F₁ ♀ × Wild Esher ♂ I bred

9 light ♂ s.
5 light ♀ s.
8 black ♂ s.
7 black ♀ s.

or as nearly as possible 50% of each form. The light specimens are all of the ordinary Esher form and do not resemble either of the light

forms obtained in the F_2 broods, or *perfumaria*. The proportion is that to be expected from a pairing of a recessive (light Esher ♂) with a heterozygous dominant (black Kent ♀).

This puzzle in genetics calls for further experiment. But for my fortunate pairing of F_1 black ♀ with a wild Esher ♂ I fear I should have fallen into the trap of describing the Ayrshire form, accepting the experiments of Adkin and Newman, together with my own, as conclusive evidence of its genetic distinctness. I believe it is a distinct form. Others more expert than myself in irregular Mendelian inheritance may perhaps explain the results. I prefer to give no publicity to my own ideas, such as they are, until I can pursue my experiments. It is reasonably clear, however, that the black ab. *rebeli* is dominant to a form or forms of *rhomboidaria* and recessive to another form or other forms. May I add that I shall be glad to hear from any entomologist interested in the species who is willing to help with some experimental breeding with the various forms.

Boarmia roboraria. A melanic form of this species has a wide distribution in Surrey. From a few larvae beaten in the autumn of 1923 I succeeded in rearing a dark ♀ on June 17th, 1924. Then on July 12th, 1926, I had the good fortune to find a ♀ at rest and I obtained ova, from which 24 larvae were successfully hibernated. I bred from these 8♂♂ and 9♀♀ of various forms, all very dark. One ♂ and two ♀♀ are really magnificent. A pairing was obtained, and a melanic ♂ appeared as a second generation on Sept. 10th, 1927. I had to hibernate the remainder on birch in a pot, owing to a household move, and only two eventually emerged.

Boarmia punctinalis (consortaria). A melanic form, also occurs. I have bred this on numerous occasions and it clearly behaves as a simple dominant to the somewhat dark form which represents the type. We do not get the lovely whitish forms which I used to receive from Kent and the New Forest. I am convinced that in the Oxshott district this melanic form is increasing in numbers and there is a long fence on which I can be reasonably sure of finding it on any dull morning while the species is out.

Boarmia bistortata and *B. crepuscularia*. Both these species occur, *crepuscularia* widely spread over the district but never abundant; *bistortata* commonly in most years in a number of rather restricted localities. Both species have melanic forms, which are very different, that of *bistortata* being produced by a general darkening of the ground colour, that of *crepuscularia* by a close dusting of black scales or groups of scales on the normal light ground.

Boarmia punctulata. A dark form of this species is, I think, beginning to appear in a wood near Oxshott, where I have also obtained specimens with well-marked cross-lines.

Ematurga atomaria. This seems to be a convenient opportunity to record the capture, at Oxshott, on July 16th, 1911, of a ♀ with the wing coloration of the ♂.

Bupalus piniaria. Many years ago this was one of the most abundant moths at Oxshott. During the last few years it has become comparatively scarce there, though it seems to be holding its own in other parts of the district.

To bring these rather rambling notes to a close with a change of scene I may perhaps place on record the capture at Dungeness on

August 26th, 1930, of a ♀ *Papilio machaon*, flying over clover in quite fresh condition. I understand other captures have been made in this corner of Kent in recent years, and that a colony existed many years ago at Dover. The specimen does not differ markedly from any Wicken specimens and is quite unlike the French ones I have had, but of course it is quite impossible to say what its origin may have been.

Stray notes on Erebiid species.

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

(1) A new race of *E. lixea*.

It would have scarcely occurred to one in view of the long list of names already attaching to this species, that there still existed, in a European country, an unnamed race, and that one of the finest of the western forms of the species. Such however is the case.

Thanks to the great kindness of Dr. A. Schmidt of Budapest, I have been, recently, able to examine a considerable number of *Erebias* from the Hungarian National collection. Among much of interest, was a nice series of *lixea* from Herkulesfürdő, a locality known to many English collectors. Dr. Schmidt thought that these specimens represented an unrecognised form, and asked me, if this was so, to describe it. His surmise proved correct, and the only reference to this race in literature that I have been able to find, is a comment by O. Diószeghy in his work on the fauna of the Retyezat Mts.; where he states that a form transitional to the eastern *ajanensis* is not rare in various localities. He is perfectly accurate in this observation, for the new race has one or two features in common with *ajanensis*, which are not to be found in other western forms.

E. lixea race **herculeana** nov.

A large form; ♂ 52-56mm, ♀ 52-58mm. (Centre of thorax to tip of forewing × 2). On the upperside the bands of colour are practically the same width throughout, while they extend right to the inner margin of the forewing, starting on the hindwing from the costa, instead of a little below it, as is so often the case. The bands are, further, in most of the specimens, broader than usual, and the inner edge on that of the forewings is nearly straight, and not slightly concave. On the forewings there are three large elliptical black spots, and one very small black dot just below the two apical spots. Spots on the hindwings variable; considerably reduced in size, two to four in number, occasionally quite absent, even in the ♀. In the ♂ there are usually no white pupils in any of the spots, though these may sometimes be present on the hindwing as tiny points. In the ♀ the white pupils may be absent, or present in the two apical spots on the forewings.

On the underside of the forewings the bands are even broader than on the upperside, the two apical spots have distinct white pupils, even in the ♂. The hindwings are most remarkable, being absolutely unicolorous, instead of being more or less marked with a series of bands. On this absolutely plain ground colour, the white streak, so familiar in this species, stands out with vivid intensity, being extremely broad at the costa, and continuing right across the wing in an unbroken line, thus resembling *ajanensis*, though of course the streak is not so

broad as in the latter. In all other western forms of the species the streak is broken, and more often than not does not extend beyond the middle of the wing. The antimarginal band which usually lies just outside the streak, is scarcely visible, faint and narrow, indeed when looked at casually it is not seen at all. The spots usually situated in this band are, on the contrary, very prominent, the red rings very sharply marked of a dark mahogany colour, the black centres small but distinct, and no white pupils. These spots number three to five, the latter number being very rare in other forms of the species where as the rule there are only three or four. In the ♀ the white streak does not seem to be quite so continuous, but the ground colour is just as unicolorous, which is the greatest contrast to the usual very variegated underside of the ♀ hindwing. The spots also, in this sex, are smaller, and the rings less sharply marked and more yellowish in colour. There are no basal markings inside the white streak in either sex, though one or two specimens show a trace of a second white line, marking off the area where normally the basal band would be.

The chief characteristics of *herculeana* are:—its large size and very fully developed bands coinciding with the loss of the white pupils on the upperside of both wings as well as on the underside of the hindwings; the other races in which there are no pupils usually have the bands reduced in width or even broken, with a strong tendency to a smaller size. Added to this are the unicolorous underside of the hindwings, the continuous white streak and very prominent spots, in the ♂ s.

It is quite possible that the ♀ s may show these last characteristics more than I suppose, for there were only three in the series, and unfortunately none of these were from Herkulesfürdő.

One ♂ (Herkulesfürdő) and one ♀ (Retyezat Mts.) are especially characterised by the enormous development of the bands, which are double the width they are in some specimens; these fine specimens are referable to ab. *borsa*, Strand. *Herculeana* is widely distributed in the western Transylvanian Mts., occurring (according to Diószeghy) in many localities in the Retyezat Mts., from where there are also several specimens in the Hungarian collection. In these localities other forms of the species are plentiful also; while, so far, from Herkulesfürdő I have only seen specimens of *herculeana*. In view, however, of the fact that none of the western races known, have developed anything like complete dominance in any locality, I feel more or less certain that *herculeana* is no exception, and will be found in the future not to be the only form of *Ugea* in the Herkulesfürdő district. Such variation as the present specimens show, further supports this supposition. It is a difficult insect to describe, but is nevertheless very striking to the eye.

(2) *E. epiphron* ssp. *transylvanica*, Rbl.

Another feature of great interest in the Hungarian collection was a series of *epiphron* from various localities in the Carpathians and Transylvanian Alps, referred (doubtfully) to *transylvanica* by Dr. Schmidt. Among others, were a series from the Retyezat Mts., and two ♂ s and one ♀ from Buceacs; the latter the locality from which Rebel's types of *transylvanica* came.

These specimens differed so much from each other, that Dr.

Schmidt, who thought the Retyezat specimens agreed with the description of *transsylvanica* felt doubtful if the others (in spite of the locality) could be Rebel's insect. Thanks to Prof. Rebel I have been able to establish the identity of these very interesting races, for he most kindly lent me his type specimens and another specimen for dissection.

The types agreed exactly with the specimens in the Hungarian collection from Bucsecs (eastern Transylvanian Mts.) and they were of course equally distinct from the Retyezat (western Transylvanian Mts.) specimens. The latter are a highly specialised form of *transsylvanica*, and may be described as:—

E. epiphron ssp. *transsylvanica* race **retyezatensis** nov.

This form shows all the characteristics of *transsylvanica*, but developed to such an exaggerated extent that at first sight it appears to be a totally different insect. It is, however, beyond all question a development of the latter. The whole coloration, in both sexes, is much more brilliant upper and underside, the bands being of a golden, rather than reddish shade of colour. On the upperside of the forewings the band contrasts with the ground colour much more sharply, is often much broader, and extends at the apex of the wing more deeply and markedly towards the base than is the case in *transsylvanica*, while the black spots are usually larger and elliptical, instead of round. On the upperside of the hindwings, in contradistinction to the great development of the bands on the forewings, there are only four, sharply outlined, oval spots, standing well apart from each other and containing black spots of varying size. In *transsylvanica* these spots are round, with a soft hazy outline, and are often so extended as nearly to touch each other. In *retyezatensis* the form of the hindwing spots is similar to those seen in *E. christi*; another feature being that the second from the costa is always much the largest, as in *E. eriphyle*.

The development of the forewing band attains the maximum ever found in any form of *epiphron*, equalling, and even passing the width shown by *silesiana* ♀. The latter also has, not infrequently, the inward extension of the spots of the forewing band, but not any more marked than in *transsylvanica*, and it also differs from *retyezatensis* in having round spots in the bands, and a broad continuous band on the hindwings, while of course all the bands are of the red shade of colouring.

Another characteristic of *retyezatensis* is that the forewing bands are sharply outlined on the inner edge in the ♂s, while being almost entirely undefined in the ♀, they are also much wider in the latter. On occasions however, specimens of the ♂s do occur which, so far as the bands are concerned, are identical with the ♀s. These extreme ♂s have been described as ab. *latefasciata* by Diószeghy. The reverse form of variation also occurs in the ♂s, specimens being found without the baseward extension of the band at the apex of the forewing. On the underside *retyezatensis* is somewhat similar to *transsylvanica*, but the markings are brighter and clearer, as on the upperside, and contrast with the ground colour rather than merge into it, as in the latter.

As already stated, *retyezatensis* is really a highly developed form of *transsylvanica*, but both seem constant in their respective habitats; it is only to be expected, however, that each may produce the other

aberrationally, on occasions. *Petyezatensis* has only been recorded from the Retyezat Mts., where it is widely distributed; *transsylvanica* flies in the eastern Transylvanian Mts. and extends far north up the Carpathians, ultimately gaining its most northerly habitat in the Tatra.

(3) A dwarf race of *E. sedakovii*.

I have received a minute form of this species from Bang-Haas, both in 1929 and 1930. Measures give 38-40mm. for both sexes, as compared with 48-54mm. of ordinary specimens. A better idea of the size can be obtained from the fact that these little *sedakovii* are slightly smaller than *E. tyndarus* ssp. *murina* at the largest; i.e., as it is found in its Swiss localities in the Cantons of Vaud and Valais. This remarkable little race may be known as:—

race **sajanensis** nov. (= *sajana*, Bang-Haas, *il.*).

A dwarf race, 38-40mm. in size (centre of thorax to tip of forewing $\times 2$), otherwise exactly as the type. Habitat; Saján Mts.

A change in the name used by Bang-Haas was necessary, *sajana* having been used more than once in *Erebia* before.

(4) Correction. *E. euryale* race *isarica*, Heyne (= *böhmerwaldensis*, Warren).

I am greatly indebted to Herr J. Soffner for calling my attention to a mistake of considerable importance in my notes on this race of *euryale* (*Ent. Rec.* 1930, p. 147). Thanks to him I am now in a position to establish finally, the correct use of this very troublesome name.

In my previous article I stated that Heyne gave the name *isarica* to the insect of the *Isergebirge*, whereas the locality he actually gives is the *Isargebirge*. I was led into this mistake by the fact that, in reality, there is no mountain range of this name; I therefore took it as a misprint for *Isergebirge*. In point of fact Heyne intended his name to apply to the insect occurring in the mountains of southern Bavaria, naming them after the river *Isar*, thus using "Isargebirge" in the sense of the mountains appertaining to the river Isar. This of course makes a great difference in the correct use of the name.

Since my last article, I find that my *böhmerwaldensis* is by no means confined to the Böhmer Wald, as I then supposed, but that it extends much further south right into the Bavarian Highlands. In this district, the inevitable blending of races, which I drew attention to before, takes place, and both *clanis* and *böhmerwaldensis* occur, though probably keeping to separate localities, and only occurring as aberrations together; i.e., single specimens of *clanis* with *böhmerwaldensis* and vice versa. I have not as many data on this point as I would like, but this is what normally occurs where two races of this species are located in close proximity.

From this it is evident that *isarica* must be used for my recently described race. There can be no doubt that Heyne did not distinguish between *clanis* and *böhmerwaldensis*, and that both occur in the district he indicates, and that therefore the two are covered by the one name. Failing an actual type specimen one cannot say which race he was describing, and I doubt if such a type exists; even if there is the series of specimens he used, in any collection, it is more than likely it

would contain the two. In this case Frühstorfer's action in describing *clanis*, automatically restricted Heyne's *isarica* to the other race; *i.e.*, *böhmerwaldensis*, for which it will stand. As a matter of fact, Heyne's description is a little more in accord with *böhmerwaldensis* than *clanis*, though not enough to be accepted as a proof by itself.

This change does not in any way alter the actual facts detailed in my last article, it is only necessary to use *isarica* instead of *böhmerwaldensis* and, of course, to note that the former does not apply to the ♀ ab. of typical *euryale* as I stated. The latter aberration had best be included under *pleniocellata*, Hartig, although that name was described as a ♂ ab. Otherwise all I wrote concerning *euryale*, *adyte*, *clanis* and *tramelana* remains unaffected. It is quite possible that *isarica* will be found in the Salzburg Alps too, some specimens of *clanis* from Styria are very close to it, in their unusually bright colour, but they still are clearly *clanis* in their other characteristics.

NOTES ON COLLECTING, etc.

PTEROSTICHUS CUPREUS, L., AB. CAESICIUS N.AB.—In 1903 I recorded [*Irish Nat.* 12 61 (1903)] a violet blue aberration of *Pterostichus cupreus*, L., taken near Caragh Lake, Co. Kerry, on June 17th, 1902, under the name of *coerulescens*. This name, however, cannot stand as our nearly allied species, which we used to call *P. versicolor*, Stm., is considered to be a synonym of *P. coerulescens*, L., and the Irish aberration in question is an ab. of *P. cupreus*, L. In the European Catalogue Edn. I (1891) *coerulescens* was given as an ab. of *cupreus*; hence the error.

I therefore propose the name **caesicius** n.ab. for this insect. The head, thorax, and elytra are dark violet blue, the antennae and legs black, except the first two joints of the former, the spurs, and tarsal claws, which are red. I have selected this name to avoid confusion, as there are already insects named—*Pterostichus coerulescens*, *P. violaceus*, and *P. cyaneus*.—HORACE DONISTHORPE (F.Z.S., F.E.S.).

CURRENT NOTES AND SHORT NOTICES.

In recent numbers of *Lambill. B.-J.* Lemphe of Amsterdam has been looking up the nomenclature of the numerous aberrations of the Rhopalocera which have been brought forward more or less recently, particularly those which have been published in the above magazine. Possibly we may give a summary of these when the articles with the discussions are completed.

Does anyone at the present time obtain *Apamea guenei* which used to be obtained in large numbers near St. Anne's-on-Sea? There are other Noctuids which one hears nothing about of late years. Does anyone get *Heliophobus hispidus* (or *oditis* as we are told it should be called)? Or *Agrotis lunigera* (*trux*) which was formerly so abundant at Freshwater? Or *Callimorpha hera* the Devonshire Tiger which was for years considered as without a British character? Finally does any one sugar? The magazines give us no reports of such doing nowadays. Is the summer time all to blame? Surely some provincial collectors live near available spots for such work.

In the *Bull. Soc. Lep. Genève* 1930, there is recorded a rare monstrosity, an example of *Thestor ballus* with five wings, the right upper

wing being much atrophied. We much regret that the veteran and illustrious artist M. Culot has by reason of his age had to give up his work on the plates, which we all used to appreciate so well. Mr. N. D. Riley, of the Brit. Museum, describes a new species of *Mylothris* (*Pieridae*) from Madagascar, *M. audeoudi* with two forms *bicolor*, and *unicolor*, illustrated by a coloured plate portraying ♂, ♀, and the two forms.

Throughout 1930 *Lamb.* has been issuing each month admirable photographic reproductions of aberrations of Rhopalocera which have occurred in Belgium, mostly from the actual examples from which the original descriptions were made. An admirable record is thus being obtained of the actual things of which the descriptions are the word pictures.

The concluding part of vol. VI. of the *Spanish Revista Espanola de Entomologia. Eos*, was published in December and contains 114 pages with many illustrations. Three articles deal with Orthoptera of which one is by B.P. Uvarov, one on Coleoptera (*Cerambycidae*), one on Hymenoptera (*Chalcididae*), one on Pseudoscorpions, and one on Diptera (*Culicidae*). There are 3 plates illustrating the article on the curious genus *Systella* (Orthop.) from the Malay region.

How soon shall we in this country get a full Annual Report of our great National Museum comparable with the Report published of the American National Museum. *The Report of the United States National Museum* for 1930 of more than 200 pages closely printed is just to hand. It contains a short summary of the work of the year in connection with the museum, the growth of the collections (355,308 biological specimens were added), the field work and exploration carried on by various members of the staff (Dr. Aldrich was in Norway and subsequently went to California), the educational work of the museum (publications and lectures), statistics of the visitors to the museum, publications apart from educational pamphlets, the library, buildings and equipments of the year and details of organization and staff. Then follow long reports of the various departments by their curators, nearly 60 pages of a List of Accessions and a list of the publications and papers issued during the year. A worthy Report, of a great work.

The *Annals. Nat. Hist. Mus. in Wien* for 1930 has just been published and contains among other matter:—(1) Reports of the Diptera and Mantodea collected by Dr. H. Zerny on the Amazon in 1927. (2) The 2nd part of the Revision of the *Gryllacridae* in the Vienna Museum by H. H. Karney. (3) Reports of the Micro-lepidoptera (2 plates) and of the *Megalopygidae* collected by Dr. Zerny on the Amazon in 1927. (4) On the species of *oneilella* (Hym. Paras.) in the Vienna Museum by the late Dr. Waterston. The volume is amply illustrated with 5 plates and 157 figures in the text of 450 large quarto pages. We note that in the collection of S. American Micros collected by Dr. Zerny there were 9 new genera and 69 new species out of the 300 species sent, according to the determination of Edw. Meyrick.

REVIEWS AND NOTICES OF BOOKS.

“A CATALOGUE OF THE RECORDED COLEOPTERA OF THE BRITISH ISLES,”
By SIR T. HUDSON BEARE, B.A., B.Sc., F.E.S., etc. VII.+55 pp.,
Janson and Sons, London (1930).—This work is a considerable
advance on all previous lists, and was badly wanted, bringing, as it

does, the British list up to date, giving many necessary changes in synonymy, and supplying labels for the cabinet. We must heartily congratulate our esteemed colleague on what must be considered, on the whole a very excellent piece of work.

The order followed is [as in the last catalogue by Beare and Donisthorpe (1904)] that of the late Canon Fowler's Coleoptera of the British Isles; except in the genus *Atheta*, where all the names of the subgenera and allied genera are used; a great improvement, which makes this unwieldy and difficult group easier to deal with.

The lists of doubtful and introduced species have been left out and many of these names brought into the body of the catalogue. This has its advantages, though in some cases the names are lost to us altogether, and others assume a too important status.

The total number of species listed is 3566, but with the addition of two published lists of addenda, together with some in the text, it reaches the considerable figure of 3590. The printing, paper and general get up is good, but the printing of a name in smaller type when it is too long to get into the same line with the author's name is a defect.

The curtailment of the abbreviations for the author's names is perhaps too extreme.

The chief criticism we have to make is that the author has followed Winkler and the European Catalogues too closely, and consistently. In noting a few of the cases where we disagree we are therefore finding fault with his source of information, and not with the author himself:—

It is very doubtful if *Amarochara bonnairei*, Fauvel, has priority over *A. glabriventris*, Rye. Both names were published in 1865, but it is certain Rye's name was published in February of that year, and judging by the pagination of the two papers, Rye's would appear to be the first published.

Atheta (Atheta) ignobilis, Sharp and *A. (A.) nitidicollis*, Fair., as proved to us by Mr. Williams, are good and distinct species, and not synonymous. We have taken both species in Windsor Forest.

Batrisodes "laportei" is incorrect; C. Aubé, who described the species in 1833, wrote *Batrisodes delaportei* and so it must remain.

"*Myrmecoxenus*" should be written *Myrmecixenus* as we have shown elsewhere [*Ent. Mo. Mag.* 66 154 (1930)]. Aug. Chevrolat founded the genus in 1835, and spelt it *Myrmecixenus*.

As pointed out by us [*Ent. Rec.* 25 92 (1913)], our myrmecophilous and northern "*Cetonia*" is the var. *metallica*, Hbst., and, of course, is a subspecies not an aberration. *Potosia cuprea*, F. var. *floricola* auct. = *metallica*, Hbst.

Elater praeustus, F., and *E. coccinatus*, Rye, are quite distinct species, and not synonymous; they differ from each other in shape, colour, pubescence, puncturation, etc.

The author has paved the way for what is really wanted now—a British Catalogue, not simply a list of names. At least all the names that have been used in British lists and literature should be given, with the synonymy, references to and dates of the original descriptions, etc. This is, of course, a task which no one man, or even two or more, could hope to undertake with success unless with the help of all our specialists

in Coleoptera, with a committee of British Coleopterists to organize, direct, and superintend the publication.—HORACE DONISTHORPE.

Parts 19 and 20 of the Supplement to *Seitz' Palaearctic Butterflies* have just been published, and contain the continuation of the additions to the *Lycaenidae*. The particulars as to *Plebeius aegon* (*argus* auct.) are completed. In dealing with these well distributed species it has been found convenient to consider the geographical sections more or less separately. For example, in the present species the individual aberration which may reasonably be expected to occur in all races and subspecies is dealt with first; colour aberration, aberration in size, and shape and arrangement of marking, suppression and superabundance of dots, eyespots, etc. The British, Central Swiss, Alpine, Tyrol, Dalmatian and Balkan, Pyrenean, Spanish, Italian (Apennine) Asia Minor, Turkestan, Altai, Japanese, etc., localities are all separately grouped, and the prevailing forms are the better contrasted and understood. The species which Chapman and Verity separated from *aegon*, viz., *insularis* distributed from N. Italy and S. France to Japan is adequately dealt with. The consideration of *argus*=*argyrognomon* is taken as an opportunity to emphasise the confusion of using the name *argus* for two nearly allied species, and to condemn the introduction of the name *idas*. The erratic use of the name *argus* in the past "has made it difficult to classify correctly to each species the various forms that should belong to them." This species is dealt with in the same way as *aegon*, Courvoisier's terms being largely used for the aberrations. In treating of *sephyrus* (spelt correctly) the opportunity has been taken to point out that the name *lycidas*, Trapp nec Meigen, must be replaced by *trappii*, Vrtý. The compiler has recognised *abencerragus* as a true species from *baton*, and allocated the previously named forms to their proper species; *vicerama*, Moore, is similarly dealt with. Concerning the widely distributed and by no means common *pheretes* there is room for much more research before it can be adequately understood. *Medon*=*astrarche* is treated separately from *cramera*, Ersch., and an attempt made to correctly allocate the recorded forms. Particularly interesting and useful will the account of *icarus* be found by our British entomologists, and an attempt has been made to collate the various aberrational names with the result of considerable suppression and substitution in nomenclature. Of course it is dealt with geographically as with other wide-spread common species. To continental collectors the paragraph on *thersites* will be found very useful. The beautiful *hylas*, *meleager*, *escheri*, and *thetis*=*bellargus*, and *coridon* are fully dealt with. From the last *albicans* has been separated as a true species and the named forms allocated. Of course it is quite impossible to give figures of all but very few of the forms referred to, although 50 to 80 figures are on each plate. The matter is quite up to date for the recent researches of Hemming, Verity and others are here faithfully recorded and assimilated. In the two parts are 32 pages and two plates, both of which are well executed, that of the "Lycaenids" extremely so. Of this supplementary volume up to the present there have been issued 288 pages and 15 coloured plates.—Hx.J.T.

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

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse*, Hill House, Frances Street, Chesham, Bucks.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins*, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), *gothicina* forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—*A. J. Wightman*, "Aurago," Bronsfields, Pulborough, Sussex.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—*C. Zacher*, Erfurt, Weimar, Street 13, Germany.

DUPLICATES.—Indian Butterflies.—*A. F. Rosa*, M.D., 4, Bellevue Crest, Edinburgh.

WANTED.—Seitz Macrolepidoptera, Vol. 5, Text only.—*Rev. T. W. Adam*, Riddlesworth Rectory, Diss.

CHANGE OF ADDRESS.—*J. F. Bird*, "Eastholm," Churchdown, Glos.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 18th, April 1st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. March 26th, April 9th, 23rd.—Hon. Secretary, Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

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June in the Balkans.

By P. HAIG-THOMAS, F.E.S.

This summer I was fortunate enough to be able to join my friends Mr. and Mrs. Cox and motor from England down the Adriatic coast to Santa Quaranta, a small port opposite Corfu in the South of Albania. Here we left the car on June 3rd, and, after staying two days in Corfu, went via Patras to Kalavryta in the Peloponese, where we stayed from June 6th till June 15th. June 16th I spent unsuccessfully at Mesolongion, and the 17th found us back at Santa Quaranta. On June 18th we motored to Korce, where we remained till the 23rd, when we motored to Monastir. We collected in the hills S.E. of Monastir on the 24th and after motoring most of the night I caught the Oriental Express at Gracko arriving back in England on June 27th.

Unfortunately we could not have chosen a worse year, following a fine and hot April the weather in May and June was appalling. We were too late for the spring insects and except in a few places butterflies were scarce and in bad condition. Between Trieste and Cettinje, we stopped at all likely spots, whenever the sun was out; much of the ground, which was covered with a species of wild sage in flower, produced absolutely nothing. There is plenty of good country between Gospic and Sebenik and again some few miles South of Split, where the road leaves the coast. North of Ragusa we collected in two places one of which was the Val d'Ombla. The best looking country of all, however, was the slope of the hill, which lies between Cattaro and the pass over to Cettinje, and up which the road winds. We arrived here late in the evening after sunset and were therefore unable to collect, but there was an abundance of vegetation and wild flowers, and the ground was obviously not grazed.

The country around Cettinje is all now under cultivation, and the the rocky hills are heavily grazed. The best collecting ground appeared to be on the road to Antivari about $1\frac{1}{2}$ miles from Cettinje. The pass above Antivari should be well worth working, but this could only be done with a car. Between Scutari and Durazzo there was a great scarcity of butterflies, much of the ground was cultivated and flat, except for a few low dried-up outcrops of limestone. This applies also to the country between Durazzo and Berati. On the other hand between Berati and Santa Quaranta there is any amount of good country. Unfortunately we had no sun during this part of the journey and were therefore unable to explore its possibilities. Except for the last twelve miles to Korce, most of the country between Santa Quaranta and Korce looked good. We collected for half an hour a few miles from Santa Quaranta at 1100 feet, but after this it poured with rain for the rest of the day.

At Korce the Hotel Palas is quite moderate in price and clean. Between June 18th-23rd we had a few hours sun on the 22nd and a glimmer for a few minutes on most of the other days, apart from this we had heavy rain, hail, and a high wind practically the whole time. There is a ridge of mountains immediately south of the town, but as they were never clear of cloud we never visited them. This is the only ground which is workable from Korce without a car. The rest of the country around Korce consists of a well irrigated and entirely cultivated plateau sloping gradually down to Lake Malik, which is mostly marsh.

At the north west end of the Lake there are some low limestone hills covered with low oak scrub, but with a few clearings on them. These hills are the watershed between Lake Malik and Lake Ochrida. Here and in the marsh we did all our collecting during our stay at Korce. On leaving Korce for Monastir the road crosses a pass about 3500 feet above sea level, here we collected for an hour on the 23rd and ought to have stayed longer, but we had been told the road was very bad near the end of Lake Prespa and as we had also to pass the Albanian and Jugo-Slavian frontier, we did not think it advisable to delay longer.

The whole of the ridge between Lake Ochrida and Lake Prespa appears to be good ground and could be worked with a car from Korce. We took a number of species on the pass, but they were mostly in bad condition on account of the hailstorms of the previous week. The country to the north east of Monastir was very much dried up. Due west there is a fine mountain called Mt. Peristeri over 8,000 feet high. In a valley running up to the highest point we found many insects up to 5,000 ft. on June 24th.

At Patras on June 6th I collected in a little wood for a couple of hours just behind the town.

During our stay at Kalavryta I collected three days on Mt. Chelmos, the rest of the time was spent between Kalavryta and the tunnel below Megaspelion, but the weather was far from being good, and one or two days were quite hopeless. At Corfu where it was hot and fine, I collected around Achilleon. I should have liked to have explored the hill at the north of the island, but our time was too limited. Wherever we went in Greece, Albania and Jugo-Slavia, we met with the greatest courtesy from the people, their dogs however still keep up their bad reputation and it is well to be armed with a thick ash plant walking-stick in case stones are not handy.

The following is a list of insects taken, with their localities:—

Papilio podalirius.—A few worn specimens seen in all localities. Fresh specimens obtained in Corfu.

P. machaon.—Worn at Corfu, Mesolongion, and Korce; not common anywhere except at Mesolongion, where it was very worn.

P. alexanor f. *maccabaeus*.—Two worn specimens of this fine insect were taken below Megaspelion and others were seen. One specimen also worn taken at Korce.

Zerynthia polyxena.—Common at Cettinje a few still fresh; more than half the females taken were f. *ochracea*. A fresh male taken on the pass above Antivari 3000 feet and others were seen.

Parnassius mnemosyne.—One male only at Cettinje; also seen at Monastir in good condition.

P. mnemosyne f. *athene*.—Fresh at 6400 feet on Mt. Chelmos and not uncommon; females very scarce.

Aporia crataegi.—Common locally in Albania and at Kalavryta.

Pieris brassicae.—Very abundant in Corfu and at Kalavryta; common in other places. The specimens in Corfu and at Kalavryta were exceptionally fine and large.

P. rapae.—Not so common as *brassicae*, but it occurred in most places.

P. manni.—I took this insect commonly but worn on the west side of the pass between Gospic and Sebenik, also fresh south of Split.

P. ergane.—This insect occurred commonly everywhere on the dry

mountain slopes South of Maikovic except in Corfu. The two generations must overlap in almost all localities.

P. napi.—My only record of this insect was in the marshes around Lake Malick near Korce, where it was common, but worn.

Pontia daplidice.—Common everywhere at Korce, and at Kalavryta the summer form was fresh and very large.

E. belia r. *maxima*.—The 2nd generation *ausonia* was very common at Santa Quaranta, Corfu and at Kalavryta. The form taken up to 6400 feet on Chelmos did not differ from those taken nearly 5000 feet lower in the Valley below Megaspelion. The specimens are very large.

Euchloë cardamines.—One fresh male taken near Monastir on June 24th.

Gonepteryx rhamni.—Seen in Corfu but not taken. I have no record in other places.

G. farinosa.—Quite common below Megaspelion, afterwards taken up to 5000 feet on Chelmos. The largest male which I took measures 58 mm. across the wings.

G. cleopatra just emerging at Corfu and not uncommon. It was rare below Megaspelion.

Colias hyale.—I only saw this insect at Kalavryta and Korce, where it was rare.

C. myrmidone r. *balcanica*.—I took a fine large female, which appears to belong to this species. Unfortunately I mistook the insect, which I found on Mt. Chelmos at 4500 feet for *croceus* and it was only on my last day on Chelmos that I took this single specimen. The sun went in for the day almost immediately afterwards. *Croceus* and *heldreichi* both occur on the same ground.

C. croceus.—Common nearly everywhere.

C. aurorina r. *heldreichi*.—We took this insect fresh at 3500 feet on the lower slopes of Chelmos on June 8th. By June 13th it had disappeared from this altitude, but was common between 4000 and 5000 feet. A few of the female form *fountainci* were taken, but they were scarce.

Leptosia sinapis.—Common below Megaspelion, at Korce and at Monastir.

Erebia medusa.—Two or three worn specimens were taken near Korce on the pass leading to Monastir at 3000 feet, a few fresher specimens were taken near Monastir at 5000 feet on June 29th. This form is larger than any specimens I have obtained in Switzerland, but otherwise it does not differ much from the form taken at St. Triphon. It is very much larger than the two specimens I obtained at Sarajevo, which were *E. medusa* r. *psodea*.

Melanargia galathea r. *turcica*.—Only taken near Korce just emerging; they appear to be identical with those taken at Sarajevo last year, but not as dark as some of the specimens from the Karawanken Mts. near Laibach.

M. larissa.—We took this insect commonly at Corfu, Kalavryta, at 1100 feet on the road between Santa Quaranta and Gjorgucati, also at Korce. The insect varies considerably both in size and markings, hardly any two specimens are identical. The form at Kalavryta was small, many specimens being very little larger than *galathea*. The Korce form was slightly larger and intermediate between the Kalavryta *larissa* and *janygia*. The Corfu race which has been named *freyeri* is

considerably larger, but the finest form of all was that found near Santa Quaranta. This race was by far the largest and I suggest the name *M. larissa* r. **coxi** for it. My largest male and female both measure 62 mm. across the wings.

Satyrus syriaca.—One specimen at Corfu.

S. hermione r. *atticana*.—Just emerging at Kalavryta when we left.

S. circe.—One female taken near Santa Quaranta.

S. anthelea r. *amalthea*.—Very common at Kalavryta and on Mt. Chelmos up to 4,000 feet. The females however were difficult to find and were never seen on the wing unless they had been previously flushed. Mrs. Cox took a fine female near Korce, otherwise it was not seen in that locality.

S. briseis.—Mr. and Mrs. Cox found this insect abundant on the north side of the pass on the road between Prilep and Veles flying with many other insects. They obtained a fine series. The race is larger than *meridionalis*.

Hipparchia semele.—I took this insect at Corfu, Kalavryta, near S. Quaranta, and at Korce. We were too early for it as only a few specimens were seen; in fact this applied to all the Satyrids in Albania. The race was identical in all localities.

Pararge aegeria.—Common and fresh locally at Patras and a few worn were seen below Kalavryta.

P. roselana.—Common locally and at Kalavryta. Just emerging at Korce.

P. megera.—We saw this insect in all localities, but nearly always worn.

P. maera.—Common near Sebenik and Cettinje.

P. hiera.—I took a few very worn specimens on the high ground near Monastir.

Epinephele ida.—Two specimens at Corfu and a few very worn at Mesolongion.

E. jurtina.—At Corfu and Korce.

E. lycaon.—One specimen taken at Korce.

Coenonympha leander.—One specimen on the pass near Korce, one or two seen near Monastir; evidently just emerging.

C. arcania.—Not uncommon in the same localities as *leander*. It approaches the form found near Constantinople.

C. pamphilus.—Common everywhere in Dalmatia and Albania, also in Corfu and Kalavryta. The specimens have on the hindwing a submarginal row of ocelli and belong to the race *thyrsides*, Stgr.

C. tiphon r. *rhodopensis*.—One fresh male and one or two damaged specimens taken near Monastir. We had hoped to have taken this insect around lake Scutari and in the marshes at Korce.

Limenitis camilla.—Seen nearly everywhere but not common.

Pyrameis atalanta.—Not common anywhere.

P. cardui.—Owing to the bad weather this insect was scarce this year.

Vanessa io.—Only taken at Monastir where it was fresh.

Aglais urticae.—Taken on Mt. Chelmos, between Korce and Monastir, and near Monastir where it was common. I took three specimens of the form *turcica*, one at each locality.

Eugonia polychloros.—Very common and fresh at Kalavryta, otherwise not seen.

Euvanessa antiopa.—Seen near Santa Quaranta and at Monastir.

Polygonia egea.—Very common all along the Dalmatian coast, mostly worn.

P. c-album.—A few seen at Kalavryta, Korce and Monastir.

Melitaea aurinia.—One fresh male taken near Gospic, otherwise not seen.

M. cinxia.—Common at Cettinje, very worn at Megaspelion, still fresh at Monastir.

M. phoebe.—I took a few odd specimens of this insect at Cettinje, near Durazzo, at Megaspelion and at Korce. It was nowhere common this year. Two specimens from Sebenik appear to be identical with the form from the south of Greece.

M. didyma.—A few at Cettinje and Santa Quaranta. Common in Corfu, a few taken near Megaspelion; they all appear to belong to the same race.

M. trivialis.—Two taken between Resan and Ochrida, June 25th, large and dark.

M. athalia.—One or two near Korce, common on the pass on road to Monastir, and near Monastir; presumably race *mehadiensis*.

Brenthis daphne.—One fresh male at Monastir.

Issoria lathonia.—A few seen in Dalmatia only.

Argynnis niobe f. *eris*.—Not uncommon at Korce and Monastir.

Dryas paphia.—One male at Corfu and one female at Kalavryta. Other specimens at Kalavryta were all ab. *immaculata*.

D. pandora.—A few at Kalavryta and at Korce.

Libythea celtis.—Very common in several places on the road between Scutari and Durazzo.

Strymon spini.—Fresh at Sebenik and near Ragusa.

S. ilicis.—Common near Durazzo and at Korce, abundant at Kalavryta. The females are very dark.

S. acaciae.—One taken at Korce and one at Kalavryta.

Heodes alciphron f. *meliboeus*.—At Korce and Monastir only; not rare. Mr. and Mrs. Cox found it abundant near Resan.

Chrysophanus dispar, subsp. *rutilus*.—We took a few fresh males and eight fresh females in the marsh at Lake Malik near Korce. Mr. Cox took one female near Resan. The weather was so bad that it was difficult to say whether the insect was common. The females are much larger than the Buda Pest specimens I have seen.

Heodes dorilis.—Kalavryta, scarce, also at Korce and Monastir.

Syntarucus telicanus.—One specimen at Kalavryta.

S. balcanicus.—One worn female near Ragusa.

Plebeius argus.—Korce and Monastir only.

P. sephyrus.—Common, Mt. Chelmos.

Scolitantides (baton r.)=vicrama.—Common near Maikovic, one specimen taken in Corfu and one at Korce.

S. orion.—The commonest Lycaenid in Dalmatia, otherwise not seen.

Polymnatus medon (astrarche).—Found almost everywhere, but not common.

P. anteros.—I saw a male of this insect near the top of the pass at Antivari, May 31st. I took two fresh males on the pass near Korce and about a dozen males rather worn and two fresh females near Monastir, June 24th: also found near Resan by Mr. and Mrs. Cox.

- P. icarus*.—Common in all localities.
- P. amandus*.—Kalavryta, near Korce and Monastir.
- P. hylas*.—A pass near Korce, very worn also at Monastir.
- P. escheri*.—I took two forms of this insect, one near Sebenik and the other at Kalavryta, where it was very common on lower slopes of Chelmos.
- P. thetis (bellargus)*.—Sebenik, Korce and Monastir, common.
- P. semiargus*.—Common near Monastir and on pass near Korce.
- Iolana iolas*.—One seen near Cetinje.
- Glaucopteryx (helena) melanops*.—Occurred in small numbers a few still fresh at 4500 feet on Chelmos second week in June.
- G. cyllarus*.—A few worn in Dalmatia.
- Lycanopsis argiolus*.—Kalavryta only.
- Lampides baeticus f. orientalis*.—One specimen quite fresh near Sebenik.
- Spilothyrus althaeae*.—Korce and near Monastir.
- Powellia orbifer*.—Widely distributed and common at Kalavryta.
- Hesperia serratalae var. balcanica*.—Near Sebenik and Cetinje, Monastir common.
- H. armoricana*.—Sebenik, Cetinje, Kalavryta and Korce.
- H. malvoides*.—Sebenik and near Monastir.
- H. phlomidis*.—I took a fine series of this insect just out, on the hills between lakes Malik and Ochrida on June 22nd. The insect was flying over the limestone outcrops in the clearings among the oak scrub. It was easy to catch if flushed, when the weather was cloudy. But as soon as the sun became hot it became very active and almost impossible to follow. I took 17 males and six females.
- H. sidae*.—Only seen near Monastir, June 24th, when it was locally common and fresh.
- Nisoniades tages*.—A few at Sebenik and Monastir. Common on Mt. Chelmos at 6000 feet.
- Gegenes nostradamus*.—We took four specimens of this insect on May 29th, two or three miles north of the Val d'Ombra near Ragusa. One was fresh and three were worn. Evidently we were too late for the first brood.
- Thymelicus acteon*.—One specimen at Cetinje on May 30th.
- Adopaea flava (thaumas)*.—Kalavryta and Patras, common.
- Argiades sylvanus*.—Locally common in Albania, one taken at Megaspelion.
- One hundred and three species.

Notes on *Heliothis peltigera*, Schiff.

By H. B. D. KETTLEWELL.

I have been prompted by Dr. Cockayne's most interesting article under this heading (page 161, Vol. XLII.) to write my own observations on the forced pupae of this species in the autumn of 1928. This stimulus to write these notes has been further increased by the fact that my results are entirely different not only from Dr. Cockayne's but also from everybody else, who had the good fortune to breed this species in this year.

Briefly his results were these, that pupae forced in the autumn of 1928 from larvae obtained a month or so earlier produced "light"

	FORCED OR UNFORCED	COLOUR.	NUMBERS.	DURATION OF PUPAL PERIOD.	TEMPERATURE DURING		HUMIDITY.
					RESTING PERIOD.	FORCING PERIOD	
Dr. Cockayne Lot 1	Forced	Light	16	Oct. 2—Oct. 27. 25 Days	Constantly cool	Very hot	Very dry
Dr. Cockayne Lot 2	Forced	Light	16	Oct. 10—Nov. 10-17. 33 Days (average)	Constantly cool	Very hot	Very dry
Dr. Cockayne Lot 3	Forced	Light	16	Oct. 10—Nov. 24. 48 Days, Dec. 2 (average)	Constantly cool	Very hot	Very dry
Mr. Worsley Wood	Forced	Light	70	Sept. 20—Dec. 2. 70 Days (average)	Constantly cool	hot	Very dry
Mr. H. B. Williams	Forced	Light	?	?	Constantly warm	hot	Very dry
H. B. D. Kettlewell	Forced	Dark	16	Sept. 20—Oct. 20. 43 Days	Varying day and night temperatures	Very hot	Saturated
Dr. Cockayne	Unforced	Dark	23	Oct. (1928)—Sept. (1929). 300 Days (average)	Very cold Very hot	Hot (heat wave)	Dry
Mr. H. B. Williams	Unforced	Dark	9	"Three weeks to a month." 24 Days	Constantly warm	?	In damp fibre

examples which are absolutely and entirely different from the "dark," "tawny olive" and "wood brown" forms he obtained from 1929 unforced pupae. He does not pretend that there are not intermediate forms, but taken as a whole the difference between these two forms was most striking and for the most part the results uniform.

I will now recall the fact that pupae forced by me in the autumn of 1928 from larvae taken at Dungeness at the end of August, all produced "dark" forms of *H. peltigera*. There can be no dispute regards the actual forcing, the heat was terrific. Thinking there must be some mistake on my part I wrote to Dr. Cockayne and after a lengthy correspondence in terms of Ridgway Colours in which I was severely handicapped, not having a Ridgway Card, I eventually sent him my series of fifteen *peltigera*.

In his reply he says, "Your forced ones match my 1929 unforced ones almost exactly both in tint and depth of colour." What is the factor at work that caused mine to favour this dark form while the majority of breeders obtained extremely pale forms? Be it what it may it leaves Dr. Cockayne's concluding remark open to challenge, "I have therefore very little doubt that the light ground and reduced markings were the direct result of heat applied to the pupae, and since the two very dark ones developed during the coldest period of 1929 I have very little doubt that their dark colour was the result of cold applied to the pupae." I will therefore tabulate a list of the varying conditions imposed on the pupae by various breeders who have been good enough to give me their full data:—

From the above table of time, temperature, etc., it can be seen that my treatment differed from that of my friends in two points only. Firstly my pupae were subject to outside day and night temperatures until they were dug up in late September, and as they were then in Devon they experienced no very cold night temperatures so I think that a "cold" factor can be eliminated.

There only remains the question of the actual forcing conditions. All my friends forced their pupae on mantle-pieces over fires and the air must have been absolutely dry. Mine were forced in "The Tropical-Pit" of the Cambridge Gardens. The temperature was extremely high and the air absolutely saturated with moisture.

Furthermore the tin containing these pupae was placed on an inverted flowerpot and stood in the middle of a water tank so as to avoid the attention of the host of ants which swarmed here.

It therefore seems to me reasonable to accept Mr. Williams' explanation of my dark coloured forced ones.

"The essential difference is that your forcing was in 'damp' heat ours in 'dry' heat." And he goes on to add that he has previously obtained different results in the use of "dry" and "wet" forms of heat in other species.

The common factor then in the production of examples . . . on the one hand my 1928 forced examples, and on the other Dr. Cockayne's 1929 unforced ones, . . . is that in neither case did they undergo a process of "drying up." In my case artificial heat and watervapour were produced, in his, normal temperatures and humidity were experienced.

Although this is a negative factor I believe this is all important in the production of dark *peltigera*.

Notes from Morocco.

By HAROLD POWELL, F.E.S.

Meknès-Medina is not situated in an entomologically rich district; there are many interesting species to be found, chiefly amongst the Heterocera, but one needs to go a long way out to find really good collecting ground. So, lately, since an attack of phlebitis has left one of my legs in poor condition, I have devoted most of my spare time to larvae rearing and have bred a few more or less worthy species such as *Papilio machaon*, *Teracolus nouna* (type form), *Splothyrus baeticus*, *Heliothis incarnata*, *Agrotis crassa*, *Episeme hispana*, *Cucullia chamomillae*, *Aporophylla miroleuca*, *Heliophobus oditis* (*hispidus*), *Timandra amata*, *Acidalia monicaria*, *Apocheima flabellaria*, *Coscinia chrysocephala*, *Oenogyne bactica*, *Chondrostega* sp. (possibly a race of *randalicia*), *Taragama repanda*, *Hippotion celerio*, *Phycita poteriella*, *Amicta lefebrei*, *Talaeporia* sp. and some micros. *P. machaon* is very fine in this country. It is on the wing all the year round, but is rather scarce in the depth of winter. I have found the larva only on species of *Ruta*, and have never seen one on fennel here, nor on carrot or other Umbelliferae. Bouchelier of Casablanca reports the larva of *machaon* on *Citrus* there (lemon). This is not the first time I have heard of *Citrus* as food for *machaon*; at La Cran near Hyères, M. de Labarrière found a larva feeding on lemon in his garden years ago.

Teracolus nouna is, as a rule, a scarce butterfly in this part of Morocco, but it turned up plentifully late last summer and during the autumn was common. I know of only two caper bushes in the immediate vicinity of Meknès and one of these was completely eaten up by *nouna* larvae. On Nov. 16th I paid a visit to the valley of Oued Djedida, where I knew there was some caper. On the bridge crossing the stream several bushes were growing and *nouna* was flying in swarms around them. Very few females were in evidence. *Nouna* is a wanderer and may be seen miles away from its breeding-place. I believe that the abundance noticed this autumn was the result of a migration from the south of the country, but of course a great many of those seen were the offspring of the invaders. The larva appears to be remarkably free from parasites. I reared well over a hundred but not one was parasitized. I bred a large proportion of cripples and that I put down mainly to the low temperature (low for *nouna*) at the time when my imagines emerged (the majority hatched out towards the end of December). The specimens are typical *nouna*, Lucas, and differ considerably from the Biskra-El Kantara race. Some females are heavily marked with black.

I don't see so many entomological friends out here as at Hyères. Morocco is quite an easy country to visit but few come to know it. During 1930 I had visits from Dr. R. R. Armstrong who is a collector of Lepidoptera: from Dr. Hartert who spent a month or so in the country; from Prof. Cockerell who was collecting bees, and from my friend Mr. Le Cerf of the Paris Museum. Mr. Le Cerf made another expedition to the high ranges of the eastern Middle Atlas, which may be considered his special territory for he is the only entomologist who has explored that particular region yet. He showed me his captures on his way back, and there were several moths which are almost certainly new.

He had a series of the new race of *Polyommatus (Agriades) coridon* which was discovered by Ungemach, near Faza in 1929.

I have made many notes on the Lepidoptera of Morocco, but they are mostly incomplete and I find it difficult to get them in good order for publication. There are certainly some new races and subspecies to be described, but as our fauna is much like that of South Spain, a knowledge of the races from that country, which have been described of late years, would be necessary in order to compare with the Moroccans before giving new names. It is also very difficult to obtain the names of the numerous parasites (Hymenoptera and Diptera) which I breed, particularly with the Braconids and Chalcids. The few specialists I know of seem to be too busy to deal with them.

Classification of the Geographical Variations of *Melitaea diamina*, Lang. (= *dictynna*, Esp.)

By ROGER VERITY, M.D.

I have shown in Vol. XLII, p. 151, that the name of *M. diamina*, Lang, must be substituted for that of *dictynna*, Esp., in general use, because the latter is a "primary homonym," according to the International Rules of Zoological Nomenclature.

I think it will now be of some use to make a general survey of the geographical variations of this species and that it will especially contribute to clear the debated position of *wheeleri*, Chapm., concerning which I have made a suggestion in vol. XLII, p. 108 and I have been blamed by Mr. Warren, at p. 115, for not having dealt with this question more fully. I was perfectly aware that Turati had found *wheeleri*, alone, with no individuals having the usual *diamina* aspect on the upperside, in some low localities about the Lakes, but it seems to me this points still more to the fact that the former is a form of the latter, due to local conditions. Warren's important information that "*dictynna* does not occur *between* the broods of *wheeleri*," as Mr. Wheeler believed and had led us to believe, "but with and after the 1st generation," I quite agree is a serious objection to the theory of alternating forms, which I had based on the latter's statement. It will presently be seen that the following study of the species has suggested a modified view of the case and an explanation of the presence of the two forms at Reazzino, without recurring to the highly improbable specific distinction.

As to my name of *post-wheeleri* being a useless synonym of *autumnalis*. Trti., it depends as to whether the latter is considered a homonym of the *phoebe* of Tessin so named by Frübstorfer.

It must, first of all, be noted that the European races of *diamina* divide into two groups, very distinct from each other by absolutely constant and obviously hereditary features, which are only found mixed together and with transitional individuals in a zone stretching between their two areas. The features and the distribution of these two groups and of the mixed races correspond more or less exactly to those of the Northern and Central exerges and to the synexerges of other *Melitaea* and of many butterflies, so that if what I have said about their peculiarities and origins from westward migrations is true, it must apply also to *diamina*. The chief differences one finds

in comparing it, for instance, with *athalia* are perfectly explainable in that *diamina* requires much damper surroundings and cooler climates, so that it presumably has never existed in the Southern zone and that after having spread along the Central one, as far as the Pyrenees, during the cold period of the end of the Miocene, its Central exerge has become extinct in the greater part of the Central zone. The *diamina* recorded from Armenia should be relics of it and some of the races from the Balkans may be too, but, not having seen any specimens, I cannot state whether their aspect belongs to this exerge or whether they are branches of the Northern one, which have been pushed southward during some cold period, like the *Apatura iris* and the *E. maturna* of Dalmatia. What I wish to lay stress on is the principal group of races of the Central exerge, which spreads from the Central Alps to the Pyrenees and the Gironde. They all differ sharply by the colouring and the pattern of the underside of the wings from those of the Northern, nominotypical, exerge, which spreads from the Pacific coast of Siberia (lowland race *erycinides*, Stögr., and alpine, smaller and very black, race *erycina*, Led.) to Northern and Central Europe. The tone of colour of that surface is duller, paler and much less red; notably the basal and central bands of the hindwing, instead of being of a rich chestnut brown and occasionally of a deep chocolate colour, are of a pale yellowish fulvous, or even golden yellow; the same thing may be said of the space containing the row of black arches with black dots in the middle, which is usually very much filled up with a red suffusion in the nominotypical exerge, whereas it is yellow in the Central one; also the space between the two capillary marginal streaks is never reddish, but yellowish white. The black pattern is distinctly thinner and sharper and the arches and dots mentioned above are in a large percentage of individuals, indistinct and partly obliterated or blent together, so as to form a little circle, with a whitish central space.

The first race of the Central exerge which has received a name is that described from Vernet-les-Bains (Pyénées Orientales), under the one of *vernetensis*, by Rondou in his *Cat. Léop. Pyénées*, p. 24 (1903) and again by Oberthür in his *Études*, of 1909, who figures it in figs. 348-351. The characteristic they noticed, however, was simply the remarkable extent of the fulvous spaces on the upperside, which gives such an *athalia*-like look to some individuals that one can scarcely distinguish them from it without turning them over. On this account *vernetensis* is the race which, at first sight, seems to be the most distinct from nominotypical *diamina*, so that it has soon become well-known. If, however, one works it out more thoroughly, it is easy to see that this is a mistaken impression and that the races of the Western Alps stand further from the Northern exerge, because they are pure strains of the Central exerge, whereas all those of the S.-W. of France have a more or less strong admixture of the Northern one in them, exactly as I have shown it to be the case in those of *aurinia*, *didyma* and *athalia* of this region. What tells the tale here is the underside, and that speaks very clearly: in the Western Alps the characters of the Central exerge I have described above are exhibited to the utmost and not one specimen I possess from either the French or the Italian ones shows the slightest tendency to vary in having a richer and warmer underside

colouring. Instead *vernetensis*, although it decidedly belongs to the same group and many specimens are absolutely indistinguishable from those I have collected at the Baths of Valdieri, 1350m., in the Maritime Alps, usually has more bright and reddish russet bands and spots and a few extreme examples are quite similar to the nominotypical German *diamina* in this respect. Comparing the females, this difference is still more striking than in the males: those of Valdieri are constantly paler and have on an average a thinner black pattern. On the other hand, on the upperside the fulvous spaces are broader on the forewings of both sexes than in the German *diamina*, but never to the same extent as in *vernetensis* nor producing the peculiar *athalia*-like look of many of the latter by being increased also on the basal half of the hindwing. The average size at Valdieri is nearly as large as that of *vernetensis* and *pravilla* and some individuals of these three races are quite gigantic as compared with the German *diamina*, not to speak of the small *alpestris*. It is surprising that the very distinct race of the Maritime Alps should not yet have been recorded; I name it **magnaclara**. That of Cesana and Onix, in the Cottian Alps, has the same underside features, but it is smaller and it has, on the whole, smaller fulvous spaces on the upperside, so that it is intermediate between *magnaclara* and the still smaller and darker *alpestris*, Frühst., found at Sestrières at 2035m. Frühstorfer, in describing this race as that of high altitudes from the Engadine, whence he selected his "types," to the Simplon, Zermatt, Chamonix, Cogne, Courmayeur, La Grave, points out particularly that the russet colour of the underside is replaced by "pale yellow." My specimens from the whole of this region and also as far east as the Mendola Pass fully confirm that *alpestris* always breeds perfectly true to this feature of the Central exerge, and that on an average it is distinctly smaller and it has lesser fulvous spaces on the upperside than the nominotypical *diamina* of the lowlands, such as I possess from Versoix, near Geneva, where it is absolutely similar to my specimens from Central Germany and to Esper's "typical" figures from Uffenheim in Franconia. Those from Chiusa (Klausen) in the Upper Adige, are much larger, brighter, and handsomer than the latter and have broader fulvous spaces on the upperside of some individuals, so that they are well worth recording as race **isarcica**; the underside constantly exhibits the rich reddish colouring and the thick black pattern of the Northern exerge; they are thus unmistakably northern immigrants, which have thrived in that comparatively southern and warm valley, because it was damp enough to suite their northern constitution.

I dwell on this fact, because it strikes me that the famous *wheeleri*, Chap. = *areolata*, Frühst. = *briantea*, Trti., might very well be nothing more than a case of this sort; its underside features are those of the Northern exerge at their highest degree, so that, if it has its constitution, it is very natural that the warmer and drier climate of the southern watershed of the Alps should have modified its aspect in reducing the black pattern of the upperside and should have stimulated it to produce a second generation. Kitchelt mentions a second generation of *diamina* in the warmer valleys of the Upper Adige (S. Tyrol), in August. Rühl records a second one also at Zürich, during the exceptionally long and hot summer of 1892 and Hafner states that in Carniola the second generation, of the end of August, "cannot exactly

be called scarce when circumstances are favourable to this species, as they have been, for instance, in the year 1915." Osthelder in his *Schnett. Südbay.* says Lenz has often met there with a second generation at the end of August and in September. It is thus no peculiarity of *wheeleri* to produce it.

Moreover, it must be remembered, in this connection, that the *Lycaides argus*, L. = *aegon*, of the lowlands at the foot of the Alps, in the Po Basin, are exactly similar to race *aegiades*, Gerh. of the plains of Germany, whilst race *aegidion*, Meisn. of the Central Alps belongs to the Central exerge, exactly as *alpestris* does in *diamina*, and that *M. didyma* race *ignea*, Vrtz., of the shores of Lake Maggiore has all the features of the Northern exerge of this species, whilst race *turlonia*, Frhst., which flies higher up in the Ossola Valley and the surrounding mountains, has an entirely different aspect and clearly belongs to the Central one. It is thus very natural that *diamina* should have accompanied them and that in certain suitable localities, such as Reazzino apparently is, its two exerges should live together, each, however, behaving differently, according to the organic balance it had acquired in the past, along the different routes they have followed and in the very different epochs during which they spread westwards.

It seems to me too much importance has been attributed to the extent of the fulvous spaces of the upperside, both as regards *wheeleri* and *vernetensis*. It varies individually more than any other character, except, perhaps, size, in all the races of *diamina*, so that it evidently is very easily influenced by slight differences in the surroundings of each individual during its development, and what makes those two races striking is simply that the fulvous expands to the utmost, and especially that it does so on the basal half of the hindwing, producing a superficial resemblance to *athalia*. I do not in the least see why this single character and the second partial generation, which also *athalia*, like typical *diamina*, may produce or not produce, according to localities and even according to years, should be reasons for suspecting *wheeleri* to be a separate species. The climate "at the end of the lake of Geneva, in the Rhone Valley" acts so differently from that of the Po Basin on nearly all the butterflies that they belong to very distinct races in these two regions, so that Warren's argument in Vol. XLII., p. 116, does not stand, to my mind, although the *diamina* of the former locality no doubt belong to the same northern exerge as *wheeleri*. A strong argument against considering the *athalia*-like forms of *wheeleri* and *vernetensis* anything more than an extreme variation due to the direct influence of surroundings on individual development is that they are foreshadowed in races *isarcica* and *pravilla* and that in *vernetensis* they are connected with the *diamina* having the usual upperside aspect by a complete series of transitional forms. Oberthür notes that at Vernetles-Bains "individuals resembling very much the *diamina* of other localities exist, but . . . the great number are as light above as the normal *athalia*." In my series of Gèdre, 1000m., in the Hautes Pyrénées, the upperside look is, as a rule, quite similar to that of *magnaclara*, but 5% of the specimens are as small and dark as *alpestris*, whilst as many are the extreme opposite and exactly correspond to the average, less highly characterised *vernetensis*, so that here, too, the extent of the fulvous is very variable. On an average the spaces of

that colour are a little more pronounced than in *magnaclara* and of a richer and warmer tone, owing to the fact that this race is, as I have already mentioned, a synexerge: 50% of the undersides differ in no way from *magnaclara*, 20% from nominotypical *diamina* of Germany and 30% are transitional. I propose naming it **pyrenaealpestris**.

(To be concluded.)

NOTES ON COLLECTING. etc.

TETRASTICHUS MISER, NEES. [EULOPHUS MISER, NEES. (1834); CIRROSPILUS ATTALUS, WALKER (1839)], A CHALCID PARASITE ON SPECIES OF CASSIDA.—On September 6th, 1920, Miss Kirk and I took several pupae of *Cassida nebulosa*, L., by carefully searching patches of *Gnaphalium* in a field near Wokingham, Berks. From one of these pupae thirteen specimens of a Chalcid emerged a week later from several holes which they had made in the dorsal surface. Again on August 24th, 1921, we took the imago, a larva, and a pupa of *Cassida nebulosa* on *Chenopodium album* in a field near Waterbeach, Cambs. The larva pupated on August 28th, and in September thirteen specimens of the same Chalcid emerged from three holes in the pupa's dorsal surface.

I gave some of these parasites to the British Museum, where they were unfortunately mislaid, and there the matter rested. Recently I took some of my own specimens to Mr. Ferrière, who kindly identified them as *Tetrastichus miser*, Nees., a species reputed to be a parasite on *Cassida*. Having mentioned the matter to Dr. Scott, he made a search, and found some of my specimens put aside in a drawer without names. With them were also specimens from a Mr. Smee labelled parasitic on *Cassida rubiginosa*, Mull. (*viridis*, L.), Fittleworth, Sussex; and others from Mr. E. J. Bunnett parasitic on *C. rubiginosa*, but without locality.—H. DONISTHORPE (F.Z.S., F.E.S., etc.).

ABUNDANCE OF THE LARVAE OF MACROTHYLACIA RUBI, L. IN Co TYRONE.—Last Autumn (1930) the larvae of this species appeared in enormous numbers, after a period of comparative scarcity. Towards the end of September they were in swarms on the moorland surrounding Lough Fea, on the County Derry boundary. The larvae were most numerous on the portions of the moorland sheltered from the wind, but were also common on the mountains overlooking the Lough. On a trip by road to Omagh in the centre of the county on September 29th, the same abundance was observed; every suitable area or patch of bog or moorland had its hundreds or thousands. Has this abundance been noticed in other districts?—THOMAS GREER, Milton, Tullylagan. March 3rd, 1931.

ABERRATION IN PIERIS BRASSICAE.—With reference to his article on the aberration of *Pieris brassicae*, it may interest Dr. G. S. Grabam-Smith to know that I have from time to time bred examples of ab. *nigronotata* with the spots on the forewings more or less developed, from a tiny spot of only a few black scales, to a conspicuous oblong patch and sometimes a streak. If I remember rightly I had eight specimens of this ab. in my collection now at Tring, and have recently obtained four others, all British.—F. W. FROHAWK (F.E.S.), Sutton, Surrey. Feb., 1931.

CURRENT NOTES AND SHORT NOTICES.

Entomology in the Argentine Republic is rapidly reaching a high state of advance. We have just received the three parts of the *Revista Soc. Ent. Arg.* for 1930. It consists of some 180 large quarto pages, and 18 plates with a large number of text illustrations. The Society has about 170 members at the present time with headquarters in Buenos Aires. During the past year the Coleoptera claims about a dozen articles, while the Lepidoptera has nine. Other orders have one or two articles apiece. The study of the Lepidoptera has reached the stage when "The future protection of the Butterflies" is under discussion, and strong criticism is raised by the modern use of butterfly wings in jewellery and other ornaments. P. Köhler announces and describes a number of new species, a Saturniid, a *Papilio*, a *Morpho*, and two Arctiids. The same writer also gives an account of the Argentine Diptids with two plates. Alberto Breyer gives an account of the Lepidoptera of Goranto, Cordoba province, with several new species. There is a figure and description of a very interesting gynandromorph of *Morpho aega* by F. Nosswitz. In another article all the Argentine Castniids are reviewed, and in another the eggs and egg-laying of the same group are described.

REVIEWS AND NOTICES OF BOOKS.

"DEMONS OF THE DUST.—A STUDY OF INSET BEHAVIOUR" by William Morton Wheeler. pp. xviii.+378. with 50 Illustrations. Kegan Paul, Trench, Trübner & Co., Ltd., London. Price 21/-.—This work, with its sensational, but very suitable, title, consists of a monograph of the Ant-Lions and the Worm-Lions, and they are both thoroughly dealt with from every point of view. The book is divided into a Preface, nine Chapters, two Appendices, a Bibliography, and an Index.

In the preface the author expresses a doubt as to whether he has crashed between two stools in attempting to interest both the entomologist and the general reader. All entomologists who write must have experienced this difficulty at some time or other; but we can set the author's mind at rest, as in our opinion he has succeeded admirably in both cases.

The first chapter gives an account of some eighteenth century naturalists; but at the same time the earlier references to the Ant-Lion by Issidore of Seville (560-636 A.D.), and others, are mentioned. It is shown that the observations of Poupert, Réaumur, Bonnet, and Rösel, surpass many of those which came later. We learn that the earliest note published on the Worm-Lion (*Vermileo*) was by an anonymous observer in 1706, who referred to them as "Ant-Foxes," a name which was, perhaps unfortunately, rejected by Réaumur in favour of "Worm-Lion."

Réaumur, who wrote a treatise on this insect (see Appendix B), sent some of the larvae to Ulrica, Queen of Sweden, who handed them over to Degeer in 1751. A translation of Degeer's original article on the "Worm-Lion" is given in Appendix A.

Chapter II. gives a very complete fauna of the sands, and references are made to the experiments of our Dr. Buxton and others on the temperatures, etc., of deserts. A list, and a good account, of the Psammophilous *Formicidae* is of especial interest to us.

Chapter III. deals with post-eighteenth-century observations on the Ant-Lions, and it is shown that little of any value was published from 1800 up to 1830-40, when a rather sudden revival of interest in these insects set in.

The position of the *Myrmeleontidae* in the Neuroptera is next discussed, and their habits are investigated. The author shows that the extraordinary long-necked larva named by Withycombe *Pterocroce storgi*, is really the *Necrophylus arenarius*, Roux, discovered by Roux in the dust of ancient Egyptian rock-tombs in 1833.

The account of the behaviour of ant-lions by most European authors refers to the two species *Myrmeleon formicarius* and *M. europaeus*, and as their larvae are practically indistinguishable, it is not always clear to which species they are referring. It is pointed out that the imago can be readily separated, as in the former the wings are not spotted, but in the latter they are ornamented with black spots. We thus learn that the figure in our "Guests of British Ants" p. 141, Fig. 26, refers to *M. europaeus* and not to *M. formicarius* as stated. This figure, we believe, is from one of those old fashioned, but well drawn and realistic plates, such as, "the Nest of the Mole-Cricket," etc., which one used to find in all the early popular books on natural history.

An excellent account and figures are given of the external and internal anatomy.

We entirely agree with the author in protesting against Doflein's interpretation of the insect as a 'pure reflex automaton,' as numerous of its behaviouristic peculiarities cannot be explained either as simple tropisms and reflexes, or as chain-reflexes. "Instead of analyzing the ant-lion's activity into elements which, after they have been recognised and named [thigmotaxis, stereotaxis, haptotaxis!], cannot be put together again to yield any intelligible meaning, it would seem preferable to start . . . from a consideration of the insect's behaviour as an organized whole." The chapter ends with an account of the pit-making activities of the larva; and of its enemies, which appear to be very few.

The next five chapters of the book treat of the Worm-Lions, their distribution, nearest allies, position in the Diptera, the observations of past and present authors, anatomy, habits, etc., etc. There are splendid photographs, and figures, of the larvae, etc., and their pits. There is a full account of Wheeler's own experiments in breeding the American species *Vermileo comstocki*, in which he has elucidated many points which were previously obscure.

He shows that the proper name for the Mediterranean Worm-Lion is *Vermileo vermileo*, L. and not the *V. degeeri*, Macq. in general use.

An excellent map shows the distribution in the World of the four species of *Vermileo*; and a list is given of all the localities where the Mediterranean species has been found. Unfortunately on page 150 the author writes ". . . future collectors may succeed in finding it not only in Sicily . . ." In our paper on the Ants, and some Myrmecophiles, of Sicily [*Ent. Record*, 39 9 (1927)] we record that we found a number of the larvae of this fly in their funnel-shaped pits at the base of a rock at Taormina on April 26th, 1926. This fact is also mentioned in the "Guests of British Ants," p. 150 (1927) and we figure the imago and larvae (Fig. 21).

Chapter VII. gives a full account of the worm-lions of the genus *Lampromyia*.

In the conclusion (Chapter IX.) Wheeler very properly emphasizes the great dissimilarity of the structure and the extraordinary similarity of the behaviour of the two insects. This peculiar convergent behaviour of a legless Dipterous maggot, and a six-legged Neuropteran larva equipped with powerful sucking mandibles is, as pointed out by Redtenbacher, truly remarkable. Some of the detailed resemblances between the ant-lion and worm-lion include the various sensory reactions of the larva, the normal biennial life-span, the digging of a pit-fall, the lying in wait, the poisoning, submerging beneath the sand and sucking the juices of the prey, the occlusion of the posterior end of the stomach, the feigning death, the ability to remain for months without food, the pupation in the sand, the wriggling of the pupa to the surface for the emergence of the imago, etc.

Certain striking differences are also noticed, such as the backwards locomotion in the ant-lion, the crawling on the dorsal surface in the worm-lion, the circuitous method in pit-excavation of the ant-lion absent in the worm-lion, difference in the lying in wait posture, the making of the cocoon in the ant-lion, etc.

Wheeler gives the name of lochétic (from λοχητικός, lying in wait, entrapping) to the behaviour of all those organisms that ambush instead of actively seeking their prey. There follows a very interesting description of the habits of a number of such organisms, from the mammalia downwards, and especially of the various nets and snares constructed by Caddis larvae, spiders, etc., etc.

We think enough has been said to show what a very interesting and thorough work this is, and how much ground it covers in almost all branches of the study of entomology. Every entomologist, whatever their speciality may be, should read it.—HORACE DONISTHORPE.

THE MIGRATION OF BUTTERFLIES, by C. B. Williams, M.A. Published by Oliver and Boyd, 33, Paternoster Row, London, E.C. Price, 21s., 473 + XI. pp., 71 figures.—This is the most recent addition to a series of Biological Monographs issued by Messrs. Oliver and Boyd. It will be of great interest to all those, who, like the writer, have read during many years isolated accounts of Migration in the current magazines and nature periodicals, and also items concerning odd specimens of *P. daphidice* taken in the vicinity of Dover, later on to find their way to the auction rooms under the label "British."

In these days when science can only advance by specialisation this volume would appear to be long overdue.

To the average mind the term "*migration*" is associated with return movements to the original area. This is endorsed by Thomson (1926) when discussing the migration of birds. The Author disagrees with Thomson and knowing that the life of most insects is extremely short, it is easy to see why. He is only able to quote one species (*Danaïda plexippus*) for which a return flight is well authenticated. Hence he puts forward the following definition:—"Migration is a periodic, more or less unidirectional, continued movement, assisted by the efforts of the animal, and in a direction over which it exerts a control which results in the animal passing away from its previous daily field of operations." The insertion of "in a direction over which it exerts a control" rules out involuntary distribution or "dispersal." It causes one to wonder what percentages of accounts of migration of insects can be accepted as falling strictly within the definition of the Author

and what proportion should have been classified under the heading "dispersal." In order that our knowledge may approach exactitude, it behoves future recorders to bear in mind the definition quoted above.

All students must study this work and consider the "Main Problems" (vide pp. 15) if their work in the future is to be on the right lines and so worth the doing.

The history of migration is given from the Biblical record of the migration of locusts in the Old Testament right up to Tutt's work in 1899-1901.

Our thanks are abundantly due to the Author for the great task he has undertaken in collecting and collating such an immense number of records from all sources. He pleads for more and more accurate detailed accounts of unidirectional flights from all parts of the world in order that some day sound theories may be deduced. He also advances many good suggestions (vide pp. 424, 425) as to what points should be recorded. Finally there is a valuable and exhaustive bibliography pp. 429-455.—H.E.P.

Two more parts of the *Supplement to Seitz Palaeartic Lepidoptera* are to hand, pts. 21 and 22. Part 21 is the completion of the *Lycaenidae*, 16 pp. and plt. 16 with 119 figures ♂, ♀, and underside. The format is somewhat confusing as occasionally one meets a paragraph beginning as if it were dealing with a specific form instead of subspecific or racial form, e.g. *L. cimon* of *L. semiargus*, the former being a racial name and therefore indicated by *L.* wrongly. *L. martinalpium* and *L. melanoposmater* of *L. cyllarus* are equally wrongly indicated. With *L. semiargus* much of Tutt's work has been included. To *L. arion* more than fifty new nominations are attached. With *C. argiolus* Tutt's work has been amalgamated.

Part 22 is the first part of vol. III. Noctuidiform Moths by Dr. M. Draudt. The publishers wisely consider that the other three volumes should run concurrently, and this will avoid hurry in the revision and checking before issue, such as occurred a while ago rather pointedly. This part contains 16 pp. and 1 plate and deals with the *Acrionicta* and allied genera to the genus *Metachrostis* (called *Bryophila* in error). Contrary to the statement in the text that *Bryophila* was described by Treitschke 2 years previously to Hübner's *Metachrostis* the reverse is the case. Hübner described *Metachrostis* in that portion of the *Verz.* which was published about 1822 (*teste* Durrant, Sherborn, Prout, etc.) whereas Treitschke's description was made in 1825. The *y* in *Acrionicta* should be *i* as in the prior spelling. We note one unfortunate omission in this part and that is that there are no page and plate references to the former volume; it is to be hoped that these will be supplied in all future parts. The genus *Craniophora*, Snell. has been reintroduced for some of the *Acrionicta* species and the author has adopted the subgenera *Hyboma*, L. and *Triaena*, Hb. as did the late Dr. Chapman. Plate I. has nearly 70 well chosen and well executed figures of the more important forms. Containing as it does all our British species this work should prove an indispensable book of reference; even if the actual forms described have not yet been found in our island, yet every lepidopterist can here readily ascertain the lines of variation in any species and know the innate potentialities, which under favourable conditions may be manifested in their own areas of collecting.—Hy.J.T.


BITUARY.
Major C. E. Liles.

It is with deep regret that we announce the sudden death of Major C. E. Liles on February 28th last. Born in London in 1860, he was educated at St. John's Wood Grammar School and afterwards in Germany. From his earlier days, he always took a keen interest in natural history and entomology coupled with an enthusiasm for all forms of athletic sports at most of which he excelled, being the holder of over 600 trophies for cycling, rowing, running and boxing.

His sporting career was unique. He became a member of the Temple Bicycling Club in 1877 and after many club successes won the Temple Bicycle Club Championship in 1879. The following year he took part in 31 races, winning 14 prizes, amongst which he secured the "Sporting Life Cup," then regarded as the "Fifty Mile Championship" and also the one mile National Championship. In 1881 he rode 37 times, and took 9 firsts, including the "Sporting Life Cup" for the second time, and in 1882 he won the First Bicycling Union Five Mile Championship.

The year 1883 was an outstanding one in his career, he having won 8 out of 11 bicycle races, including the 25 mile championship, and four out of five on a tricycle, including the one and ten miles championships. He also won the middle-weight boxing competition, organised by the London Athletic Club. In the same year he took up rowing, and was in the winning crew of the West London Club, being offered a seat in the club's crew at Henley. He continued rowing and sculling right up to the year of his death and held some 300 trophies for this sport. For many years he was president of the Kensington Rowing Club and a well-known figure on the Tideway.

In 1888 he took up yachting and achieved many successes, the most notable being with his two boats "Turquoise" and "Early Bird." He was one of England's representatives in the Olympic Yacht races in 1908 and a member of the Royal Corinthian Yacht Club.

His military career started from the year 1891, when he joined the volunteers as a lieutenant in the 26th Middlesex (Cyclist) Volunteer Rifle Corps and later became Commander, a rank he held for nine years. He was regarded as the pioneer of cyclist warfare.

In 1911, at the age of 52, he learnt to fly, but had the misfortune to crash the very day before he was due for his certificate; fortunately he escaped unhurt. During the war he was granted a regular commission, with the rank of Major, and served in the 9th Queen's (Royal West Surrey Regiment).

Space will not permit giving a full list of Major Liles' other successes, suffice it so say he held seven awards for rifle shooting, three for cross-country running, four for walking and fifteen for swimming, the last included a sixty yards swimming handicap at the age of 62.

Towards his later years he became more and more keenly interested in entomology, which gave him opportunities for exercise in long country walks. He retained however, his sporting connections, and at the time of his death was president of the Ranelagh Harriers. He was a great traveller and did much good entomological work on the continent.

He joined the South London Entomological and Natural History Society in 1922 and was a member of the Verrall Supper. Many of his acquaintances, due to his unassuming manner, were unaware of his marvellous athletic achievements and his wide and varied interests, and he will be sadly missed by his numerous friends who held him in high esteem.—A. DE B.G.

Erich Wasmann, S.J., Hon. F.E.S.

Erich Wasmann, S.J., died on February 23rd, 1931, at the Jesuit College in Valkenburg, Holland, in his 72nd year. He was born on May 29th, 1859, at Meran in the Tyrol, where his earliest years were spent.

His father, Friedrich Wasmann, an accomplished artist, was a pupil of the celebrated painter Overbeck at the Nazarene School in Rome. Both Wasmann's father and mother—Elizabeth Krämer an excellent wife and mother—came from Hamburg. We may mention that he told us personally he had an English grandmother. He received his higher education in the Jesuit College "Stella matutina" in Feldkirch, and on September 28th, 1875, he became a novice of the Society of Jesus at Exaeten, Holland.

It was in Holland that his serious lung trouble, which afflicted him all his life, first made its appearance. At an early age he was attracted to the study of Entomology, and wherever he was sent, for his health, etc.—Prag, Luxemburg, etc., etc.—he seized the opportunity to add to the knowledge of natural history and especially his chief study, the ants and their guests. He has left nearly 300 works to his credit, dealing especially with Myrmecophiles and Termitophiles, but also on psychological problems, etc. On account of his beliefs he was naturally an opponent of Darwin, and others, especially Haeckel.

Space will not allow us to discuss his various writings here, but we may mention that he made numerous discoveries in the life histories of the myrmecophiles, etc., and also described very many new species from all over the world. He was a good draftsman, and an expert in micro-photography. If we have not always agreed with his theories, we must acknowledge that they were always worthy of study and attention.

His collections, writings, and scientific apparatus, etc., are to be kept together and known as the "Wasmannian Museum," for the benefit of future students. Finally one may mention some of the honours bestowed upon him:—Hon. member of the Grand Ducal Institute of Luxemburg; one of the 40 actual members of the Accademia Pontif dei Nuovo Lincei; Doctor phil. nat honoris causa Freiburg-Schw. University; hon. member of the Niederlandischen Entomolog. Vereins; of the Société Scientifique de Bruxelles; of the Société Entomologique de Belgique; of the Entomological Society of London (for which we had the honour to propose him in 1911); of the Spanish Entomolog. Society; the German Ent. Soc.; the Brazilian Ent. Soc.; the Zoological and Botanical Society of Vienna; the Ent. Soc. of Normandy; the Society of nature friends in Luxemburg; and the Nature Knowledge Society of Freiburg.—HORACE DONISTHORPE.

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News from the Argentine.

By CAPT. K. J. HAYWARD, F.E.S., F.Z.S., F.R.G.S.

The trip South has been abandoned for this season owing to the world financial situation. Here foreign exchange is 43% to the bad.

Doubtless you will be interested to hear of my last short collecting trip to the Nevado de Famatina. On the whole it was a failure owing to bad weather, but I returned with about 3000 insects.

Leaving Guayapá on the last day of the year (1930), I motored via Patquia, Vichigasta and Nonagasta to Chilecito, which was to be my headquarters. A long irksome trip, hot to excess, roads terrible for the greater part of the way, and the scenery except for the half hour or so passing through Los Colorados, the great Red Sandstone fault, I have written you about already (possibly under the name "Los Mogotes," which is the southern portion) fairly uninteresting, the Velascos distant to the right and the commencement of the Nevado de Famatina, here very insignificant, on the left, appearing grander since they were nearer and rose directly from the plain. My recollection of the trip, which started soon after sunrise and finished in the late afternoon will always remain centred on one long stretch between Los Colorados and Vichigasta where there were many thousands of magnificent old algarobo-negro trees, all of great age and all dead. Amongst the tangle of dead wood and fallen branches were young trees none probably more than fifty or sixty years old. An old story that repeats itself but too often in this country, the story of plentiful water withheld for a period of years due to some natural cause, so that the existing vegetation dies, fresh vegetation commencing with the return of the former humid condition.

On the 1st—a day heavily overcast and threatening rain—I went to a spot about 15 km. west of Chilecito and remained there till the 3rd, collecting 5 hours on the 1st, during daylight on the 2nd, and for about 3½ hours on the 3rd. The altitude at which I stayed was 5350 feet, and except whilst approaching this point on foot up the valley, I did not collect below this level, confining myself to the slopes above up to 7000 feet. In the valley there was permanent water, but owing to the dull day little flying, I devoted myself principally during the hour or two I was moving up to collecting a long series of *Epscada hymenaca*, which afterwards I found out to be so much wasted time, as the day following beneath the shade of an ancient walnut tree, I found this species in such profusion that a single sweep of the net produced no less than 37 specimens.

Beetles which were my chief object appeared to be practically non-existent in the valley, but later in the day encountering a small patch of flowering alfalfa at a small chacra perched up on the hillside, I found a small species of meadow-sweet in full flower and much of the local wild parsley, and the flowers of these plants were covered with several species of the smaller *Malacodermata*, *Mordellidae* and *Cerambycidae*. Naturally the alfalfa flowers attracted most of the species of Lepidoptera except the *Satyridae* that were flying at that altitude, but frankly there was little of real interest, the only outstanding insects from this point of view being *Appias drusilla* (which I have also taken in this province at Guayapa), and to me, the typical forms of *Phyciodes*

ithra, *P. simois*, and *Hypanartia bella* for the altitude. I continued collecting until dark, and netted a total of between 450 and 500 insects.

The following day was bright and sunny and I collected about the cultivated and semi-cultivated land till the afternoon when I moved out to the scrub-covered hillsides. Three hours amongst the hills produced at most 30 insects, a few Satyrids, *Hamearis* and *P. simois* and a short series of a large Cassid (Col.) that I encountered in a valley at above 7,000 ft. flying over a certain route at intervals of several minutes between specimens. In this same valley there was a migration of *Pieris phileta* race *automate*, the insects flying north-west down the valley. Beyond a few *Staphylinidae* I found nothing much that I had not encountered the previous day, but in spite of the three hours spent more or less ineffectually on the dry mountain side, the day's (daylight) catch passed the 1,100 mark.

On the 3rd I was only able to put in 3½ hours collecting, of which the last hour was dull, preceding a sharp thunderstorm. About 400 insects resulted, more or less evenly divided between wasps and beetles. Although I was sorry to leave this spot, I was beginning to realise that, in spite of the glorious views over the Chilecito plains to the Velascos, I had more or less exhausted the entomological possibilities for the moment, and that although a longer stay would certainly enable me to unearth further species, yet the time spent would not give a sufficient yield to warrant my cutting short my proposed stay at higher altitudes. The migration of the Pierid continued all this day.

Returning to Chilecito on the 3rd I left early on the 4th for Famatina, again by car, the road being excellent for the first 30 kms. after which we had to take to a stream bed, here about 400 yards wide, and proceed for the remaining 8 or 9 km. over this medium, a road consisting entirely of boulders, for the greater part hidden by a rushing torrent of yellow mud-filled water, luckily nowhere more than a foot deep. A most tortuous and hair-raising proposition, which however was nobly overcome by "Henry" who at Famatina emerged from the river-bed more like a derelict steamer, thrown up on a beach after lying many years half submerged in the mud. Passing Famatina we proceeded a further 25 km. N.W. and just before arriving at our destination found the way barred by a further complete "washout," the river bed in this case being strewn with boulders of such size that it was impracticable for a car of any sort, even our humble Ford. The only method was to continue the journey afoot, but as less than half a mile intervened, the hardship was not so great. The car returned later in the afternoon and just managed to get clear of the river below Famatina before a fresh burst of flood-water caused by a terrific storm that burst overhead caught it up. This storm successfully finished anything there might have been of road and left me marooned at Los Corrales for ten days instead of the three or four I had intended to put in there. As a matter of fact it rained on every one of these days, the only fine spells being till 10 a.m. on the 5th, till 11 a.m. on the following Saturday, the following Sunday morning, as also the Tuesday morning. During these fine spells the sun shone for a total of about 8 to 10 hours. If not actually raining the clouds came down and I was blanketed in a thick white mist with visibility of about 50 yards. Actually at 7,500 ft. I managed once to reach 10,100 ft., but to venture out in the mist was foolish, as it would have been impossible

to have found one's way back again, and when raining, there was no object. The total insects collected during these 10 days did not exceed 500; this alone shows what the conditions were. The cold was great all the time with the snow on the peaks just above us. All the insects were very worn and amongst the lepidoptera especially so. These latter were extremely scarce, but I was able to collect several species of *Pieridae*, which will probably prove interesting when worked out, but I was disappointed not to take either *Colias blameyi* or *Phyciodes acniquijae*. Probably I was too early, but I managed on the last day to get a few *Mathania loranthi* of which two were in splendid condition. *P. ithra* and *P. simois* both appeared at the highest points reached; of the former one only. At the highest point I found the snow-white hairy caterpillars of *Halisodota texta*, H.-S. To me they were very interesting as unusual in colour. The only *Papilio* seen on the trip was *P. polydamas* at 7,500 ft. Beetles were here very scarce; a few nice *Staphylinidae*, and a good series of one of the less common *Cyclocephala* alone being worthy of mention.

The country here, Los Corrales, was fairly barren, the hillsides excessively steep and covered with many species of cactus, one with a beautiful, champagne-coloured flower, the others of the commoner canary yellow, deep red, and white colours. The few stunted bushes were "jarilla" (*Larrea divaricata*), species of *Prosopis*, "lata" (*Mimosa carinata*), and such-like, thorny scrub for the most part, making, together with the cactus, a thorny path if one tried to cut across through them. In most cases though one was compelled to keep to the tracks. There were two rivers that met at the point I stayed, both constant as far as the flow of some water is concerned, so many of the rivers in this part are dry except for a few hours or days after rain. One the yellow river, always thick with yellow mud and containing a great deal of antimony, the other generally clear, but during all my stay both ran high with yellow flood water, crossing being on many days an impossibility. If crossed one had to keep an eye on the weather to avoid being prevented from recrossing by a sudden flood or "crecient," which comes down the river with a roar of tumbling boulders and like a low wall of water, the fore-front bearing a mass of leaves and light debris picked up on its way. Both rivers contain much gold.

From this point the Nevado goes up fairly steeply to the Cerro Nigro, which is I believe still unclimbed, and although no height is given on my map, is, I believe, well over the 20,000 ft. Perpetually under snow, it is I am told very steep near the peak and cursed with a terrible wind most of the time, often sufficient to blow over man and mule even at the much lower altitudes crossed by the mule track. This neighbourhood contains several mines producing copper in fairly heavy percentage, mixed with some silver and a small proportion of gold. Most of the mines are not at the moment worked. From La Mejicana, the highest (at 14,700 ft.), a ropeway runs to Chilecito, and the prospectus may well say that a journey (at your own risk) in one of the waggons is one of the most thrilling experiences one can undergo to-day. British built about 30 years ago, the cables swing out from lofty towers over enormous gorges, approaching in some cases half a mile in width and of a depth exceeding at their centre 800 ft. The total length of this double track is about 35 km. A fine piece of engineering.

Classification of the Geographical Variations of *Melitaea diamina*, Lang. (= *dictynna*, Esp.)

(Concluded from p. 70.)

By ROGER VERITY, M.D.

Another race which is closely connected to *vernetensis*, but which certainly cannot be designated by the same name, is the handsome one of the marshy lowlands of the Gironde; I should call it **magnaobscura** from my series of Villandraut and Villenave (4th to 20th of June). It is quite as large as the former; the black bands on the upperside are broader, so that no specimen strikes one at first sight as being like an *athalia*, but on the basal half of the hindwing there exist in reality, nearly constantly, all the fulvous spaces, which give that look to most *vernetensis* and *wheeleri*; what abolishes it here is that they are reduced to small, round dots, but they are a peculiar feature of this race of *pravilla* and of *isarcica*. The fulvous is deeper and redder than in *vernetensis* and so are usually the russet markings of the underside: $\frac{1}{3}$ of my specimens are in this respect quite similar to the German *diamina*, $\frac{1}{3}$ are transitional and $\frac{1}{3}$ have this colour replaced by yellow. Evidently this is thus a synexerge with a considerably greater proportion of the northern strain than there is in the two races of the Pyrenees. Further north and east the Central exerge loses all influence and one only meets with the nominotypical *diamina*. This is the case as far south as the Cevennes; whence I possess a few specimens of Concoules, 1200m., on the Lozère, which only differ from German examples by a slightly greater extent of fulvous and a clearer tone.

The Northern exerge, as is the case in most butterflies, varies geographically much less than the Central one. The nominotypical race spreads, without changing aspect, all over Central Europe, from northern and central France to Austria and the northern Balkans. Race *wheeleri* is thus, certainly, a remarkable exception, only foreshadowed, as stated above, by other extreme southern races of that exerge and notably by *isarcica*, Vrtv., of the low valleys of the Upper Adige (S. Tyrol) and by the very fine *pravilla*, Frhst., of Laibach in Carniola, which is of very large size, equivalent to *magnaclava* and which has conspicuous fulvous spaces, on the hindwing, as well as on the forewing of the females, and of some males, whilst other males are, on the contrary, very black. Frühstorfer points out, as a peculiarity of *pravilla*, that the central series of spaces on the underside of the hindwing, which are silvery white in the other races, exhibit in most individuals of this one an ochre-yellow tinge. This separates it sharply from *isarcica* and from the Bosnian race, which otherwise resembles it considerably.

The only other race of this exerge I am acquainted with is that of high altitudes in the Eastern Alps, corresponding to *alpestris*, Frhst., of the Central and Western ones. By its small size and by its broadly black upperside it exactly resembles it, but on the underside it is very different, because the former, as we have seen, has the colours and pattern of the Central exerge to their fullest extent, whereas here those of the Northern one are no less fully exhibited, and the contrast is thus striking. The red is even more saturated and at the same time brighter than in the nominotypical German race and the white

spaces are of a still purer white, with a stronger silvery sheen, so that the underside has, on the whole, a very pretty aspect. I name it **orientalpestris**, taking as typical a large series collected by myself in the clearings of the fir-woods, at Sappada, 1300m. in the Carnic Alps. The sharpness and the absolute constancy of the difference between these two alpine races seems to be another interesting proof of the existence of hereditary differences between exerges, for no local cause could be so absolutely constant and effective as to produce it alone, changing suddenly somewhere about the Adige Basin. It can only have acted in the sense that the damper and colder climate of the Eastern Alps, taken as a whole, may have caused the Northern exerge to prevail there and cut out the Central one. This has taken place in several butterflies and in the case of *Satyrus maera*, L. the areas of the exerges are nearly exactly the same as in *diamina*.

I must, finally, state that I fully agree with Staudinger (*Catalogue* of 1871), with Leech (*Butt. China*) and with Turati (*Naturalista Siciliano*, August, 1920), who cast a strong doubt on the specific distinctness of *protomedia*, Mén. from *diamina*. Only, rather than call it a local race, I think its position is exactly established by noting that it corresponds to *niphona*, Butl. of *M. athalia*. The latter is a very distinct subtropical exerge, because its genitalia are markedly different from those of the other exerges of *athalia*. It is very unlikely that a greater difference should be found between those of *protomedia* and *diamina*, as there is no peculiarity pointing to a specific distinction: the striking difference in the aspect of the upperside is nothing more in *protomedia* than the *athalia*-like extent of fulvous of *vernetensis* and *wheeleri*, whilst the underside is exactly that of the Central exerge of *diamina* in Europe. Thus *protomedia* corresponds to *vernetensis* by both these features, as well as by inhabiting the southern limits of the habitat of *diamina*, and it seems logical to conclude it is its subtropical exerge, if nothing more is discovered about it that can alter this view.

On the Mineralisation of Termitaria.

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

If it is true that the profession of elephant-hunter is becoming extinct, termites are losing one of their few defenders, since most dwellers in the tropics have nothing but abuse for these industrious insects. I was told by an elephant-hunter that, when chased by an angry monster, the safest place on which to take refuge is an ant-heap. This must sound strange to a palaeartic myrmecologist, but in Africa the word "ant-heap" means a termite's nest, which may be a massive pyramid some fifteen feet high or even more. The theory is that the elephant hesitates to entrust his great weight to the termitarium, which is, however, strong enough to support a good many men.

There are also other uses for them. The earthy material from which these nests are formed is widely used in Africa for making bricks; these, some four times the bulk of a standard English one, are known as "Kimberley bricks" and in many districts are the best building material available. The same substance is very useful in the highest regions of the interior plateau of Angola. Here, at an altitude of from

four to five thousand feet and at a distance of some eleven hundred kilometres from the Atlantic, the country consists almost exclusively of an incoherent sand. In the highest points this is of a deep rust-red colour but as a rule it is grey, bleached superficially to a snowy white where exposed to the sun. This sand is so loose that open spaces are quite soft. The numerous roads cut by the Portugese for communication by motor are so dry and incoherent in places that the wheels sink in them right down to the axle. The only binding material available in this district is the earthy substance of which the termites nests are composed. These are broken into lumps and then beaten into the ground, thus producing a very fairly firm and compact surface.

The termitaria in this region are of a totally different design from the familiar pyramidal type general in most parts of the continent. They are shaped like mushrooms, some two to three feet high and up to about eighteen inches across the top; sometimes they are double or even treble-deckers. I believe the genus is *Calotermes*. They are not quite symmetrical and I was told that they tend to bulge down wind. I regret that this idea was put into my head too late to be verified. As the wind, in the dry season, blows unceasingly from the south-east or approximately that quarter, the termitaria would be useful to enable travellers to orientate themselves, like *Laciniium*, the compass-plant of the American prairies. Sometimes these nests occur in great colonies, clustered by the hundred into a small area; in such case they are a useful quarry.

Another exception to the incoherent nature of the ground in this part of Angola is afforded by big lumps of ironstone. These occur scattered irregularly and of very varying size, from a couple of feet across to big masses running to several cubic yards. They consist of limonite, of a dark brown colour, yellowish in places, or passing to reddish. When broken open the interior is seen to be spongy, pierced in all directions by irregular tubular channels which are filled with a softer but equally ferruginous material.

Nazaroff and I were long puzzled by these lumps of ironstone. I came across a reference to them in one of Livingstone's earlier works, where he attributed them to the action of madrepores, "the holes showing the course of the insect in many directions." But my friend, by careful observation, solved the mystery, finding them to be nothing more nor less than pseudomorphs of the local termitaria in ironstone. He found specimens in different stages of ferruginisation and there can be no doubt as to the accuracy of his observation. On one place he also found a specimen silicified.

A German author, Dr. K. Hummel of Giessen, in a recent interesting article, ("Termitenbauen und ihre geologische Bedeutung" Mit 8 Abbildungen, *Natur und Museum*, Bd. 60., Heft 8., August 1930, pp. 356-363), has noticed the same curious formation and gives a photograph showing the spongy structure clearly. He calls the material "Zellenlaterit," that is, cellular laterite, and connects it with the formation of laterite and laterite- or ironcrust, with which we may associate desert-sunburn. These well known tropical phenomena, however, are quite distinct and are possible only where the suitable minerals are present in the soil. In the neighbourhood where we found these termitaria most numerous, this was not the case.

At Cohemba, at a substantially lower altitude, these mushroom-

shaped nests are replaced by a small pyramidal design, some four or five feet high, irregular in shape, terminating in several sharp spires, which I found very useful as cover when shooting driven game. The material appears to be the same but here we did not observe any of the ferruginised termitaria, nor did I notice their use as road metal, perhaps because there is rock in the neighbourhood in the form of a doleritic dyke.

A new British Proctotrupid of the subfamily Belytinae.

By G. E. J. NIXON.

Brunnicophilus, gen. nov.

Head: Eyes entirely glabrous, small, very smooth and strongly shining. Antennae: 15-jointed in the ♀, 14-jointed in the ♂; the 1st joint of the funicle in the ♂ is deeply excised on its basal half. Clypeus strongly convex. Mandibles short, projecting forwards, their apices touching but not crossing. Vertex behind with a short band of woolly hair.

Thorax: Prothorax with a conspicuous collar of woolly hair similar to that of the vertex. Scutellum with a very large transverse hollow anteriorly; the length of this hollow is equal to that of the convex part of the scutellum beyond it. Wings: marginalis moderately long; stigmalis short, at right angles to the marginalis; postmarginalis inconspicuous, about as long as the stigmalis; radius very long. Hindwing without a trace of a basal cell.

Abdomen: petiole short, strongly swollen medially and appearing constricted at each end. Apex of the abdomen laterally compressed in the ♀, simple in the ♂.

Type of the genus, *donisthorpei*, mihi.

Brunnicophilus donisthorpei, sp. nov.

♀ *Colour*: somewhat variable; light yellowish brown; the head usually darker, approaching reddish brown. Antennae and legs always conspicuously pale.

Head: large, spherical, very smooth and strongly shining, and bare except for sparse, inconspicuous, fine hairs. The distance between the antennal insertions and the occipital margin over the head is evenly semicircular. Eyes very small, their length only a little longer than half that of the scape. The distance between the eyes and the mandibles is considerably greater than the length of the eyes themselves. Antennae: scape a little shorter than the following 4 joints together, and having on each side at its apex a small triangular projection; pedicel strongly narrowed basally; first 6 joints of the funicle very close-set and of equal width; 1st joint twice as long as wide and as long as the following 2 joints together; joints 2-6 nearly square in outline; joints 7-13 becoming gradually wider; 9-12 well separated, bead-like; 13th large, oval, wider than the preceding joint, about as long as the 11th and 12th together. If the head be viewed from the side, there is a conspicuous angulation between the convex clypeus and the mandibles.

Thorax: Mesonotum slightly narrower than the head, very smooth

and shining, virtually glabrous, having only a few fine upstanding hairs. Parapsidal furrows represented by extremely fine, weakly impressed lines which anteriorly are quite distinct, but which fade out long before reaching the posterior edge of the mesonotum. Propodeum divided by 3 sharply defined carinae into 2 shining areas, which are longer than wide; the middle carina becomes almost imperceptibly forked at its base.

Wings: marginalis about equal in length to that part of the subcostalis between the upper origin of the basalis and the basal limit of the marginalis itself; postmarginalis hardly as long as the stigmalis; a false radius encloses a long radial cell which is about twice as long as the marginalis.

Abdomen: petiole somewhat shining, clothed with long whitish hairs. 1st sternite, seen from the side, forming a prominent angulation at its base; this angulation is nearly right-angled, and is thickly clothed with whitish hairs. The apex of the abdomen becomes suddenly and strongly constricted laterally.

Length: 2.3-3.4mm.

♂ differs from the ♀ only in the following respects:—

Head: Antennae with the scape a little longer than the following 2 joints together; pedicel about as wide as long; funicle clothed with short inconspicuous hairs; 1st joint twice as long as the pedicel, deeply excised on its basal half, the side opposite to the excision slightly bowed; following joints subequal in length, about two-thirds as long as the 1st, all becoming narrowed towards their base, especially the apical ones.

Abdomen: 1st ventrite without an angulation at its base; apex of abdomen somewhat flattened dorsally.

Length: 2.5-2.7mm. Types in Coll. Donisthorpe.

Berkshire, Windsor Forest; in nests of the ant *Acanthomyops brunneus*, Latr.

This genus is closely related to *Acanosema*, Kieffer, and differs from it, apparently, only in having no basal cell in the hindwing. The woolly collar on the pronotum and on the vertex, its smooth shining surface, combined with a certain delicateness of appearance render this little species superficially very like a *Diapriine*.

I have pleasure in naming this interesting insect in honour of its captor, Mr. H. St. J. Donisthorpe, to whose indefatigable energies in the field we owe yet another addition to our list of British Hymenoptera.

Some Observations on Aleurodidae.

By J. W. HESLOP HARRISON, D.Sc., F.R.S., F.R.S.E.

Although I have published but little recently concerning the *Aleurodidae*, my interest in them has continued unabated, and I have never ceased collecting them for the purposes of study. Naturally, therefore, I commenced to read Marriner's paper (*Ent. Rec.*, Feb. 1931) with some zest. However, my interest changed to dismay as I proceeded, for so many points in it revealed themselves as demanding criticism.

In the first place, the title seems quite inaccurate. If the word "Aleurodes" is intended to be the title of the most important

British genus the name is inapplicable to the paper, for other genera are discussed. On the other hand, if it is supposed to be the plural of an English word replacing the more usual "Aleurodid," as the use of the singular "aleurode" on page 22 would signify, then what is the word "Aleurodes," printed in small capitals on line 14, supposed to imply or to cover?

Other points needing comment in Marriner's paper I propose to take up as I place on record observations of my own.

Aleurodes fragariae, Walker.—Rare in N. Durham. Marriner's specific name is incorrectly spelt.

A. loniceræ, Walker.—Extremely common everywhere in Northumberland, Durham and N. Yorks; polyvoltine, the last brood of the year hibernating in dead leaves at the bases of the food plant, where I have often captured them in winter, when collecting Arachnids. Again the specific name is spelt wrongly in Marriner's list.

A. sylvestri, Westhoff.—There appear to be two species on honey-suckle one of which seems to be this. I hope to breed both the present form and the preceding from the egg to settle the point.

A. rubi, Sign.—Not at all common with us on bramble and raspberry.

A. rubicola, Douglas.—More usually found on bramble than the former, and generally more plentiful.

A. quercus, Sign.—Has occurred only sparingly recently in our oakwoods.

A. spirææ, Douglas.—Waldridge Fell still remains our only locality.

A. prolella, L.—Very common on its food plant on the walls of Aydon Castle, Northumberland. The Celandine (*Chelidonium majus*) is very local with us and therefore this Aleurodid must be the same.

A. prenanthis, Schrank.—Abundant on *Prenanthes purpurea* at Zweisiltschinnen and Gsteig, Switzerland.

Asterochiton carpini, Koch.—Sparsely distributed in the Derwent Valley. Mr. Marriner very charitably regards my use of the generic name *Asterochiton*, for this species in place of *Aleurodes* as "probably a slip." It never seems to have dawned upon him that the change was the outcome of prolonged study and tedious breeding work. Further he is quite in error in asserting that the genus is South European. It is a record for Germany, and I myself have taken it in the form of the species *Asterochiton coryli*, Britton, in Quebec, and of a second and undescribed species from *Praxinus pennsylvanica*, in Ontario. Moreover Marriner's own *S. phillyrææ* has been assigned to it by responsible authors.

A. avellanae, Sign.—More or less western in our counties, but nevertheless plentiful in at least two broods; also captured in Midlothian. Again the determination of the genus demanded a considerable expenditure of time and was not a "slip."

Trialeurodes vaporariorum, Westwood.—Common everywhere in greenhouses on *Solanaceæ*, *Fuchsia*, *Passiflora*, *Abutilon*, etc., the second being by far the worst affected plant in my experience; can maintain itself outside during the summer and autumn.

Tetralica ericæ, Harrison.—Still at Waldridge and recently captured in Dipton Woods, Northumberland. Let me hasten to assure Mr. Marriner that, despite his lack of knowledge of the fact, a description

of both genus and species has been supplied in the *Vasculum*, Vol. III., No. 2, page 60, 1917, and repeated by special request in the *Entomologist*, Vol. L., page 170, August, 1917. This species is likewise polyvoltine.

Mr. Marriner, in his concluding paragraph is, of course, simply repeating the subject matter of the two last paragraphs of my paper on "New and Rare British Aleurodidae" (*Entomologist*, Vol. LIII., Nov. 1920) and supplying confirmation thereof. I must protest against his bestowal of the name *Aleurodes scrophulariae* upon the *Scrophularia* species. The name is nothing but a *nomen nudum* and therefore cannot stand. Further, the use of the generic name *Aleurodes* shows a failure to appreciate the kind of facts one must accumulate before one may venture to assign a species of this group to its correct generic position. Since Mr. Bagnall's original detection of the figwort insect I have observed it myself and would hesitate long before I would regard it as a typical *Aleurodes*. The same holds true of Marriner's "*Aleurodes ulmi*," although matters are worse here, for in my 1920 paper my studies were far enough advanced to enable me to place the species in the genus *Asterochiton*.

I may state for the benefit of other workers, that I have ova, larvae, pupae and imagines of several new species.

(1) From *Fraxinus pennsylvanica*, Islington, Ontario, Canada.

(2) From *Clematis vitalba*, several localities between Interlaken and Grindelwald, Switzerland.

(3) From *Impatiens noli-tangere*, very common Zweilütschinen, Switzerland.

(4) From *Aegopodium podagraria*, common near Wilderswil, Switzerland, also once or twice in Durham.

(5) From *Aquilegia vulgaris*. In spruce and beech woods, Wilderswil, Switzerland.

NOTES ON COLLECTING, etc.

NESTOBIUM RUFOVILLOSUM, DEG.—THE DEATHWATCH BEETLE.—The attention of Coleopterists might perhaps be called to the leaflet recently published by the Forest Products Research Laboratory of the Department of Scientific and Industrial Research, and reviewed in the issue of the *Times* of April 2nd, and particularly to the request of the Director (Forest Products Research Laboratory, Princes Risborough, Bucks) for suitable material containing living insects to be sent to the laboratory. It is stated that thousands of adults are required for the study of the life-history of such a pest to the old timbers of our valuable and historic buildings, which may lead to the development of more successful methods of prevention and control, and particularly in the early larval stages of this insect.—G. C. LEMAN (F.E.S.).

SCIENTIFIC NOTES AND OBSERVATIONS.

YOUNG LARVA OF PHLOGOPHORA METICULOSA IN FEBRUARY.—On February 1st last I found a green larva about half an inch long which I did not recognise. It was feeding on a flower of *Anemone fulgens* and had eaten conspicuous holes in several of the petals, so I brought and the flower indoors and installed it in a glass tumbler for

observation; after feeding for several days it prepared for ecdysis and was four days thinking about it! After the change I at once recognised it as it was quite typical of the full fed larva and I gave it dock under the same conditions. It has now cast another skin without any apparent change in appearance except that of size, it being now one inch in length. The question is, when was the egg from which it hatched laid? About the beginning of January I found two full fed larvae of this species and on February 16th another; these, I presume, are offspring of the moths which one sees on treacle in September and October and are therefore normal, but this tiny larva must have come from a *very* late moth, or it must have spent about three months in the egg state. I remember many years ago finding larvae of this species feeding on chrysanthemums in our greenhouse at Clapton—to my father's disgust and my own delight!—after the plants had been brought in for flowering, and this would be in September or October, so no doubt these larvae would have emerged as moths the same year, though they *might* have passed the winter as pupae. I see Newman and Leeds in their *Text Book* show the larva in every month and the species as continuously brooded from March to September, during which period ova, larva, pupa and imago may all be found. These two peculiarities make this species absolutely unique amongst the British lepidoptera, for although most of the internal stem and root feeders pass two or three years as larvae, their imaginal period is very short. Given a run of very mild winters *meticulosa* might become continuously brooded throughout the year! I have seen the imago here once only but no doubt it remains on the wing much later than in less favoured parts of the country and as the winter has so far been mild and open this tiny larva may be accounted for in that way.—C. NICHOLSON, F.E.S., Tresillian, Cornwall. *March 6th, 1931.*

BIRDS AND INSECTS.—During the correspondence on this subject some fifteen years ago I wrote a contribution respecting *Plusia moneta* larvae and a robin; see this magazine Vol. 28 (1916) p. 138. Having accumulated further evidence of the Robin's taste in insects it may be of interest to set it forth here. By way of introduction I may say that for many years whilst we were at Hale End we were rarely without one, or a pair, of this bird in a more or less tame condition in the garden, so that observation and experiment were comparatively easy, and but for that universal and unmitigated pest, the domestic cat, would have been much easier. Since we came here we have continued to encourage birds in the garden and our tame robins are objects of much interest and instruction. On several occasions of scarcity of food in the garden, or when they were rearing their young I have gone to Epping Forest and beaten for larvae, giving the whole "bag" (except any that I wanted to keep) to the robins on my return. This provided them with easily earned food and enabled me to observe their attitude to the various kinds of larva. I found a good dodge was to put all the larvae into a fairly large cardboard box with a halfinch hole at one end; this was placed on the top of my tool-shed and was then just at a convenient height for me to note the species of each larva as it crawled through the hole and one or the other of the birds took it. The cock robin got quite knowing after a time and if there happened to be only one larva visible when he returned from the nest he would sometimes

wait to see if another would appear, snapping it up as soon as its head came into view. I have not yet adopted this dodge here, but I save every larva I find and do not want for myself, until I see one of our robins to offer it to; I do the same with moths and insects of other orders. We always keep a supply of meal-worms provided by Gamage's, and the pupae and perfect beetles (*Tenebrio molitor*) are eaten just as readily as the larvae. It has been most interesting to see that the theories of protective and warning coloration are well supported by the behaviour of our robins. All smooth larvae I have tried whether green, brown, grey or nondescript, are readily taken, whether Noctuids or Geometrids, except *Abraxas grossulariata*, the *Hyponomeuta* species, *Diloba coeruleocephala*, *Hadena oleracea* and probably every other black spotted or yellow marked species. On the other hand all hairy larvae, except *Nola cucullatella*, are rejected; I have tried the birds with *Spilosoma menthastri*, *S. lubricipeda*, *Euproctis similis* and *Malacosoma neustria*.

The cock robin is quite at home in my garden shed here and snaps up the "bluebottles" and other Diptera that fly to the window, as well as any "clothes-moths" disturbed whilst I am working; these consist mainly of *Borkhausenia pseudopretella*, with an occasional *Endrosis lacteella*, or *Depressaria*. *Dasycera sulphurella* is also common in the shed, but I have never seen it touched. Larger moths if protectively (but not warningly) coloured are taken readily if they move. I once offered a fine *Pygaera bucephala* at rest on my finger to one of our Hale End robins but she was not at all interested, until I threw it on to the path, where it alighted upside down, and as it fluttered in righting itself it was at once snapped up, as it would have been had it shown signs of life whilst on my finger. *Hepialus lupulinus* was also accepted readily, and disturbed Geometrids on the wing are usually readily taken, the snapping of the bird's beak—irresistably suggesting a smacking of human lips!—being very noticeable.

I have not tried them with many Coleoptera, but such as have been offered suggest that robins are good entomologists! The meal-worm beetle has already been mentioned and *Helops striatus*, which is very common about here in dead wood and under bark, etc., is readily taken but the Carabids, such as *Nebria brevicollis*, *Steropus madidus*, *Harpalus aeneus* and the small black Harpalids, are left severely alone! The Coccinellids, too, are rejected, but I believe *Sitones* are accepted, though I am not sure, and I have not experimented with the green *Phyllobius* and *Polydrusus*.

Earwigs are accepted readily here, but the Hale End birds would not have anything to do with them, and apparently woodlice are unacceptable to all robins, as is also *Polydesmus*; but *Lithobius forficatus* and *Geophilus flavus* are eaten with gusto, and *Julus terrestris* also, after some special treatment which I could not understand. I offered a half-grown specimen to our cockrobin and after nipping it once or twice he turned his head round and apparently touched the underside of his tail with it; this occurred once or twice before he swallowed it, but there was no rubbing such as one would expect if there were any unpleasant exudation to wipe off.

Spiders of small dark species are readily eaten, but I don't know what would happen to the big Tegenarias.

In conclusion I may add that robins have no difficulty in catching swiftly moving spiders and *Lithobius*, but I usually notice that when the latter is discovered under pots, stones, boards or tiles no robin is near and I secure the specimen until I can call one of the birds up to take it. Robins are wonderfully smart at finding meal worms thrown to them and falling amongst dead leaves or grass, and on one occasion recently the hen robin actually *turned over* a dead leaf to secure the meal worm that had fallen under it several feet away from where the bird was waiting and could not see it when she reached the spot.

Another point of interest is that protectively coloured larvae are fairly safe in situ so long as they are still, but are caught at once when seen in motion; nevertheless a rolled up green or brown larva thrown towards the bird when on the ground, or offered on one's open palm, is immediately recognised and taken. This *may* be accounted for by the fact that when the birds become familiar with us they take it for granted that anything one offers is intended to be eaten, unless its colour warns them otherwise. I don't recollect ever trying our robins with any of the Hemiptera-Heteroptera, but when I do so I will report the result in a future article.—C. NICHOLSON, F.E.S., Tresillian, Cornwall.

CURRENT NOTES AND SHORT NOTICES.

From W. F. H. Rosenberg, F.Z.S., F.E.S., of Haverstock Hill, we have received a copy of his new *Catalogue of Lepidoptera*. (Price List No. 31.) It consists of 64 pp. large octavo, and lists the species in systematic order. The *Papilionidae*, for instance, being subdivided into America, Indo-Australia, Africa and Palaearctic. The Noctuae, Geometrae and Micros are not listed, but Mimicry Groups, Warning Colours, Protective Resemblance and Sexual Dimorphism are specialised. There are also cheap lots and special offers of certain families offered. Those who wish to add, say, examples of far eastern forms of our British or European species would do well to consult such a list.

Another Catalogue has reached our table, A Catalogue of Books on Insects, from John D. Sherman, Jr., of Mt. Vernon, New York, including the list of purchases made by the compiler during his tour in Europe of 1930, of which there is an account on the early pages. The Catalogue shows how prices have soared since we bought our own copies of numerous works. For example, Hagen's *Bibliotheca Entomologica*, for which some years ago we gave 8s. is now priced at £6. Still a large number of useful volumes are quite reasonably priced and should attract buyers.

Dr Rocci has sent us copies of two articles published by him recently in the *Boll. Soc. Ent. It.* The first is argumentative on subjects of which notes have at various times been included in our pages, and in the pages of other English magazines. The remarks of the author on the works of de Prunner are well worth noting as coming from one familiar with de Prunner's localities in Piedmont. The author then goes on to discuss the Nomenclature Rules proposed by the British Nomenclature Committee, as published in the *Proc. Ent. Soc. Lond.* (1928). The second pamphlet contains a few notes on *Melitaea athalia*.

From Pablo Köhler the well-known Argentine lepidopterist we have received the following separates 1. The life-history of *Colalus cannae*, a small Pamphilid; 2. The life-history of *Chlosyne saundersi*; 3. Notes entomological, dealing chiefly with diseases of larvae; 4. A Catalogue of the Lepidoptera of the Argentine with a supplement; 5. A review of the *Agaristidae* of the Argentine; 6. An account of the genus *Hamearis* of the Argentine; and 7. The Danaine butterflies of the Argentine. All are adequately illustrated with plates and text figures, and are a good sample of the excellent work in progress in the country.

With the above was included a figure and description of a very remarkable aberration in the markings of the underside of *Callicore candrena*, by Alberto Breyer one of the enthusiastic members of the Argentine Entomological Society, whose aid and patronage of everything appertaining to natural history may be relied on.

The *Societas Entomologica* after running for 45 years has now ceased to exist as an independent magazine and is henceforth amalgamated with the *Entomologische Rundschau*, which has run for 47 years. The *Ent. Rund.* will in future appear twice a month with *Insekten Börse*, alternately with the *Entomologische Zeitung*, which also appears with the same great entomological advertising medium.

The *Ent. Rund.* for January contains part of an account of a collecting trip around Goyaz by Dr. Seitz, the Foodplants of the *Nepticula* by K. Nutterberger, and a continuation of Contributions to a Knowledge of Plant-lice by Dr. Lindinger.

The *Ent. Zeit.* for January 8th, contains the conclusion of the descriptions of the mines of Diptera and Lepidoptera allocated to their various foodplants; the breeding of the Indian Atlas moth, *Attacus edwardsi*; Description of the S. Swiss race of *Parnassius apollo*, *triumphator*, Frühst.; the breeding from the egg of *Chrysophanus dispar* subsp. *rutilus*; and the Macrolepidoptera of the Bernese Oberland and the Upper Engadine in 1927 and 1928.

In the *Ent. News.* for December, J. D. Gunder concludes his accounts of the "N. American Institutions featuring Lepidoptera" with the 19th article "Entomological Institutions in Mexico," with 7 illustrations. In the same number is an interesting Note on the mating habits of *Callosamia promethea* and *Telea polyphemus* (Satur.) and another on the Naming of Individual Variants in Lepidoptera criticising the Gunder method of registering these forms.

In the January and February numbers of the *Ent. News.* is a comprehensive article on the insects of *Typha* species mostly in *T. latifolia*. The list comprises 56 species of insects including parasites. The observations are classified. Insects infesting roots, stems, leaves, heads and parasites. A Bibliography concludes the article.

The December issue of *L'Amateur de Papillons* contains an informative article on the "Rules of Nomenclature" by the well-known French micro-lepidopterist M. J. de Joannis, which is well worth reading. The writer gives the history of the movement from its commencement in 1842 (sic) at the meeting of the British Association at Manchester, to the present time. It seems that Britain is the only active mover in what is done, in fact in spite of the action of the International Congress at Oxford, 1914, in unanimously recommending National Committees, Britain is the only country which has established one and which is

endeavouring to push forward the subject. The decisions of these committees have to be submitted to the zoologists who deal with all animal life from jellyfish to elephants, and whose knowledge of the special circumstances of entomology is nil. There seems no hope of progress until other national committees are formed and are ready to function, and to unite in throwing over the kow-tow to the General Zoologists. The same magazine for January gives the first part of the Lepidoptera of the Mont Blanc region by M. Catherine.

The *Verhand. zoo.-bot. Gesell. Wien.* pts 1-2 (1930) contains a large amount of entomological matter including a "Lepidopterological Excursion to Andalusia in the Autumn" in 1928 by Herr Schwingenschuss forming a supplement to Dr. Zerny's visit in the previous year; "Autumn collecting at light in Corsica" by Herr Hans Reisser, and "A contribution to the knowledge of the Ants of the Quarnerian Isles" off the Dalmatian coast by Herr Stephen Zimmerman.

Iris, pt. 4 (1930) has the following interesting articles, "An Account of a Journey in the Congo Region." "On the Knowledge of the Microlepidoptera of Palestine." "Biological items from Equatorial Africa," etc.

The Société Ent. de France has just issued the 3rd portion of the "Lepidoptera-Heterocera of Tonkin" with full index, by J. de Joannis. The whole work consists of 834 pages and 6 plates.

To those going to Frankfurt-on-the-Main the recent articles on the Lepidoptera of that neighbourhood in the *Ent. Zeit.* will be of use. There are many places easily accessible from Frankfurt which evidently afford good opportunities.

The *Ent. Zeit.* for January last has figures of the ♂ and ♀ of *f. saharæ* of *Papilio machaon*, of which a number of examples have been met with at Sollum on the western boundaries of Egypt.

A visit to the Gadmen-tal (Bernese Oberland) is described in the *Ent. Zeit.* for February 8th, and in the following number for February 22nd, the Lepidoptera of Pontresina in August, 1928, are listed with annotations, and Herr C. Vorbrodt lists the Lepidoptera taken at light around the Lake of Lugano.

REVIEWS AND NOTICES OF BOOKS.

A TEXT-BOOK OF AGRICULTURAL ENTOMOLOGY. By Kenneth M. Smith, D.Sc., Ph.D. Cambridge University Press, 286 + xiv. pp., 79, figs. oct. price 12/6.—A handy volume which claims to be an up-to-date treatise "dealing with insect pests of crops in Great Britain designed for the use of the agriculturist as well as of the agricultural entomologist." The volume is well got up and is more fitted for the library of the scientific agricultural entomologist than for the daily use of the agriculturalist. Each species of pest is dealt with in a comprehensive manner; general remarks, scientific description, life-history, host plants, injury caused, distribution in Britain, control, natural enemies. The pests are arranged under their natural orders and families, to each of which there is a general preface of characteristics, and appended to each order is a long list of references. There is an admirable selection of most useful illustrations for the entomological student but of little use for the practical agriculturist, whose training

is not sufficiently scientific for the recognition in the field of an insect of which he has only a figure "greatly enlarged." Who can recognise a pollen beetle, *Meligethes aeneus*, from a figure magnified 22 times? The figures of lepidoptera (enlarged) are very difficult to recognise even by an experienced lepidopterist without the names attached, to those unfamiliar with insect life size is everything to recognise similarity and aid identification. (See p. 75, 86, etc.) The Appendices and Indices are some of the more useful features of the book. I. Characteristic symptoms of Insect Attack, is a really good tabulation. II. Common Farm Weeds in relation to Insect Pests: an extremely useful collection of facts concerning the alternate hosts for farm pests. III. An Index of Parasites or Predators in their several families. IV. A good general index to the whole work. As an "up-to-date textbook on agricultural entomology" this work admirably fulfils its object, and whatever is further desired can be obtained by using the comprehensive lists of references given to each chapter. But for the working, scientifically untrained agriculturalist it would probably not be of that practical use which illustrations of natural size would have rendered it.—HY. J. T.

OBITUARY.

William Henry Bennett.

William Henry Bennett passed away at his residence, 21, Wellington Place, Hastings, on Saturday, 4th last, aged 68. He was born in 1862 at 23, Hill Street, Hastings. His father, Henry Edward Bennett, was a pork butcher carrying on business in George Street, and when he died the son had to take over the business at an early age.

Although all his real interests were centred in Natural History, he continued to be a pork butcher until he retired some years ago. He was a very good all round naturalist, not only as an Entomologist—specializing in Coleoptera—but also as an Ornithologist, etc.

He had a wonderful genius for field work, and we well remember collecting with him in the early 90's—and also later—when we were always struck by his consummate knowledge of the fauna of his district. One may justly add that one could not have wished for a more generous, intelligent, and interesting companion in the field. Every Entomologist who visited Hastings always went to see Bennett to secure his help and advice. Besides adding largely to the knowledge of the fauna of the Hastings district, he was equally successful when away from home, and he added various species to the British list. One may mention *Lebia turcica*, F. of which he captured the only authentic British specimen on April 30th, 1888, near Guestling—*Ochthebius lejolisi*, Muls., discovered by him, new to Britain in rock pools at Ilfracombe in June, 1895; our most distinct species.—*Ilyobates bennetti*, Donis. described after him by us on a specimen taken with the ant *A. (D.) juliginosus* in the Bexhill High Wood in 1907 (figured on page 76 in *Guests of British Ants*)—*Anthonomus rufus*, Schön., he first captured this little weevil, new to the British list, at Fairlight on June 19th, 1892, by beating blackthorn, etc. His fine collections of British beetles, butterflies and moths, etc. are housed in the Brassey Museum at Hastings. He was interred in the Cemetery at Ore on Thursday, April 9th. *Requiescat in pace!*—HORACE DONISTHORPE.

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Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. Opima, populeti, gracilis (Irish and Scotch and
Manx), gothicina forms of gothica and selected unusual forms of incerta, gracilis and
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EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of
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DUPLICATES.—Indian Butterflies.—A. F. Rosa, M.D., 4, Bellevue Crest, Edinburgh.

WANTED.—Seitz Macrolepidoptera, Vol. 5, Text only.—Rev. T. W. Adam, Riddlesworth
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The South London Entomological and Natural History Society, Hibernia
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Place, Blackheath, S.E.3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the
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Collecting 1930. (Lepidoptera.)

By H. B. D. KETTLEWELL.

As a medical student in the much despised Midlands (from the Entomological point of view)—I intend to give once again a précis of the season's collecting, just to show that however black are one's prospects—both from the district and work point of view, nevertheless, allowing for week-end excursions to more distant parts—the result at the end of the year is fairly successful, provided one does not abandon the net altogether to the more pressing things of everyday life.

On April 8th, 9th, 10th and 11th I had four ♀s of *Endromis versicolor* hatch from pupae. These were kept alive with very slight hopes of being used for "assembling," as I was necessarily handicapped by a recuperation from an operation. On the 12th, however, I was driven out to a well-known forest near Bewdley and scarcely 24 miles from the centre of Birmingham. The day was sunny and windy with cloudy intervals. The battery of four females was placed free on an oak trunk in a spot where there is an abundance of small birches growing along heathery rides.

The first males arrived practically immediately. This was at 11.30 a.m.—flying up wind and keeping low down about a foot or two from the ground following a zig-zag course in their searchings.

During the bright intervals I took eleven in a very short time. None of the females were allowed to pair, but two were kept with the hope of being made further use of. These were kept in a roomy cage supplied with birch twigs. No eggs were laid and every day they were seen to be "calling" with their ovipositors extended beyond the last segment of the abdomen.

On April 22nd, 12 days after their emergence, these identical two ♀s were again taken over to the same spot. The day was hot and sunny. Thirty males arrived within two hours and many more undoubtedly would have come had I not allowed them to pair. This was between 12 noon and 2 p.m.

Allowing a female to sit exposed on my ruc-sac I was actually followed by a male as I wandered through the forest—a truly wonderful sight. One of the females was left behind to make amends for my depletion of males in this flourishing colony of *versicolor*. Ova were freely laid by the remaining female the following day and night (23rd). These did not hatch till May 14th—22 days in ova stage. Young larvae which were let loose on birches in the garden in the open all died in the 2nd instar. The rest kept in cages all fed up well and pupated throughout July.

The same day (April 22nd) *Vanessa io*, *Aglais urticae* and *Polygonia c-album* were observed together with *Gonepteryx rhamni*, also a half-grown larva of *Brenthis euphrosyne* sunning itself on an old oak trunk (emerged June 1st).

I was "doctor's orders" down to Bournemouth on April 24th, but how can one lie lazy in a district so rich in rare species? I spent the greater part of my time on my hands and knees looking for the larva of *Coscinia cribrum* in the very limited area where we have taken it for three or four years now—three miles from Bournemouth. Although there was an abundance of *Aira cespitosa* tufts growing among the

heather none were found sunning themselves as so vividly portraited in various works on the species; the heather was swept, beaten and diligently searched in turn and under the most ideal conditions, but I failed to find one—only an odd larva of *Cybosia mesomella* about 0.4 of an inch in length. Yet this June my friend R. P. Demuth took six *cribrum* in two nights on this identical spot including one very nice blackish female. *Saturnia pavonia* males were flying freely on the 25th and a solitary hibernated larva of *Macrothylacia rubi* was observed still unupated.

On April 26th and 28th I gathered up very large numbers of larvae of *Melitaea aurinia* on the earthworks a short distance from Blandford—they were swarming here but extremely local. Most of them were fullfed and the rest fed up on honeysuckle and I still had larvae of the species long after the majority had pupated and hatched in June. About 60% were parasitised by Diptera and 8 or 9% ichneumonid. The range of variation from this locality is suprising—7 or 8 brick red females, and 2 blackish females being the best perhaps—an interesting point being that the darkest ♀ came from a pupa which had velvet black wing-sheaths instead of the usual white and black spotted pupae, so that I had awaited with interest to see if this variation in the pupa-cell portended a variation in the imago.

On April 29th and 30th I was in the New Forest. *P. c-album* was exceedingly common along nearly every ride nearly 90% being male specimens. *Pararge aegeria* was equally common, and I also observed two *Pyrameis atalanta* in different parts of the forest, and in each case showing a decided preference for oak catkins, in spite of an abundance of sallow catkins all around.

I searched unceasingly on both these days for larvae of *Limenitis sibilla*, with which I had had no previous experience, but without avail.

On May 5th I again visited the Forest in search of *L. sibilla* larvae—after a good two hours hard work I found two about 0.3 of an inch in length. The next hour produced about half a dozen more and then with that unconscious mechanism which we call “getting one’s eye in,” I found that I could pick them out almost as fast as I could gather them. I collected 40 in the next fifteen minutes from those identical plants of honeysuckle which a few hours previous I had searched so diligently and so unprofitably. Is it the withered brown leaf of the old hibernaculum which catches the eye? or the sudden realisation that they, in nearly every case, are found a few inches from the ground and rarely over more than a few feet above ground level! They were all very small, the biggest being about 0.5 of an inch in length. They fed up at a tremendous rate and without a death and were pupating in 20 days time (May 26th) and hatched between June 13th and 20th—unusually early dates.

On May 24th I went over as in past years to the Huntingdon Woods after *Strymon pruni*. Larvae were exceedingly scarce and in two days I only beat one. *Ruralis betulae* was more common, a dozen being taken, and I also beat the following species. *Zephyrus quercus* (2), *Leucoma similis*, *Malacosoma neustria*, *Trichiura crataegi*, *Poeciloscampa populi*, *Nola cucullatella*, *Miselia oxyacanthae*, *Asteroscopus sphinx* (very common), *Taeniocampa gracilis*, *T. pulverulenta*, *Scopelosoma satellitia*, with numerous Geometrid larvae, and also on the same day

found larvae of *Cirrhoedia xerampelina*, *Amathes circellaris*, *Mellinia gilvago*, *A. lota* and *Cirrhia citrago*.

B. euphrosyne was on the wing by May 28th and was exceedingly abundant in Wyre Forest, but extraordinarily constant in form. It continued on the wing up to June 25th, on which day I took a female with its normal black markings suffused and blurred.

B. selene was out on June 18th at the same place and I had the good fortune to take a most peculiar and extreme variety of the species and one which had only just recently dried its wings:—*Forewings*. Ground colour a uniform brown heavily dusted with black scales which are superimposed on top, all the usual black markings absent or very faint except the two stigmata marks which stand out alone conspicuous on the forewing. *Hindwings* absolutely normal. One or two other minor varieties were taken and there seems to have been a tendency to vary a good deal this year.

On June 6th, in company with my friend Demuth, we spent the weekend in an uninhabited spot near Seaton, S. Devon, and worked those few miles of chalk cliffs on the edge of which we camped with the rough and bushy slope beneath us going sheer down 200 ft. to the sea. Daytime work was very profitable no less than twenty-three different species of butterflies being observed during our two days there, which were exceedingly hot—in fact unbearably so.

Leptosia sinapis was exceedingly common and in good condition, although I know it had been well on the wing at least a fortnight prior to our visit. It seemed to us a most extraordinary locality to find this insect after seeing it in its totally different surroundings in the Surrey rides and woods, and we can only hope that it will be more successful in maintaining itself here, than its less fortunate inland brothers and sisters have been.

The following butterflies were also seen:—*Pieris brassicae*, *P. napi*, *P. rapae*, *Euchloë cardamines*, *Colias croceus* (*edusa*) 1 ♂, *Vanessa io*, *P. atalanta* (2), *A. urticae*, *B. euphrosyne*, *B. selene*, *M. aurinia* (a few), *Plebeius* (*Aricia*) *medon* (*astrarche*), *Polyommatus icarus*, *P. thetis* (*bellargus*), *Lycænopsis argiolus*, *Cupido minimus*, *Callophrys rubi*, *Pararge megera*, *Epinephele tithonus*, *Coenonympha pamphilus*, *Hesperia malvae*, *Nisoniades tages*, the majority being exceedingly abundant. *Aretia villica* was also flying by day and the sloe bushes were covered with nests of *Malacosoma neustria* and *Lachneis lanestris*.

The next night we were entirely unsuccessful after *Dianthoecia albimacula*, which we had hoped to get;—in vain did we creep up to the tufts of *Silene nutans* growing, as always, dangerously near to the edge of precipices. The following night, however, we found a larger patch of the catchfly and on the evenings of the 8th and 9th, we were fortunate enough to take 15 specimens of this species hovering over their food plant along with *Theretra porcellus*, *Chariclea umbra* and others.

We noted the females ovipositing on certain clumps of the food-plant only—the flowers from these were subsequently collected and kept in water and during the following weeks sufficient larvae of *D. albimacula* appeared to satisfy the greediest collector; they fed up well on campion pods, pinks, etc., and pupated shallowly, only just under the surface of the ground.

On the evening of the 8th along with the *D. albimacula* we netted

three specimens of a species of *Tapinostola*, which seems to us identical with *T. hellmanni*, were it not for the extraordinary date and unlikely locality for this species. There was a bed of *Calamagrostis* grass growing on a damper part of the cliff close at hand. I may add as a coincidence that on two occasions when I had this insect in the net I had an *albimacula* in the bag at the same time and I should think it is the first time on record that these two insects of such entirely different times of emergence and localities, have been taken alongside each other. I also had a solitary *D. albimacula* hatch on June 15th from larvae obtained near Folkestone last year.

On June 21st I was at Wicken Fen for the night along with Mr. Worsley-Wood. It was not one of Wicken's best nights—on the other hand sugar was fairly well patronised—in quantity if not by quality. *Eumorphia elenor* was observed at dusk taking a hasty sip but was quickly supplanted by hosts of *Xylophasia lithoxylea*, *Mamestra thalassina*, *Apamea unanimitis*, *Leucania pallens*, *Agrotis exclamatoris*, *Rusina tenebrosa*, *Apamea basilinea*, and the following insects turned up:—*Palimpsestis octogesina* (1), *Senta maritima* ab. *bipunctata* (1), *Xylophasia sublustris* (a few), *Leucania obsoleta* (1)—also *Mamestra sordida* and *Aplecta advena*. The last named species seem to have an interesting habit of appearing at the first streaks of dawn and although they had been appearing sporadically throughout the night, I boxed far more by daylight without the use of a lamp than the whole of the rest of the night put together.

Light proved very poor sport, except for a few *Meliana flammea*, both sexes of *Microgaster arundinis* (*castaneae*), and numbers of males of *Pygaera bucephala* arrived to a female freshly emerged at the foot of the sheet.

The same day a hasty trip over to the Brecklands around Tuddenham had produced a bunch of *Silene otites*, which in a week's time swarmed with larvae of *Dianthoecia irregularis*. They feed up well on pinks and campion pods and pupate much deeper than its relative *albimacula*.

The following day (June 22nd), Mr. Worsley-Wood and I went over to the same Huntingdon Woods where *S. pruni* larvae had been so scarce earlier in the year. We found the imagines exceedingly abundant and in good condition. Out of 51 insects netted only five were females, though I am told that at a later date the sexes are equal in number. It is inconceivable to me where these insects could possibly have bred in such numbers as we caught them around the identical bushes which I had beaten so unsuccessfully earlier in the year.

On July 2nd, after many days of searching, I succeeded in finding wild larvae of *E. versicolor* in the same locality near Bewdley, where the imagines had been so abundant this spring. The empty egg-cases—11 in number—first called my attention to their presence on a small birch bush, about seven feet high, situated on the edge of a wooded ride in the middle of the Forest; although the larvae were fullfed it took me a good twenty minutes to find half a dozen of them. Their protective coloration is remarkable for so large a creature. They are far from being gregarious in the last instar and were evenly distributed over the whole tree.

(To be concluded.)

Stray Notes on Erebiid species.

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

(1) *E. medusa*.

Frühstorfer did a great deal of useful work in describing the local forms of many species of *Erebia*. Unfortunately some species did not lend themselves to his method of treatment, being essentially of a variable nature which tended more to the production of aberrations than constant races. In these cases it is not surprising that he became hopelessly involved in his effort to define races, which in point of fact were non-existent. Striking examples of this are to be seen in his treatment of *E. oeme* and *E. medusa*. The latter is, perhaps, one of the most unstable species in the genus. It produces some few constant races, and for the rest assumes an almost incredible variation. Frühstorfer, who worked on the principle that the races of any two widely separated localities must be different, evidently did not give the necessary study to these unstable species, before trying to define their racial forms. His work in these species therefore requires very careful checking. In writing on *medusa*, however, he made one surprising mistake, of a totally different character: this was his treatment of *hippomedusa*, Ochs. This name he applied to one of the few constant races; that which occurs in the highest altitudes attained by the species, in eastern Switzerland, Styria and the N. Tyrol. In this he was entirely mistaken. When Ochsenheimer gave the name he merely wrote: "Die hier beschriebene kleinere Art habe ich vor zwei Jahren aus Steyermark erhalten; sie ist offenbar eigene Art und von mir *Hippomedusa* benennt." On the strength of this Frühstorfer states that the name must be used for the small Styrian race, but it is hard to understand how he could have ignored the first words; "Die hier beschriebene kleinere Art." Ochsenheimer was applying the name to the insect already described in the same publication by Meissner, and it is beyond all question that it is to this insect the name belongs. One must suppose that Frühstorfer was under the impression that Meissner's insect did not occur in Styria, but even if this was so (which it is not) it would make no difference, and *hippomedusa* would have to be used for the insect covered by the description to which Ochsenheimer appended the name. This has been done for the most part by past writers like Meyer-Dür; who was followed by many English authors, like Kane and Wheeler. What struck Frühstorfer, was that two forms were being placed under the one name, but unfortunately he restricted it to the wrong one.

Meissner's insects came from the Jura; and although, as Meyer-Dür shows, there were several mistakes in Meissner's description, the latter points out quite correctly the remarkable characteristic of the race, in the reduction of the markings, the spots and their pupils in the ♂, accompanying an *increased* development of the same features in the ♀. This race (*hippomedusa*) not only occurs on the Jura and in many other mountain localities in Switzerland, as well as in the Vosges, etc., but also in Austria and even as far east as the Carpathians, from where there are specimens in the Hungarian National Coll. in Budapest. It is therefore more than probable that Ochsenheimer did get true *hippomedusa* from Styria, indeed Treitschke's reference to the name suggests that this is so. The position therefore is:—*hippomedusa*,

O. = *meissneri*, Frubst., and the race Frubstorfer termed *hippomedusa* is left without a name, and may in view of its habitat, appropriately be known as:—

race **altissima** nov.

One of the smallest races of the species; in the ♂ the spots and markings are greatly reduced as in *hippomedusa*, but the patches of the bands which remain are represented by very narrow rings of even width, around the spots, of a dark mahogany colour and very sharply outlined, not suffused in an irregular manner; usually only three on each wing. The result of these narrow and sharply defined rings, is to give the insect more of a look of *E. oeme* than *medusa*. In the ♀, while the rings are a little broader, paler and more suffused at the edges on the upperside, than in the ♂; on the underside, especially of the hindwings, they are narrower and much darker than in any other ♀ form of the species. Occurs at great altitudes in eastern Switzerland, usually from 6-8000 ft., as well as in the Alps of Styria and the N. Tyrol.

This little race is decidedly rare in collections, as Frubstorfer pointed out.

Another mistake of Frubstorfer's, showing that he had not worked the matter out for himself but was only taking what others had written for granted, is that he refers *themistocles*, de Loche, to *medusa*, stating that it is the form of the Piedmont, Lombardy and Central Italy. The only apparent reason for this must have been the fact that Eiffinger placed *themistocles* as a synonym of *medusa*. De Loche's description is an excellent one, and one or two points in it show at once that his insect could not possibly have been a *medusa* form at all; and had Frubstorfer ever given it a moment's consideration he must have noticed this. It may not be out of place to note here that *themistocles* is a form of *E. alberganus*, de Prun. (*ceto*, Hb.) which occurs in the Graian, Cottian and Maritime Alps. It is a race very similar to the Swiss *ceto*, more or less transitional between the latter and *obscura*, Ratzer.

Before leaving the subject of *medusa*, I may note without going into detail, that of Frubstorfer's other names his *cercida* is a *nomen nudum*, but in any case it would fall to his *generosa*; while his *charila* cannot be kept distinct from his *brigobanna*.

(2) *E. jeniseiensis* ssp. **fasciola** nov. (= *ligea* ssp. *altaica*, Goltz; *euryale* ssp. *altaica*, Bang-Haas, *il.*).

A race of *jeniseiensis* occurring in the Altai Mts. which has the band on the upperside of the forewings narrow, but continuous, and of absolutely even width throughout, with almost straight outer and inner edges; instead of being strongly restricted in the middle area or even sometimes broken. The black spots on the band are usually 4 in number, and the two apical as well as the one at the anal angle, elliptical instead of being roundish. On the hindwing the band is also even in width, and practically continuous; only just divided very finely by the nervures, instead of being roundish spots as in the type. In this band there are four black spots. The underside is practically as in *jeniseiensis*, but the edges of the band on the forewings are straight, as above.

This race differs very markedly from *jeniseiensis*, as may be gathered

by the fact that Bang-Haas placed it as *euryale*, though he was very familiar with *jeniseiensis*; Goltz described it as *ligea* ssp. *altaica* (Seitz Supp. Vol. I. p. 149). This was not, however, because of any resemblance to *ligea*, but only because he was following the totally erroneous theory that all forms in this group of species, where there is a white streak on the underside of the hindwings must be *ligea*; a theory which has naturally led him into great difficulties with *ligea* and *euryale*, and accounts for his placing *euryaloides* and *arctica* as *ligea* instead of *euryale*; where they were correctly placed by their original describers. The name *altaica*, Goltz, had already been used by Goltz himself for a race of *E. aethiops*, so it cannot be retained* for this form of *jeniseiensis*.

(3) *E. euryale* ssp. *euryaloides*, Tgstr. (= *ligea* ssp. *uralensis*, Goltz).

Following the above remarks, one must also note that the insect designated by Goltz (Seitz Supp. p. 149) as *ligea* ssp. *uralensis*, Sheljuzhko, is a further incorrect determination resulting from the theory of the white streak. The insect in question is not a form of *ligea* but of *euryale*. An even stranger mistake is that the name *uralensis* is attributed to Sheljuzhko. The latter informs me that he has never described any form of any *Krebia* under that name. Goltz is therefore the author. The name, however, is preoccupied, having been used by Goltz for a race of *E. aethiops* (Seitz Supp. p. 146). This is of no consequence in this case for a special name is not required; this *euryale* form of the Urals is indistinguishable from *euryaloides*, Tgstr., from Finland. In coming to this conclusion, I have had the advantage of being able to compare specimens from the Urals with two specimens from Tengström's own collection. For the loan of the latter I am greatly indebted to Dr. R. Frey, of Helsingfors; who also with extraordinary generosity allowed me to retain one of them. There are also two specimens in the British Museum coll. which I feel sure came originally from Tengström. This combination of material has given me a reliable basis to work from. In connection with *euryaloides*, a frequently made mistake is the assertion that it is a form entirely without black spots, and though of course this is often so, the two apical spots are, not infrequently, present in specimens from Finland; they also were in one of Tengström's specimens. In these cases they are, however, indistinctly marked and reduced in size, and have no pupils.

It may be as well to add that all the statements I have made in this article, as to the separation of these *ligea*, *euryale* and *jeniseiensis* forms, are based on anatomical proof, of which in the future I hope to give photographical evidence of.

(4) *E. aethiops* race **fogarasica** nov.

The list of named forms of this species is a long one and it is with regret that I have to add yet another to it. This form is however, so remarkable in many ways, that it is necessary to describe it; even though the ♀ is still unknown. I am once more indebted to Dr. A. Schmidt of Budapest, who brought these specimens to my notice.

Hungary is one of the homes of the typical race of *aethiops*, which

* Why not?—G.W. and Hy.J.T.

as is known, is usually a fine large form; but Hungarian specimens probably attain a greater size than any of the other European races of the species, in some cases falling but little short both in size and markings of true *melusina*, the largest of all. This is the first striking point in connection with our new race: it is one of the smallest forms, though located in the middle of an area developing some of the largest. In size the new race is similar to small English specimens, such as are figured by South in his *Butterflies of the British Isles*. There were two specimens, both ♂s, among the consignment of specimens I received from Dr. Schmidt; both had been taken by him in the Fogaras Mts. (Transylvanian Alps); and he tells me that they have a third ♂ in the collection at Budapest from the Codru Mts. in the Dept. of Bihar.

race *fogarasica* nov.

A small form, ♂ 44mm., as compared with the 52-58mm., of typical ♂s of *aethiops*. On the upperside the bands are broad and continuous, and show a very even inner edge. Even on the hindwings there is no tendency to a reduction in the width of the band. The spots in the bands, in number and position as in *aethiops*, but greatly reduced in size. The two apical ones on the forewings are about half the normal size, and practically divided into two distinct spots, rather than one large spot with two white pupils. Of the others, that at the anal angle of the forewings and those of the hindwings are reduced to mere points, with extremely minute white pupils. The underside as in *aethiops*, but the markings of the hindwings is very indistinct and there are no black rings around the white points. The noteworthy characteristics of the race are; that while in the type small size is usually accompanied by a reduction in the width of the bands on the upperside, and a reduction of the eye spots (which is rare) is also usually accompanied by the same; in the present case the bands retain full development, or even a slight increase, while the size is reduced and the eye spots also, the latter with the exception of the two apical ones, reduced almost to vanishing point.

A good idea of the remarkable appearance of *fogarasica* can be gathered from the fact that a very experienced English entomologist who saw these specimens some time ago, said that he should place them as *E. stygna*; and the likeness to the latter is quite sufficient to account for the mistake.

The specific names and the Geographical Variations of *Melitaea parthenoides*, Kef. (=parthenie, auct. nec Borkh.) and of *parthenie*, Borkh. (=aurelia, Nickerl).

By ROGER VERITY, M.D.

Having had to work out the literature concerning the species we have been led into calling *M. parthenie*, Bork., and *M. aurelia*, Nick., with a view to establishing which were their nominotypical races, I unexpectedly found myself confronted with appalling results. In the past half century lepidopterists seem, in most cases, to have been following each other blindly, like sheep, and, in connection with the Rhopalocera of the Palaearctic Region, Staudinger's judgments were comfortably considered for a long time as final verdicts, so that no effort was made to check them. When the spell was broken, in the

last few years, many corrections have been found to be necessary, and in the case of the intricate *Melitaea* it has turned out he has been particularly unfortunate, partly, but not always, owing to the lack of knowledge of their genitalia. The present case, however, is as far as I can make out, unaccountable and it is a blunder which will be most troublesome, because it consists in having shifted the name of *parthenie* to a near ally of the species for which it was erected, so that the literature of three quarters of a century on this subject is under the wrong headings: what is called *aurelia*, Nick., should be called *parthenie*, Borkh., and what is called *parthenie* should be designated as *parthenoides*, Keferstein.

Esper's name of *minor* cannot be used, because it is a primary homonym, already employed several times in the large genus *Papilio* of those days, which included all the butterflies, and besides, it would have been an unsatisfactory specific one.

Staudinger had it all perfectly right in the first edition of his Catalogue of 1861 and Kirby confirmed it in his *Syn. Cat. Diurnal Lepid.* of 1871. Why the former suddenly altered the whole nomenclature in his second edition of this same year one does not understand, except by bearing in mind the terrible confusion there existed on this subject in all the leading authors of the first half of last century. They only recognised two species: *athalia* and *parthenie*; the consequence was that some rightly applied the latter name to what we have lately been calling *aurelia*, and others used it wrongly just as we have been doing too. Up to the days of Herbst and of Ochsenheimer (1807) the species we call *parthenie* had not been detected as distinct from *athalia*, so that no trace of it appears in the literature and the former name was used for *aurelia*, Nick., perfectly correctly, according to Borkhausen's original erection of it. About this there is no possible doubt. For everybody to judge for himself I translate literally his paragraph at page 53 of the I. Vol. of the *Naturg. Eur. Schmett.* (1788):—

“*Parthenie*.—I designate by this name that butterfly, which Herr Esper has figured under the name of *athalia minor* on the 89th plate's 1st and 2nd fig. Fundamentally the pattern of the upper and of the underside is nearly completely similar to that of *athalia*, but in size it differs considerably from it. I have never found it to be larger than a middle-sized *Lucina*, but often smaller. It unquestionably constitutes a species to itself. One finds corresponding patterns in both sexes. It appears a little later than *athalia* and it is still on the wing a long time after the latter has vanished; I have found it still in existence at the end of August. The yellow spots of this butterfly are slightly rounder and the brownish-black bands are more of equal breadth than in *athalia*. Its haunts are the flowery meadows, whereas the latter likes the woods. One finds this butterfly also in Russia, but, in the same way, later than its larger ally. I cannot speak of its biology; I have never bred it from its caterpillar.”

I think nobody could hesitate to recognise, in this simple and clear description, as well as in Esper's fig. 1, the species we are in the habit of calling *aurelia*, Nickerl, and thus using a synonym erected in 1850 from Bohemian specimens, belonging to the same race as Borkhausen's from Darmstadt and as the “typical” one figured by Esper, fig. 1, from “our neighbourhood,” which stands for Erlangen

in Franconia. This figure is unmistakably good, especially in Esper's original edition of the XVIII. century. The size and the shape of the wings are just as one finds them normally in the species we have been calling *aurelia*; the only form of the so called *parthenie*, which could possibly exhibit a certain similarity in these two features would be the peculiar II. gen. of the N.-E. of France, which we will see is the nominotypical form of *parthenoides* and which I had named *inanis*, but in that case the pattern would be considerably thinner; as a matter of fact I have never come across any "*parthenie*" with the sort of pattern shown in Esper's figure, especially as regards the two premarginal bands, whereas, in series of "*aurelia*" from nearly every locality, I have seen individuals, with the black pattern less heavy and of a lighter tone than the average, agreeing exactly with that figure, especially when they are small and frail; what is more, the bold row of pure white spaces across the underside of the hindwing would to my mind be of itself decisive, as it recalls *varia*, but it never occurs in German races of the so-called *parthenie*. How Staudinger can have been doubtful of figure 1, enclosing it in brackets, and never doubted of figure 2, which most other authors have rightly questioned, is incomprehensible. On the other hand it is quite impossible to attribute figure 2 to the species we have been in the habit of calling *parthenie*, as some have done, not only because of its appearance, which is totally different from any form of the latter, but also because it represents a specimen from the Volga, where this species does not exist.

One does find that Eversmann in his *Fauna Lep. Volgo-Uralensis* of 1844 uses this name, but his remarks show that he applied it correctly to "*aurelia*" and one even understands that he had vaguely grasped the existence of *britomartis*, Assm., as another distinct species in that country, where Susehkin has lately proved it flies with "*aurelia* and *athalia*." I believe Esper's fig. 2 is beyond doubt this *britomartis* and that the series of specimens from Saratoff, which Frubstorfer has named subsp. *marussia*, emphasising the fact that this figure represents them extremely well, should be referred to this species too. This, however, has no importance in connection with the right use of Borkhausen's name, because Esper's fig. 1 is to be taken as the "type."

What, on the contrary, must be taken into account, its affording an explanation of some of the blunders made during the following century, is that Borkhausen in his II. Vol. of 1789, p. 194, applied the name of *parthenie* to an extraordinarily unusual little *Melitaea*, which he found near Darmstadt, on an arid bank, where it entirely constituted the emergence from the end of the summer to late autumn. He gives a long description of this starved dwarf, which was the size of *argus* and only occasionally the size of *lucina* in the female sex; the upperside black pattern was exceedingly thin and partly obliterated, and notably, the second transverse band of the forewings and the third of the hindwing were missing in the male; the underside of the forewing had nearly no markings and the russet colour at the base of the hindwings was replaced by yellow. It is quite true that weaklings answering this description might perhaps be less difficult to find in the species we have been calling *parthenie* than in "*aurelia*" or in *athalia*, but to take a description of this sort,

as decisive in the choice of the species a name is meant for, is an act one might have thought no serious student could be capable of. As this has turned out not to be the case, every possible doubt is fortunately removed by the fact that this description is not the original one and, not agreeing either with it or with Esper's figures, to which the name of *parthenie* was explicitly given, even Borkhausen himself had no right to include it under this name, a year after he had published the latter.

Godart, if I am not wrong, is the first entomologist who unmistakably detected the specific distinction from *athalia* of the species usually known as *parthenie*; his specimens were from "Le Havre, Chartres and Auxerre"; as they belonged to the very distinct little race of the north of France of which I have named the II. generation *inanis*, they struck him on account of their small size and very thin black pattern, which are the distinctive features he describes and figures quite well in the II. Vol. (1822) of his *Lépid. de France*. He very unfortunately concluded, as far as we can presume, that they must have been the features briefly and vaguely described by Ochsenheimer as distinguishing *parthenie* from *athalia*, and originally drawn by the latter from Borkhausen's second description, leaving out all the embarrassing points, so as to make it more inclusive, quite regardless of the first, and without noticing that they did not agree with Esper's, Hübner's (fig. 19-20, called *athalia* on the plate, but recognised as *parthenie*, Bork. in the text of 1805, page 7), and Herbst's excellent figures of the future *aurelia*, although he gives references to them. Ochsenheimer must thus have misled Godart, and the latter cannot have compared his specimens with these figures either, or he would soon have seen they belonged to a third species and required a new name. Such-wise the first blunder was perpetrated.

Freyer followed in the IV. Vol. of 1842 of the *Neuere Lepid. Beitr.*, only giving Ochsenheimer as reference for *parthenie*, figuring the same species as Godart under this name on pl. 295, but noting that Hübner's fig. 19 and 20, referred to it by the former is only a small *athalia*; he was logical in this, as these figures represent what we call *aurelia*. He adds that Esper's figure 2 is not what he calls *parthenie*, but that fig. 1 is; in this one cannot understand him, fig. 1 being the real *parthenie* and thus not Freyer's *parthenie* at all.

Herrich-Schäffer, in 1843, takes still another attitude: he recognises that Borkhausen's *parthenie* is the insect of Hübner's figs. 19 and 20, that is to say *aurelia*, and he believes Ochsenheimer was of the same opinion, but he maintains this is only a small variety of *athalia* and Esper's figures represent the same. Herrich-Schäffer then proceeds to appropriate the name of *parthenie* with a "mibi," which makes one gasp, and applies it to his figure of a German specimen of the same species as Godart, explaining naively that, if a species is to be separated at all from *athalia*, it must be this one.

Keferstein in his *Crit. Syst. Aufst. der europe. Lep. (Stett. Ent. Zeit., 1851, p. 244)*, erected the name of *parthenoides* for Godart's and Herrich-Schäffer's figures (136-7 and 270-4, the five latter representing *varia* from the Valais); he adds no comment, but simply the locality: "Switzerland." He, too, does not seem to have had a perfectly clear idea of the features of his two groups, because he also included Esper's fig. 1. here, whereas under the name of *parthenie*, O. (*sic*), in which

he correctly places Herbst's figures, Hübner's fig. 19-20 and Esper's fig. 2, he also includes Meigen's fig. 3 of pl. 11 and Freyer's of pl. 295, which he should have placed under his *parthenoides*. This mixture shows that the opinion of the entomologists of those days concerning the meaning of the figures in question was not worth much; it needs an eye trained on large series of specimens from all sorts of localities to grasp the essential points of each of such species and recognise them in the figures. Keferstein was obviously quite unconscious of the fact that Esper's figures were fundamental in fixing the meaning of *parthenie* and he only mentions them at the end of his references; his misjudgment of them is thus of no importance. His name of *parthenoides* is based on Godart's and Herrich-Schäffer's figures, contrasted with Herbst's of *parthenie*=*aurelia*. It seems to me beyond doubt that *parthenoides* must stand for the species illustrated by the two former authors. Such was the opinion of Staudinger in 1861 and that of Kirby; they followed Keferstein, simply correcting the references he had got wrong and adding *aurelia*, which Nickerl had erected in 1850, as a synonym of *parthenie*, Borkh., Vol. I., p. 53 (not 55 as they state).

Meyer-Dür's long discussion in his *Schmett. d. Schweiz* of Nov. 1851, is utterly valueless, owing to the fact he ignores Borkhausen entirely and he actually accepts Herrich-Schäffer as the author of *parthenie*.

As a climax to all these blunders, Staudinger joined in, in 1871, and caused all the subsequent literature to take the wrong position. It presumably struck him that his *Catalog* should be in keeping with the use of the name of *parthenie*, which had been spread by the great text books of Godart, Herrich-Schäffer and Freyer. He was, however, evidently quite aware of the fact that Borkhausen's original description and references to Esper's figures as typical were a serious hindrance, but he got round this difficulty by deliberately casting them in the shade and substituting them by the reference to the description of Vol. II. which lends itself to the desired interpretation, when taken broadly, as Ochsenheimer had done. In Staudinger's II. edition the reference to Borkhausen's I. vol. is thus tentatively enclosed in brackets with an interrogation and "pro parte" after it, and in the III edition, of 1901, it is abolished and the reference to the II. Vol. stands alone. By this method *aurelia*, Nickerl, of 1850 was substituted for *parthenie*, Borkh. of 1788; the latter name was shifted to a species which was only discovered with certainty in 1822 and the first name of *parthenoides* really given to it, was sunk as a synonym. Such is the astounding procedure by which the nomenclature faithfully followed during sixty years has been established! This way of giving preference to the names which had come into use, whether rightly or wrongly, may have been admissible before the International Rules of Zoological Nomenclature had been formally established, but, now one is striving on all sides to fix names definitely according to uniform principles, those of the *Melitaea* we are dealing with must, sooner or later, be altered in agreement with them, and the sooner this is recognised the better. There will come a time when the last three quarters of a century and a few more years to come will give the impression of having been a tentative, transitional, period between the early chaotic days of nomenclature and the final one, which will be adopted after every possible investigation has been made and all the points thoroughly

discussed. We are in the midst of it and any attitude of rigidity at the present moment can only delay the real finality we seek.

At first, there is no doubt, that in this case the return to the old nomenclature will be troublesome, but it will be less so if authors for some time head the paragraphs that concern these species by the right name followed by the one which has been in use since the middle of last century, as I am doing here.

(To be continued.)

NOTE.—Dr. Verity's conclusions hardly seem as certain as he thinks. So much confusion occurs in the application of these names that it would be absurd to go further back than Meyer-Dur, the first author to use the names in an unmistakable way. Nothing short of absolute necessity would excuse the alteration of nomenclature established by 60 years of continuous use, and no such necessity can be shown here.—G. WHEELER.

NOTE.—Unfortunately so few look up and verify Kirby's work in his *Syn. Cat.* of 1871, where the whole argument in the above paper is reduced to figures of the species concerned, and based upon those figures. The fore-runner of Staudinger, from whence he obtained the format of his *Cat.* (1861), was the *Sys. Verz.* of Heydenreich (1851), and there we have *aurelia*, Nick. (1850) = *athalia minor*, Esp., f. 1 (1784) = *parthenie*, Hrbst. (1800), which Staudinger adopted in (1861) but reversed in his *Cat.* (1871). Quite independently my friend Dr. Higgins has come to the same conclusion, that we should use *parthenie* for *aurelia*, Nick., and *parthenoides* for *parthenie*, Auct. Thus it would appear this is only going back upon what was the established nomenclature of more than 60 years ago and which the action of Staudinger in 1871 reversed and everyone blindly followed, ignoring the great work of Kirby in 1871.—HY. J. T.

Noctuae and Vars. in 1930.

By A. J. WIGHTMAN, F.E.S.

The past year proved to be the most prolific I have ever experienced as regards Noctuae. Many species usually scarce in this district were quite plentiful, and I met with a number of species I had not previously found.

I made a start in late March but did not find insects in great numbers at the sallows. *Taenioerca gracilis* was, however, to be found freshly emerged on the dead stems of *Spiraea ulmaria* in the marsh, in large numbers and over a long period and I obtained some very nice forms. *Xylina semibrunnea* also occurred in fair numbers at sugar and I succeeded in obtaining ova and rearing the larvae. These last were so much like those of *T. incerta* that it was not until Dr. E. A. Cockayne had pointed out to me some definite points of distinction that I was able to beat for wild ones with confidence. I found the larvae only on short stunted and bushy ash saplings of which I could beat the upper branches, but as I later on obtained the imago at sugar on large trees as well, I think the larva feeds as high as it can get and is present on suitable trees of all sizes throughout the district.

Early in May larvae of *Cirrhoedia verampelina* were plentiful on ash trunks, and at the end of this month larvae of *Calymnia affinis* were abundant on elm. Early in June larvae of the closely allied *C. diffinis* occurred freely but I did not find these last to frequent the same sort of situations as those of *C. affinis*. A large number of larvae of *C. trapezina*, taken by beating lived together in perfect harmony and refused to eat several species of noctua larvae I offered them, especially species beaten from oak. They had no mercy, however, on the bulk of larvae offered.

Mid June produced plenty of larvae of *Cleoceris viminalis*, *Plastenis retusa* from willow and a few larvae of *P. subtusa* occurred on aspen.

During July I visited a new locality in Kent for *Nonagria sparganii* and from the pupae obtained bred some very extreme red and heavily marked forms, the percentage of extreme forms in the batch was exceptional; hardly a specimen bred being referable to the type form. Black forms however still elude me although I am confident such do occur.

Autumn sugaring was wonderfully productive from the point of view of numbers. *Amathes lychnidis* occurred in enormous numbers sometimes as many as 150 specimens being present on a single tree branch which had been sprayed with sugaring mixture. I estimate that on an average evening I examined from 1000-2000 specimens of this moth, on a sugared round of about 2 miles and must have seen 20,000 specimens altogether during the three weeks it was about. Other species were also especially numerous but no great rarity turned up.

In late September having been shown how to find larvae of *Agrotis ripae* in Hants by a Hants collector I found these larvae to be very abundant in Sussex.

Senta maritima.—From larvae taken near Lewes in early May, I bred a few very large moths, several are ab. *wismariensis* and I note that two very different forms are present. Both have the heavy black central streak, but while one has the costal area also dusted and finely lined in black the other has the costal area clear and shining pinkish white, the contrasts in this last make it a very striking insect.

Coenobia rufa.—I bred a good number of this species from local taken pupae, all are quite typical. The food plant here is much more often *Juncus effusus* than *J. lamprocarpus*, but as *rufa* only occurs on really wet and boggy ground, there is almost always a mixture of both these rushes in its habitat. The larva makes a "window" for emergence just like the *Nonagrias*, and the pupae are also very like those of *N. neurica* and to a lesser extent those of *N. dissoluta* (*arundineta*), that its position in our lists should be very close to *Nonagria* I can see no reason to doubt.

Nonagria neurica, Hb.—During each of the last few years I have bred a small number of this species from larvae taken in the East Sussex habitat and I am certain that during the last twenty odd years since the species was first taken there (and in Britain) some cause has greatly increased the percentage of fuscous forms (ab. *fusca*, Edelman) and produced an even more extreme black form which is quite distinct from ab. *fusca*, Edelman, and which I call ab. **nigra**.

Forewings intense black, unicolorous, except for the two small white dots present in the type and all abs. of this species; hindwings nearly as dark as forewings; white thoracic crest as in the typical form.

The rosy form ab. *rufescens*, Edels., remains, as always, very rare. The named forms of the species and of *N. dissoluta*, which are very parallel, compare as follows:—

A. Clay ground colour, (*neurica*, Hb.), typical form, (*dissoluta*, Tr.), ab. *arundineta*, Schdt.

B. Rose suffused and markings distinct (*neurica*, Hb.), ab. *rufescens*, Edelsten (*dissoluta*, Tr.), ab. *rosea*, Tt.

C. Fuscous markings obscured (*neurica*, Hb.), ab. *fusca*, Edelsten, (*dissoluta*, Tr.), typical form.

D. Black, (*neurica*, Hb.), ab. *nigra*, mihi, (*dissoluta*, Tr.), ab. *hessii*, Bdv.

Dianthoecia barrettii, Dbdy.—From pupae received from South Devon I bred several very extreme forms of this species which is, with the exception of *D. carpophaga*, the most variable in the genus. Its range from pale ochreous grey with distinct markings in pale reddish brown through several shades of pale ochreous brown to almost black, quite equals the range of *D. conspersa*, and in addition *barrettii* has variegated forms with the pale parts of the wing sometimes white and sometimes yellow, and banded forms all occurring in a single locality. *D. conspersa* produces local races but does not vary greatly in most localities. It is now eleven years since Mr. H. M. Edelsten pointed out with illustrations as well as letterpress (*Trans. Ent. Soc. Lond.* 1919) that we do not get *D. luteago* in Britain, our species being distinct and correctly called *barrettii*, although both *barrettii* and *luteago* occur on the continent, yet our British species still continues to be reported in the Entomological magazines as *D. luteago* race *barrettii*; surely the fact that not only the facies of the imago but also the genitalia are definitely different should make it obvious that no such insect as *D. luteago* race *barrettii* can occur in this country or anywhere else. I have never been able to obtain Irish *barrettii* and so cannot say whether the forms occurring in that country are racially different from our English forms, but considering the great diversity of colour and form that occurs in Devon and Cornwall, I greatly doubt the name *sicklini*, Tutt, having any racial value.

D. albimacula.—I bred some very fine specimens of this species from Kent larvae taken when full fed. It is one of the largest of our British *Dianthoecias* the average size of those bred being 39mm. while a few ♀♀ are 42mm. in expanse. There is a certain amount of variation in the shade of the ground colour, some specimens having a greenish tinge in the purple brown central fascia but I have never bred anything I could call a variety, and it is too restricted in its haunts to be likely to produce local races as *D. conspersa* does. Since it is often surprisingly plentiful where it does occur, the fear which I have sometimes heard expressed, that it is in some danger of disappearing in this country, is entirely unfounded; its habits and habitats make it safe, even from the ravages of golf and the coast bungalow builder.

Taenioecampa gracilis.—This species was plentiful in the Pulborough district last year, and produces I find a large proportion of individuals with a distinctly yellow ground colour. Some are simply more ochreous than is usual in localities where the "grey" forms of *gracilis* ordinarily occur, but others are pale sulphur and pale orange yellow. These yellow forms are rarely peppered with fuscous or black atoms, the darker scales being almost always of some shade of pink or dull red

and some are so suffused as to be quite red, not bright red, greyish red or brownish red like the New Forest forms, but deep dull terra cotta red. Other forms, which occur in small numbers, have the ground colour pale bluish grey which, when peppered with black give the specimen a blue black appearance, and when peppered with pink or pale red, appear almost lilac in colour. Others again are pale leaden grey beautifully suffused with pink and orange.

Apart from ground colour there is a good deal of variation in the extent and nature of the darker markings. Forms with a black sub-terminal line and little other dark marking are rather striking, and in a few specimens the inner and outer lines are complete and in sharp contrast to the rest of the wing.

I also bred a long series of the "red" New Forest forms, from larvae taken in the bogs on *Myrica gale*. These vary from examples with grey ground colour heavily suffused with red, through several shades of bright pink, dull red, bright rich red, dark red suffused with black, to purple brown and deep brown forms without any trace of red.

When a long bred series of these "red" New Forest forms is compared with a similar series of "grey" forms (Sussex in this case) it is at once evident that the New Forest insects normally have pale, almost white hindwings. While the "grey" forms have dull grey, almost lead grey hindwings. The greyest of the "reds" have the darkest hindwings, but I can see no approach to the pale hindwings of the "reds" in the hindwings of the reddest of the greys, although they are very red.

"Grey" *gracilis* occurs in the New Forest, I am told, outside the bog areas and so probably the greyest of these "red" forms with darkened hindwings which are rare are produced by pairings of red and grey. If this is so all true New Forest bog *gracilis* are red with pale hindwings. Mr. F. N. Pierce has found no distinction between the genitalia of "Grey" and "Red" *gracilis* and as in this group the differences of the genitalia between the various species are great, it is unlikely that two species are involved. Nevertheless, the above facts do suggest that this species deserves special attention, the red colour and pale hindwings cannot be caused by the foodplant alone as *Myrica gale* feeding larvae from many other localities are usually grey. But it does seem that the soil of these New Forest bogs causes the foodplant to undergo some subtle change which in the course of time has brought out in these *gracilis*, which have used it for generations, the red shades which are largely latent in most other localities.

"Red" *gracilis* have been recorded from North Kent, Rannoch and Essex, etc., but I am uncertain whether these specimens were in fact identical with the New Forest forms or referable to the red and orange suffused forms occasionally found in moist localities. It would be interesting to know if they had pale hindwings, as far as Pulborough Marsh red *gracilis* forms are concerned, they have dark hindwings like the grey forms among which they occur and are instantly seen to be different from the New Forest forms.

Xanthia aurago, Fab.—I failed this year to breed this species in any numbers, for although a very large number of full-fed larvae, I had reared from ova, spun up in May, when these were examined in August I found that some 300 had pupated with shortened wing cases, leaving

an unprotected soft place at the spot to which the wing cases would normally have extended, and from these the moths failed to emerge. I attributed this at the time, to the very cold weather experienced at the critical pupation period in early August, but found later that in the wild state the species was as plentiful as ever. On the only night I gave this species special attention, I examined about 80 and obtained several of the dark saffron yellow form ab. *rutilago*, Fab., and a single unicolorous orange form ab. *unicolor*, Tutt.

When I was in London recently Mr. H. J. Turner was good enough to show me the figures of this species in Seitz, Culot and Esper. I could recognise nothing from Seitz, but Culot has three beautiful figures, which unfortunately are incorrectly named as regards figs. 4 and 5, plt. LV. His fig. 3, plt. LV. called typical *aurago* is correct enough, but his fig. 4 called ab. *fuscata*, Esp. is nothing like Esper's fig. of ab. *fuscata* (*Die Schmet. in Abbildungen*, plt. 124, fig. 3) which is a good one of the extreme orange red unicolorous form with all paler markings absent except for 2 fine pale yellow lines representing the inner and outer lines. This form is rare in most localities in this country, while the form Culot's figure actually represents, ab. *virgata*, Tutt, is often more plentiful than the typical form. Culot's fig. 5, called simply *aurago* ab. is a good one of ab. *rutilago*, Fab.

Cirroedia xerampelina, Hb.—From larvae taken locally in May a good series emerged towards the end of August, at first sight I was inclined to think the variation disappointing, but a closer and more critical examination proves the reverse to be the case. I note the following points:—

1. The ground colour is pale yellow in some individuals and rich orange yellow in others.

2. The dark central fascia may be pink, purplish red or pale slaty grey with bluish tinge.

3. The dark central fascia usually stops below the costa, but sometimes reaches the costa and makes the band complete.

4. A tendency in some specimens for the red of the central fascia outer margin to spread to the usually pale areas of the wing and produce a red or purplish red unicolorous form.

5. A tendency in some specimens for the dark central fascia and outer margin to be suppressed and produce unicolorous yellow form.

Relying upon the published account of the habits of the larvae of this species I had overlooked the species for years. In this district of Sussex the larvae seem only to occur on good sized isolated ash trees growing in the river valley or along streams, and only those above flood level are worth searching. A percentage of the larvae come down the trunk and hide all day in litter at the base, but the bulk hide in crevices of the bark where they can find cover and can be found quite easily during the day by anyone with the patience to make a systematic search. At night many start the journey up the trunk, not from ground level, but from hiding places often 10-20ft. up the trunk. My larvae refused to eat expanded ash leaves and obviously preferred hard unopened buds, (into which they bored neat round holes and emptied the contents), to partly expanded buds. This species does come to sugar, but for one specimen so taken there are 50 about. It is not a sugar insect but comes freely to light.

Calymnia affinis.—In a very long series bred from wild larvae there

are 5 distinct colour forms represented from pale reddish ochreous to deep blackish slate grey all colour forms have specimens with and without the white marks on the costa, except the palest which appear always to have white marked costa, the rarest colour form here is the blackish grey one, of which I only got 5.

C. diffinis.—Except that there are two shades of red in the ground colour this species varies little. Those bred are readily divided into two groups, which are not sexual.

1st rich red tending to blackish red.

2nd pinkish red with greenish suffused pink markings.

Amathes lychnidis.—From about 20,000 specimens examined at sugar I selected and set up rather more than 250. All are in bred condition and in addition to the abs. *pallida*, Tt., *serina*, Esp., *obsoleta*, Tt., *sphaerulatina*, Haw., *pistacina*, Fab., *ferrea*, Haw., *lineola*, Haw., *unicolor-brunnea*, Tt., *brunnea*, Tt., *venosa*, Haw., and *canaria*, Esp., there are a few specimens in which the central fascia is devoid or almost devoid of markings, while the basal and outer areas are well marked. Tutt does not seem to have known this form and as I only obtained 4 in the great number examined it is probably a rather rare one.

Cucullia lychnitis, Rbr.=*scrophulariae*, Capioux, Esp.—The fact that the Kent *scrophulariae*, which were at one time treated as a distinct species, have proved on an examination of the genitalia to be *C. verbasci* Linn., does not, it seems to me, have any bearing on the use of the name *scrophulariae*. There never was anything tangible to connect the Kent insects with that species.

And now that continental *scrophulariae*, *verbasci* and *lychnitis* have been shown to comprise only two distinct species, I find it impossible to resist the conclusion that the prior name of *C. lychnitis*, Rambur (*Ann. Soc. France*. 1833, page 17) is *C. scrophulariae*, Capioux, Esp. When Rambur described his *lychnitis*, he compared it with *scrophulariae* and was doubtful himself, that it was distinct from that species.

In this country the usual food plant is *Verbascum nigrum*, but I have also taken the larvae from *Scrophularia nodosa*. They have a very extended emergence, some emerge the year following that in which the larva fed, usually in July, but I have bred them as early as May and as late as August. The bulk of the pupae, however, lay over until the second year and moths from these sometimes emerge in April. I have also had a moth emerge from a pupa which resulted from a larva, which had only gone down 28 days previously. Curiously enough this larva was a very remarkable all yellow form. The larvae of this species of course vary greatly and I find that the imagines are also more variable than those of the closely allied *C. verbasci*, some I have, being almost intermediate between the pale typical form (*lychnitis*) and that species, but even had I not bred them from obvious *lychnitis* larvae, there could have been no doubt but that they belonged to that species. They are much more ochreous and less red brown marked than *verbasci* ever is.

NOTES ON COLLECTING, etc.

PHRYXUS LIVORNICA IN SUSSEX AND SURREY.—I took a fresh specimen of *Phryxus (Deilephila) livornica* at dusk this evening, hovering over *Scilla nutans* and Rose Campion flowers in the garden. *Pyrameis cardui* are arriving in great numbers.—GEORGE S. ROBERTSON, (M.D.), Storrington, nr. Pulborough, Sussex, May 27th, 1931.

I have to report another *P. livornica* captured in Mr. Taylor's garden at Shalford near Guildford by his son, during the last week in May. It was brought to me for identification. Also that *Perizoma affinitata* and *P. flavofasciata (decolorata)* are both common again this year at Storrington.—Id.

CURRENT NOTES AND SHORT NOTICES.

In the *Ent. Zt.* for March 8th, Dr. F. Heydemann of Kiel, has commenced a series of notes on the *Hydroecia (Apamea) nictitans* group of Noctuae with 6 plates. We are indebted to the author for numerous separates of his writings which he has kindly sent us.

We have to commend a most admirable piece of work which has just been completed by Mr. R. Adkin, F.E.S. on the *Moths of Eastbourne*. The author's long connection and residence at Eastbourne has given him opportunities for research, and his interest in the Eastbourne Natural History Society as well as the desire to instruct the budding lepidopterists in the numerous private schools of the neighbourhood, were incentives to this intensely educative piece of work. It consists of an annotated list of the larger moths to be found in the neighbourhood with hints as to capture, breeding, and other particulars of interest. The List is based on the nomenclature and arrangement of South's *Moths of the British Isles*, a book of moderate price, and probably in the hands of all Lepidopterists old and young. There is a large map of the area comprised and thirty most excellent plates from negatives made by the best of our photographic artists Messrs. Dennis, Main and Tonge. Each plate contains several subjects not merely life-size figures, but in nearly every case either imago or larva is shewn in its natural surroundings. A piece of work that wanted doing has been done and done well. The next volume will deal with the smaller lepidoptera.

BRITISH NOCTUAE AND THEIR VARIATION.—During the next six months it is hoped to treat of the following species. *Xylophasia lithoxylea*, *X. sublustris*, *X. rurea*, *X. hepatica*, *X. scolopacina*, *Dipterygia scabriuscula*, *Apamea basilinea*, etc., and any facts, details, material, suggestions for these species would be very welcome.—Hx.J.T.

DEATHWATCH BEETLES.—I would like to draw the attention of experts on these pests to the suggestion contained in a letter from the Rev. Philip Dalby of Castle Dorrington in the issue of the *Times* of the 29th ult. in which he states that from personal experience incense will drive away and keep out all bats from churches and suggests that the use of incense might have a similar result in ridding churches of these pests and preventing the ravages they commit. Is there anything in such a suggestion?—G. C. LEMAN (F.E.S.).

The Verrall Supper was held at the Holborn Restaurant on Tuesday, Jan. 13th, 1931. In accordance with the rules of the Entomological Club, Mr. James E. Collin took the chair by rotation. The following is a list of the guests:—Adkin, B. W.; Adkin, J. H.; Adkin, R.; Andrews, H. W.; Armstrong, Dr. R.; Ash, Rev. C. D.; Ashby, E. B.; Ashby, S. R.; Audcent, H.; Austen, Maj. E. E.; Austin, M. D.; Bagnall, R. S.; Balfour-Browne, F.; Barnes, H. F.; Barnett, T. L.; Bedwell, E. C.; Benson, R. B.; Bethune-Baker, G. T.; Blair, K. G.; Blood, Dr. B. N.; Bostock, E. D.; Bowman, R. T.; Britten, H.; Bull, Dr. G. V.; Burr, Dr. M.; Bushby, L. C.; Bushell, Capt. H. S.; Butler, Prof. Bailey; Buxton, Dr. P. A.; Cameron, Dr. M.; Cockayne, Dr. E. A.; Collette, C. L.; Collin, J. E.; Collins, J.; Cox, L. G.; Cox, L. W. R.; Craske, E. S.; Curtis, W. P.; Daltry, H. W.; Dixey, Dr. F. A.; Dods, A. W.; Donisthorpe, H.; Doudney, S. P.; Edelsten, H. M.; Edmonds, J. H.; Edwards, F. W.; Ellis, H. Willoughby; Eustace, E. M.; Fassnidge, W.; Ferris, Prof. C. F.; Fisher, R. C.; Ford, L. T.; Fox-Wilson, G.; Frampton, Rev. R. E.; Frohawk, F. W.; Fryer, J. C. F.; Gabriel, A. G.; Gilles, W. S.; Gimvingham, C. T.; Goffe, E. Rivenhall; Goodman, A. de B.; Grosvenor, T. H. L.; Green, E. E.; Griffin, F. J.; Hallett, H. M.; Haines, Dr. F. H.; Hamm, A. H.; Harrison, Prof. J. W. H.; Harwood, B.; Harwood, P.; Hemming, Capt. A. F.; Hinks, W. D.; Hingston, Maj. R. W.; Hobby, H. B.; Hodgson, S. B.; Hughes, A. W.; Hughes, A. W. Mck.; Jackson, W. H.; Jordan, Dr. K.; Joy, Dr. Norman; Kaye, W. J.; Labouchere, F. A.; Lamb, Dr. C. G.; Lancaster, Dr. H.; Laing, F.; Leeds, H. A.; Leman, G. C.; Liles, Maj. C. E.; Lofthouse, T. A.; Lucas, W. J.; Main, H.; Maples, Maj. S.; Marshall, J. F.; Masee, A. M.; Maulik, Prof. S.; Mera, A. L.; Mera, F. G.; Mellows, W. T.; Metcalfe, Rev. J. W.; Mickel, Dr. Clarence; Miles-Moss, Rev. A.; Nell, L.; Newman, L. W.; Newton, H. C. F.; Nixon, G. E.; Oldaker, F. A.; Omer-Cooper, J.; Patton, Prof. W. S.; Pierce, F. N.; Poulton, Prof. E. B.; Prideaux, R. M.; Rait-Smith, W.; Richards, O. W.; Riley, Capt. N. D.; Richardson, A. W.; Robbins, J. C.; Robinson, Capt. A.; Rymer Roberts, A.; Saunt, J. W.; Scharff, Dr. R. F.; Scott, Dr. E.; Scott, Dr. H.; Sherborn, C. D.; Smart, Dr. H. D.; Smith, Dr. G. Herbert; Stafford, A. E.; Step, E.; Stringer, H.; Syms, E. E.; Seydel, Mons. Charles; Talbot, G.; Tams, W. H. T.; Tarbat, Rev. J. E.; Terzi, E.; Thompson, J. Lawson; Thompson, W. R.; Tomlin, J. Le B.; Tonge, A. E.; Tottenham, Rev. C. E.; Turner, H. J.; Wainwright, C. J.; Walker, Comm. J. J.; Wheeler, Rev. G.; Whittingham, Rt. Rev. A. G.; Wigglesworth, V. B.; Williams, H. S.; Williams, H. B.; Withers, T. H.; Wood, H. Worsley.; Worms, C. G. M. de; Worssam, C.

The Chairman made a few remarks in regard to the functioning of the Verrall Supper, and welcomed the foreign visitors, who were Prof. G. F. Ferris and Dr. Clarence Mickel from America, and Mons. Charles Seydel from Belgium. He further pointed out that the function was much more than a pleasant evening. It was a meeting which had a definite and distinct value in relation to the science of Entomology, and that there was much cause for gratitude to some of the older members of the Association for making the necessary arrangements on the death of Mr. Verrall for the continuance of such meetings. The evening was very successful, 152 guests being present.—H. W. E.

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

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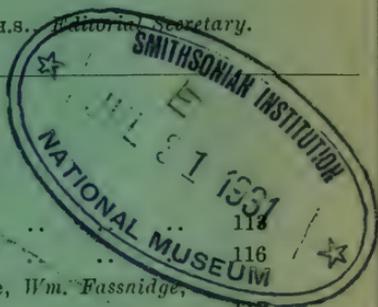
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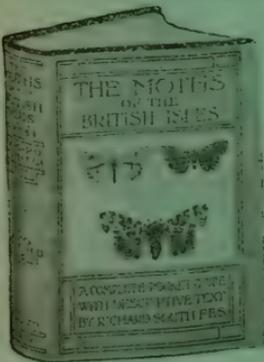
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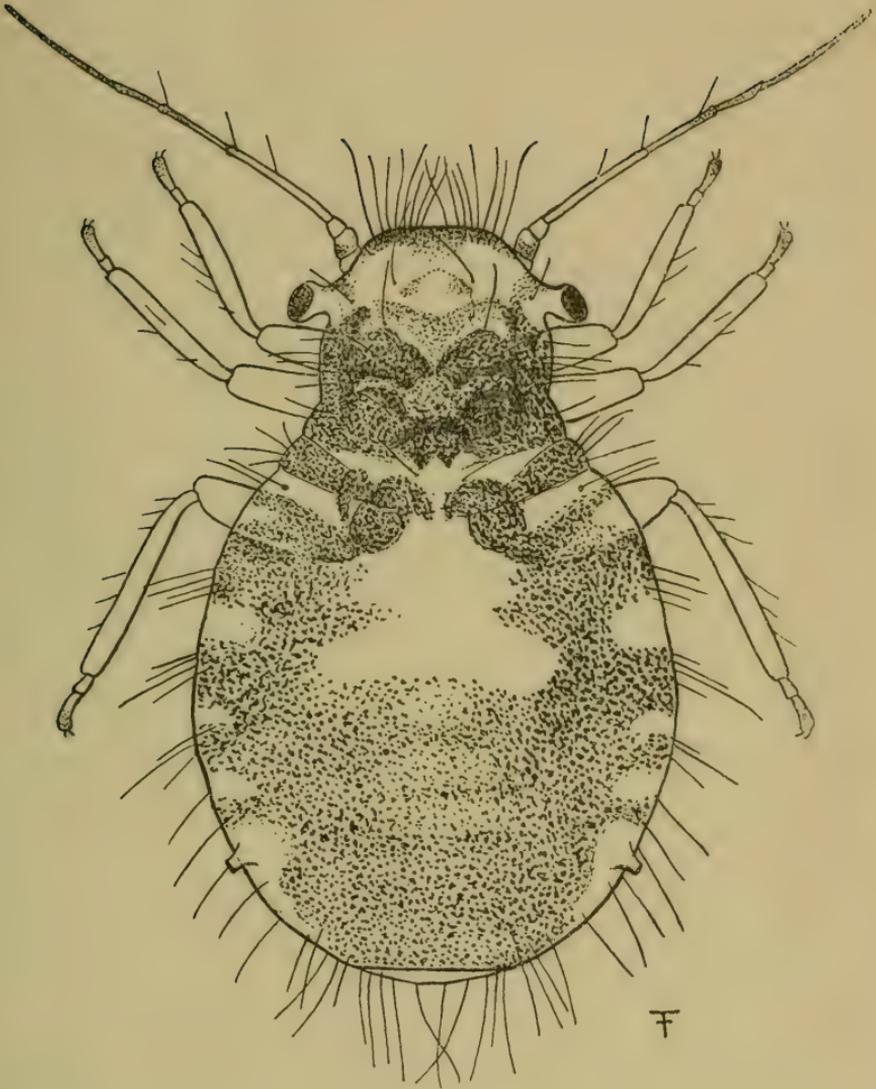
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The Entomologist's Record.

A CURIOUS APHID.

Collecting 1930. (Lepidoptera.)

By H. B. D. KETTLEWELL.

(Continued from p. 96.)

My holidays started on July 31st when I went down to Cambridge after *Metachrostis muralis* (*glandifera*) var. *impar*, for which I was too early. Mr. Worsley Wood took a magnificent series a short time later.

My destination was the Norfolk Broads around Wroxham and en route I stopped at Tuddenham in the Breckland District. *Acidalia rubiginata* was common in a field of hop-headed clover as also was *Mamestra trifolii* flying by day but nothing else of interest was observed.

Having joined my friend Dr. Cockayne at Norwich we spent the first night at Horning—our quest being *Pelosia muscerda*—we ran the headlights of the car throughout the night, which to all appearances was ideal, yet without success. The following species turned up however:—*Pheosia tremula*, *P. dictaeoides*, *Notodonta ziczac*, *Cosmotriche potatoria*, *Lithosia lurideola*, *L. griseola*, and var. *stramineola* (common), *Nonagria dissoluta*, *Calamia phragmitidis*, *N. brevilinea* (1), *Plastenis subtusa*, etc. *N. cannae* pupae were not at all common this year, the weather conditions having been exceptional; throughout the whole of July the waterlevel had been up a foot over the normal for that month and although this species can stand undoubtedly fairly short submergences under water, it is a totally different tale over a prolonged period as was exemplified by the large numbers of dead larvae and pupae extracted.

The pupae were equally distributed in the stems of *Scirpus*, *Typha angustifolia* and *T. latifolia*, and one was also taken by Mr. Gane in a stem of Water Hemlock. The outward signs in each of these pupal sites is entirely different and to improve one's technique, separate days have to be given to searching each species of foodplant and even with this perhaps the majority of pupae are overlooked. The essential feature to remember in searching for this species is, that *Scirpus* has always to be in the immediate vicinity so that it is useless to search for pupae in stems of *latifolia* and *angustifolia* without this rush being present. The outward signs of an infected stem of *Scirpus* are extremely variable, they may show a complete collapse and death of the stem above the pupal site, or there may be no further evidence beyond the small dark-coloured oval parchment covering the emergence hole. Signs in *latifolia* and *angustifolia* are more definite. It is essential to look for a discolouring of the two *central* leaves only—here again if these are dark brown and definitely dead, it will be found that the tenant has gone. It is those plants which show a pair of pale yellow centre-leaves which are the most likely and even then a large proportion of these prove unoccupied.

On August 2nd we spent the evening on the Norfolk sandhills at Waxham. The marram grass was swarming with insects, chiefly *Agrotis nigricans*, together with a few *Tapinostola elymi*, *Leucania littoralis*, and *Helotropha leucostigma*. Later that night using the car headlights on the Broads we took a solitary specimen of *P. muscerda* (♂).

The following day we met our friend Mr. Gane to whom we afterwards owed all our successes with his unrivalled experience of over fifteen years collecting on these same Broads. We proudly confided to him our success of the previous evening—I refer to our solitary *P. muscerda*—only to learn that he had observed that same night between one and two hundred! It has since transpired that in this locality of his, in the heart of the Broads, reached only by a hazardous boat journey, there occurs just once or twice every August, what he calls, a “muscerda night” when this rare species turns up at sugar in countless numbers—usually confining itself to certain patches only. Apart from these nights of abundance the species turns up regularly nearly every night in much fewer numbers throughout August.

This locality is a most remarkable spot and my friends sugared here with Mr. Gane every night for the next three or four weeks.

The night of August 3rd was a cold clear-skied windless night with great white banks of fog drifting over the Broads—a thoroughly poor night for sugar—as were all the subsequent nights in the following week. Five *P. muscerda* turned up, also a good few *Dyschorista suspecta*. The following night 3 *muscerda* came our way along with hosts of common species:—also *Hylophora bicolorana*, which had turned up commonly a week or so before our visit. The small aspens were found to have an abundance of larvae—*Pygaera pigra*, by far and away the commonest, a few *P. curtula* along with *Palimpsestis octagesima* and *P. or* in smaller numbers. Ova of *Pterostoma palpina* and *Pheosia tremula* were very common, as many as nine or ten per aspen of the latter species.

On August 5th we found the larvae of *Papilio machaon*, half grown to full-fed, and the same time observed the imagines on the wing. The same day Dr. Cockayne left us and returned to London.

The following day (Aug. 6th) I had to go down to Folkestone and chose my route via Woodbridge, so that I had an opportunity of visiting the locality where we had so fortunately taken 3 *Hyloicus pinastris* in one afternoon in 1928.

It proved an entire failure this time, however, probably due to the late date, as my friend Mr. Wiltshire had taken the species a good fortnight before this. I may add that he succeeded in getting upwards of 70 ova from a female, and that out of the seven he gave me I was lucky enough to get one of the few larvae which hatched from them, all the rest proving infertile. This larva hatched on August 3rd, and immediately ate the whole of its eggshell; it fed up at an enormous rate and went down to pupate on Sep. 8th having only once had to change the sprig of pine which I kept standing in water.

On August 8th, on seeing a report in the papers that “a cloud of Continental White and Fritillary Butterflies had invaded the Broadstairs District” I set off to this said place from Folkestone. The day was sunny at intervals during any one of which, lasting only a few moments, I saw more ‘White Butterflies’ than on any one day before. They were in countless thousands, nearly all *Pieris brassicae*, and needless to say no “Continental Fritillaries” and no *Cotias hyale* that I had hoped for.

In the afternoon of the same day I went to some woods where I had taken *Cucullia asteris* some ten years ago. They are situated eight or nine miles outside Folkestone on a road to Canterbury. I found

the wood cut down to the ground but to my delight an abundance of 'Golden Rod' blooms remained. These on examination proved to have quite large numbers of *C. asteris* larvae on them, from a little over a $\frac{1}{4}$ of an inch in length to fullfed size.

About 5.30 in the afternoon I came across a solitary fullfed larva of *C. gnaphalii* sitting conspicuous up among the unopened flowering-buds of golden rod and about two feet from the ground. It very nearly escaped when I boxed it owing to its extraordinary convulsions on being touched. No others were found on subsequent days although a large area of the foodplant was searched and then beaten. It pupated a few days later.

The following day August 9th, I was joined by Mr. Demuth. We spent the entire day in the dykes and ditches between Folkestone and Sandwich in search of *Nonagria sparganii*, but did not find a single one. We met the same failure on subsequent days of hard searching and came to the conclusion, rightly or wrongly, that the species must be rarer than formerly. I may add that nearly every pupa of *Nonagria typhae* we came across was parasitised.

The same evening we made an expedition to the famous Deal Sandhills, with the faint hope of striking the "few hundred yards" where *Lithosia lutarella* var. *pygmaeola* was said to inhabit. After walking a mile or two in the dark I was fortunate enough to net a moth which proved to be a male of this species. We took *nineteen* altogether, nearly all sitting on the tips of grasses. They are extremely difficult to see, the females particularly so; indeed we found we were passing them over more or less consistently as 'grass moths' which were here in numbers and had the same habit, unfortunately for us, of sitting folded up on the grass stems. The female of *pygmaeola* is a considerably smaller insect however. Eggs were laid freely but proved unfertile.

I spent another night here on the 11th. It was cold and windy—the latter condition being particularly against one's success, because of the consequent waving grass stems. Six *pygmaeola* were taken.

On the 13th I went down to Dungeness. No *Heliothis peltigera* larvae were found on the Sea Ragwort in contrast to their abundance here on my last visit (1928).

On August 14th I rejoined my friends on the Wroxham Broads. They had been taking a few *P. muscerda* each night under particularly bad sugaring conditions.

I would like here to report on my friend Gane's behalf two rather extraordinary pairings which occurred on sugar, in each case a male *Calymnia trapezina*. On August 5th with a ♀ *Palimpsestis duplaris*, and on August 14th, with a ♀ *P. fluctuosa*. In each case they died *in copula*.

(To be concluded.)

A Curious Aphid.

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

(With PLATE III.)

On September 30th, 1930, when evening sweeping in a plantation in Windsor Forest, I noticed a very curious little insect in my net, and as I had never seen anything like it before, I promptly bottled it. It proved to be a small Aphid with periscopic eyes (*i.e.*, eyes on short stalks), and as far as I know nothing like it is known. Mr. Laing, Dr. Silvestri, and others have seen it but are unable to suggest to what genus it belongs. I have swept in the same spot on many occasions since, but I have never seen another specimen.

The plantation in question was planted about 1850 and is situated on high sandy ground. It consists of birch, oak, and Scots pine, and fairly long grass and herbage, very suitable for evening sweeping, grows beneath.

The following is a list of the Coleoptera I have taken by evening sweeping in this plantation.

GEODEPHAGA.—*Bradycellus harpalinus*, Dj.; *B. similis*, Dj.; *Blechnus maurus*, Stm.

PALPICORNIA.—*Anacaena globulus*, Pk.; *Cercyon melanocephalus*, L.

BRACHELYTRA.—*Oxyptoda lividipennis*, Man.; *O. alternans*, Gr.; *Atheta (Bessobia) monticola*, Th.; *A. (Philhygra) palustris*, Kies.; *A. (Microdota) amicura*, Steph.; *A. (Atheta) inoptata*, Shp.; *A. (Hypatheta) castanoptera*, Man.; *A. (Dimetrota) intermedia*, Th.; *A. (D.) laerana*, Muls.; *A. (Acrotoma) clientula*, Er.; *A. (Amischa) analis*, Gr.; *A. (A.) diciptens*, Shp.; *Gyrophæna minima*, Er.; *Hypocryptus discoideus*, Er.; *Conosoma lividum*, Er.; *Tachyporus chrysomelinus*, L.; *T. humerosus*, Er.; *T. pusillus*, Gr.; *Tachinus marginellus*, F.; *Bolitobius pygmaeus*, F.; *Mycetoporus lepidus*, Gr.; *M. angularis*, Rey.; *Quedius boops*, Gr.; *Philonthus ventralis*, Gr.; *P. quisquiliarius*, Gyll.; *Sunius angustatus*, Pk.; *Stenus pusillus*, Er.; *S. fuscicornis*, Er.; *S. aerosus*, Er.; *S. picipes*, Steph.; *S. impressus*, Germ.; *S. tarsalis*, Ljun.; *Platystethus arenarius*, Fourc.; *Oxytelus laqueatus*, Marsh; *O. sculpturatus*, Gr.; *Lathrimæum atrocephalum*, Gyll.; *L. unicolor*, Steph.; *Homalium concinnum*, Marsh; *H. striatum*, Gr.; *Proteinus brachypterus*, F.; *Megarthritis depressus*, Pk.

CLAVICORNIA.—*Liodes cinnamonea*, Pz.; *L. anglica*, Rye.; *L. lucens*, Fair.; *L. curta*, Fair.; *L. calcarata*, Er., and ab. *nigrescens*, Fleisch.; *Cholera angustata*, F.; *C. cisteloides*, Fröh.; *C. velox*, Spence; *C. grandicollis*, Er.; *C. tristis*, Pz.; *C. kirbyi*, Spence; *C. fumata*, Spence; *C. watsoni*, Spence; *Colon brunneum*, Lat.; *Trichopteryx lata*, Mots.; *Adalia obliterated*, L.; *A. bipunctata*, L.; *Coccinella 10-punctata*, L.; *C. 11-punctata*, L.; *C. 7-punctata*, L.; *Halyzia conglobata*, L.; *H. 18-guttata*, L.; *Scymnus pygmaeus*, Fourc.; *S. scutellaris*, Muls.; *Exochomus \pm pustulatus*, L.; *Rhizobius litura*, F.; *Epuraea aestiva*, L.; *Thalycra sericea*, Stm.; *Corticaria elongata*, Gyll.; *C. epplesheimi*, Reitt.; *Byturus rosae*, Shp.; *Antherophagus nigricornis*, F.; *Cryptophagus setulosus*, Stm.; *C. pubescens*, Stm.; *Atomaria pusilla*, Pk.; *Simpliocaria semistriata*, F.; *Aspidiphorus orbiculatus*, Gyll.

LAMMELICORNIA.—*Aphodius borealis*, Gyll.; *A. foetens*, F.; *A. punctata-sulcatus*, Stm.; *A. zenkeri*, Germ.

STERNOXIA.—*Agrius laticornis*, Ill. ; *Throscus carinifrons*, Bonv.

MALACODERMATA.—*Cyphon variabilis*, Thunb. ; *C. padi*, L. ; *C. coarctatus*, Pk. ; *Ernobius mollis*, L.

TEREDILIA.—*Dorcatoma flavicornis*, F. ; *Cis bidentatus*, Ol.

PHYTOPHAGA.—*Cryptocephalus pusillus*, F. ; *Phyllodecta cavifrons*, Th. ; *Longitarsus suturellus*, Duff. ; *L. atricillus*, L. ; *L. pusillus*, Gyll. ; *Phyllotreta atra*, Pk. ; *P. nigripes*, F. ; *P. undulata*, Kuts. ; *Chaetocnema hortensis*, Fourc. ; *C. subcoerulea*, Kuts. ; *Plectrocelis concinna*, Marsh. ; *Cassida flaveola*, Thunb.

HETEROMERA.—*Salpingus castaneus*, Pz. ; *Anaspis subtestacea*, Steph. ; *Anthicus floralis*, L.

RHYNCHOPHORA.—*Apion miniatum*, Germ. ; *A. haematodes*, Kirb. ; *A. rubens*, Steph. ; *A. platalea*, Germ. ; *A. simile*, Kirb. ; *A. marchicum*, Hbst. ; *Strophosomus coryli*, F. ; *Sitones hispidulus*, F. ; *Hypera punctata*, F. ; *H. variabilis*, Hbst. ; *Orchestes quercus*, L. ; *Anoplus plantaris*, Naez. ; *Coeliodes erythroleucus*, Gmel. ; *C. 4-maculatus*, L. ; *Balaninus betulae*, Steph. ; *B. rubidus*, Gyll. ; *Magdalis cerasi*, L. ; *Pityophthorus pubescens*, Marsh. ; *Ptiogenes bidentatus*, Hbst.

Notes and Additions to the List of the Lepidoptera of Digne (Basses-Alpes).

By WM. FASSNIDGE, M.A., F.E.S.

It was not quite by choice that I spent my Easter vacation of 1929 at Digne, the Mecca of entomologists, but rather because the English Master at the Lycée Gassendi wished if possible to arrange for an exchange and to discuss the details in person with me. But it was inevitable that my first visit should be followed by a second, this time in August and September, 1930, and it is fairly safe to add that if ever the opportunity occurs to spend a few weeks there at any other season I shall haste to avail myself of it. Many accounts of visits to this locality have appeared from time to time in the various entomological journals of this country and the continent, but so far as English collectors are concerned, they deal almost wholly with the Rhopalocera, and I know of nothing published that might help in the compilation of a List of the so-called Microlepidoptera.

The fact that the first List of the Macrolepidoptera of Digne which makes any claim to completeness should have been published in Germany is a standing reproach to French entomology. It was published by R. Heinrich as a Beiheft of the *Deutsche Entomologische Zeitschrift* in 1923 under the following title: "Beitrag zur Macrolepidopterenfauna von Digne (Basses-Alpes)." In spite of the title the List includes localities as far away as Allos and Larche, but this only adds to its usefulness. A first Supplement was published in 1928, and we are promised others as material for them comes to hand. This List is, in my opinion, one of the very best of its kind, giving as it does full information as to localities, methods of hunting, dates of captures, etc., together with a Bibliographical List of all previously published entomological literature of the Basses-Alpes.

In the notes which follow I have tried to give any details of interest which do not appear in the List. The number placed before the name of each species corresponds to its number in the List or

Supplement, while those marked with an asterisk are new. I have included also some notes and additions kindly communicated to me by Mynheer Caron, of Amsterdam, with whom I had the pleasure of hunting during some part of my holiday, and whose stay at Digne lasted this year from early July until the end of August, though like myself, he has also collected there before this year. My own collecting was done between April 3rd and April 26th, 1929, and between July 31st and Sept. 14th, 1930. It should be added that the dates are those of the first capture or observation of a given species.

28. *Apatura ilia*, Schiff.—Four specimens taken from 25.viii.30 onwards, all ab. *clytie*, Schiff.; others seen.

30. *Pyrameis (Vanessa) atalanta*, L.—A fair number, especially on sugar by day, 3.viii.30.

31a. *V. io*, L.—Seems very rare, 23.iv.29.

37. *Polygonia egea*, Cr.—21.iv.29., 26.viii.30; haunts the rocks along the Dourbes road.

53. *Argynnis daphne*, Schiff.—Still flying in worn condition in early August, 1930.

**Dryas (A.) pandora*, Schiff.—4.viii.30.; one fresh specimen behind the hospital; another seen.

93. *Epinephele lycaon*, Rott.—Locally fairly common in early August, 1930.

108. *Ruralis (Zephyrus) betulae*, L.—Four specimens taken in all, 1.viii.30.

**Lampides boeticus*, L.—Not common, 21.viii.30.; taken also by Mynheer Caron.

**Polyommatus (Lycaena) amandus*, Schn.—A few by Monsieur Coulet; taken in fair numbers by Mynheer Caron on the Cousson, 29.vi.30.

134. *P. (L.) admetus* var. *ripartii*, Fr.—Quite common in the first half of August on the high slopes of St. Benoît, among other places.

135. *P. (L.) damon*, Schiff.—Abundant locally on the Cousson from 8.viii.30.

139. *P. (L.) semiargus*, Rott.—In low lying fields by the river, 23.iv.29 and 27.viii.30.

167. *Smerinthus quercus*, Schiff.—One half-grown larva beaten, 10.ix.30; seven others found, Reine Jeanne, 13.ix.30; at least four of these were stung, and of the remainder none reached the pupal stage.

168a. *S. ocellatus*, L.—One larva, 31.viii.30.

**Herse (Protoparce) convolvuli*, L.—Several specimens at light during August, 1930.

178. *Hemaris fuciformis*, L.—Several seen in early August, 1930.

**Stauropus fagi*, L.—One ♂ in June, 1929, by Mynheer Caron.

184. *Hoplitis milhauseri*, F.—One full-fed larva, Reine Jeanne, 12.ix.30.

185. *Drymonia querna*, F.—Several at light, 31.vii.30.

188. *Notodonta ziczac*, L.—Several at light, 31.vii.30.

189. *N. phoebe* var. *tiefi*, Bartel.—Several at light, 18.viii.30.

**N. tremula*, Cl.—One found drying its wings, 19.viii.30; two others since.

**N. dromedarius*, L.—Several at light; 18.viii.30.

192. *Lophopteryx cuculla*, Esp.—One specimen at light, 28.viii.30.
194. *Pterostoma palpinum*, L.—Several at light; 19.viii.30.
Probably most of the Notodonts here noted are examples of partial second broods, for at the same time larvae of most of them were also found.
193. *Rhegmatochloa alpina*, Bell.—Monsieur Coulet showed me at the end of August a brood of larvae still very small. I beat a few larvae quite small from both osier and poplar.
- 194a. *Phalera bucephala*, L.—Numerous larvae beaten and seen, August, 1930.
- **Pygaera pigra*, Hufn.—One specimen at light, 19.viii.30. Mynheer Caron reports that the species was not very rare at Digne in June and July, 1929.
196. *Thaumatopea processionea*, L.—Both ♂♂ and ♀♀ at light, 17.viii.30.
- **Porthesia similis*, Fuess.—One specimen at light, 8.viii.30.
201. *Stilpnotia salicis*, L.—A few at light, 18.viii.30.
- 205a. *Malucosoma castrensis*, L.—Bred in numbers from larvae found, 21.iv.29.
- **Friogaster catax*, L.—Six or seven nests of larvae found, 16.iv.29. Imagines emerged in November, 1929, and in late October, 1930; some pupae are obviously going over until another year.
213. *Epinaura tremulifolia*, Hb.—Eight larvae beaten from poplar and osier, 4.ix.30.
215. *Eutricha (Gastropacha) quercifolia*, L.—Larvae, 16.iv.29. Imagines quite common at light throughout August, 1930.
- 217a. *Saturnia pavonia*, L.—Several taken, 15.iv.29.
221. *Demas coryli*, L.—One specimen at light, 18.viii.30.
227. *Craniophora ligustri*, F.—Fairly common at sugar, 10.viii.30.
- 229a. *Triphaena (Agrotis) janthina*, Esp.—Several at sugar, 10.viii.30.
230. *A. linogrisea*, Schiff.—One specimen, 3.ix.30.
231. *T. (A.) fimbria*, L.—A few at sugar, 9.viii.30.
249. *A. margaritacea*, Vill.—One specimen at light, 18.viii.30.
291. *A. obesa*, B.—One ♂ at light, 4.ix.30.
301. *Mamestra oleracea*, L.—Very common at sugar, 9.viii.30.
307. *M. trifolii*, Rott.—Several at sugar, 31.viii.30.
- **Miana literosa*, Haw.—One specimen at sugar, 8.ix.30.
331. *Metachrostis (Bryophila) algae*, F.—Moderately common at light and sugar, 7.viii.30.
335. *Valeria jaspidea*, Vill.—Two specimens; April, 1929.
- **Luperina dumerilii*, Dup.—Fairly common; comes to light but is easily found sitting on grasses by night, together with *L. rubella*, Dup., 28.viii.30.
- **L. nickerlii* var. *gueneei*, Dbl.—One specimen at rest on grass, just emerged, 1.ix.30.
341. *Hadena adusta*, Esp.—Two specimens, quite typical, at sugar, 10.viii.30.
342. *H. ochroleuca*, Esp.—One specimen, 2.viii.30.
363. *Polia polymita*, L.—One specimen at sugar, 5.ix.30.
380. *Dipterygia scabriuscula*, L.—Fairly common at sugar, 9.viii.30.
384. *Callopietria latreilli*, Dup.—One specimen, 29.viii.30.
- 389a. *Naenia typica*, L.—A few at sugar, 19.viii.30.

- **Leucania fulva*, Hb.—Three specimens, 28.viii.30.
 389b. *Luceria virens*, L.—One specimen on the Barre des Ourbes,
 31.viii.30.
 **Leucania l-album*, L.—A few at sugar, 10.viii.30.
 398. *L. congrua*, Hb.—One specimen at sugar, 9.viii.30.
 431. *Mesogona acetosellae*, F.—A few at sugar, 10.ix.30.
 **Calymnia affinis*, L.—One worn specimen beaten from elm,
 13.viii.30.
 464. *Xylina ornithopus*, Rott.—One specimen, 17.iv.29.
 **Cucullia lychnitis*, Rbr.—A few larvae found on *Verbascum*,
 15.viii.30.
 497. *Emblemma jucunda*, Hb.—A few at light, 18.viii.30.
 499. *Thalpochares polygramma*, Dup.—Fairly common at the end
 of August, 1930.
 501. *T. candidana*, Fb.—A few at light, 4.viii.30.
 502. *T. pura*, Hb.—Abundant in the late afternoon on the higher
 slopes of St. Benoît, 15.viii.30.
 506. *Haemerostia renalis*, Hb.—A short series at light behind the
 hospital, 24.viii.30.
 507. *Scoliopteryx libatrix*, L.—Several at sugar, 8.viii.30; larvae
 not common.
 511. *Plusia chalcytes*, Esp.—Two specimens at flowers, 15.viii.30.
 **P. chrysitis*, L.—Taken by Mynbeer Caron, July, 1929, 1930.
 517. *Metoptria monogramma*, Hübn.—Fairly common locally,
 8.viii.30.
 524. *Pseudophea tirrhaea*, Cr.—One specimen at sugar, 7.ix.30.
 532. *Catocala conjuncta*, Esp.—A short series at sugar, 9.viii.30.
 537. *C. diversa*, H.G.—Four specimens at light and sugar, 9.viii.30.
 538. *Apopestes spectrum*, Esp.—Common at sugar, 9.viii.30.
 539. *A. cataphanes*, Hb.—A few, 8.viii.30.
 541. *Toxocampa lusoria*, L.—Locally common on the Cousson,
 20.viii.30.
 545. *Zanclognatha tarsicristalis*, H.S.—A few worn specimens,
 4.viii.30.
 **Herminia cribrumalis*, Hb.—One specimen sitting on reeds,
 14.viii.30.
 **H. crinalis*, Tr.—One ♂, two ♀♀, 6.ix.30.
 552. *Cymatophora octogesima*, Hb.—Common at light and sugar,
 10.viii.30.
 567. *Acidalia ochrata*, Sc.—Common in many places, 2.viii.30.
 569. *A. rufaria*, Hb.—A few, 6.viii.30.
 572. *A. mediara*, Hb.—A few, 1.viii.30.
 573. *A. sericeata*, Hb.—Very common locally on the slopes of St.
 Benoît, 3.viii.30.
 574. *A. moniliata*, F.—A few, 2.viii.30.
 577. *A. asellaria*, H.S.—A few at light, 2.viii.30.
 588. *A. calunetaria*, Stgr.—One specimen, 4.viii.30.
 590. *A. filicata*, Hb.—A few at light, 23.viii.30. The species was
 unfortunately confused in the field with *A. rusticata*, F.
 596. *A. inornata*, Hw.—A few at light, 14.viii.30.
 599. *A. emarginata*, L.—A few at light, 2.viii.30.
 **A. immutata*, L.—Three specimens by night searching, 15.viii.30.
 609. *Codonia albicellaria*, Hb.—One specimen at light, 4.viii.30.

625. *Minoa murinata*, Sc.—Several, 3.viii.30.
 630. *Anaitis plagiata*, L.—Not common, 17.viii.30.
 666. *Larentia frustata*, Tr.—A few at light, 18.viii.30.
 677. *L. unifasciata*, Hw.—A few at light, 15.viii.30.
 **L. siterata*, Hufn.—One specimen on a wall near a lamp by day,
 8.ix.30.
 702a. *Tephroclystia extraversaria*, H.S.—A few, 25.iv.29.
 730. *Abraxas marginata*, L.—Several, 15.viii.30.
 732. *Bapta pictaria*, Curt.—Several at light, 15.iv.29.
 742. *Crocallis elinguaris*, L.—Several at light, 24.viii.30.
 742a. *Urapteryx sambucaria*, L.—One specimen at light, 15.viii.30.
 743. *Opistographis luteolata*, L.—Several at light, 28.viii.30.
 744. *Epione apictaria*, Schiff.—One specimen at light, 7.ix.30.
 **Ennomos alniaria*, L.—One specimen at light, 17.viii.30.
 757. *Boarmia occitanaria*, Dup.—Two ♂♂ bred from larvae beaten
 from broom in April, 1929. The insects emerged sometime during
 August, 1929.
 757b. *B. cinctaria*, Schiff.—One specimen at light, 11.viii.29.
 764. *Tephronia sepiaria*, Hufn.—Common at light, 12.viii.30.
 **Mannia oranaria*, Stgr.—One specimen at light, 21.viii.30.
 789. *Selidosema taeniolarium*, Hb.—Fairly common at light,
 15.viii.30.
 794. *Fasiane scutularia*, Dup.—A few, 12.ix.30.
 803. *Aspitates ochrearia*, Rossi.—Common, 5.ix.30.
 808a. *Nola confusalis*, H.-S.—One specimen on a tree-trunk,
 18.iv.29.
 812. *N. albula*, Schiff.—A few at light, 3.viii.30.
 813. *Sarothripus revayanus*, Sc.—ab. *degenerana*, Hb. Two speci-
 mens at light, 12.viii.30; two larvae beaten from willow, from which
 one moth was bred, 1.x.30.
 815. *Earias chlorana*, L.—A few at light, 18.viii.30.
 815a. *Hylophila prasinana*, L.—Small larvae beaten, 10.ix.30.
 816. *H. bicolorana*, Fuess.—Several at light, 31.viii.30.
 817. *Syntomis phegea*, L.—One specimen, 4.viii.30.
 818. *Dysauxes ancilla*, L.—A few by day, 2.viii.30.
 **Spilosoma urticae*, Esp.—One specimen found at rest by night,
 19.viii.30.
 822. *S. lubricepeda*, L. (*menthastri*, Esp.)—A few at light, 4.viii.30.
 826. *Rhypparia purpurata*, L.—One specimen by day, 1.viii.30; a
 very late date.
Diacrisia sannio, L.—Several; 9.viii.30.
 827a. *Arctia caja*, L.—One at light, 22.viii.30.
 830. *A. testudinaria*, Fourc.—Two bred from larvae found in April,
 1929.
 834. *Euprepia pudica*, Esp.—Larvae common in April, 1929;
 imagines at light from 26.viii.30. The larvae remain for some months
 unchanged in their cocoons and must not be disturbed. Emergence in
 September and October. Easily reared.
 836. *Coscinia striata*, L.—A few by day, 5.ix.30.
 837. *C. cribrum* var. *candida*, Cyr., and var. *punctigera*, Frr.—Both
 forms taken in small numbers by searching at night with the lamp,
 7.viii.30.

838. *Hypocrita jacobaeae*, L.—A few, 1.viii.30, a very late date; larvae common.

**Pelosia muscerda*, Hufn.—One at light, 14.viii.30, and one at sugar, 10.ix.30.

853a. *Zygaena erythra*, Hübn.—Locally common in several places, 4.viii.30.

859. *Z. achilleae*, Esp.—Locally common, 4.viii.30.

866. *Z. ephialtes*, L. var. *peucedani*, Esp.—Locally common, 4.viii.30.

869. *Z. hilaris*, O.—Locally common, 4.viii.30.

**Acanthopsyche atra*, L.—A few, 12.iv.29.

**Pachytelia villosella*, O.—One ♂ bred, 29.v.29.

**Hyaline albida*, Esp. var. *lorquiniella*, Brd.—A few, 20.iv.29.

882. *Apterona crenulella*, Brd.—One ♂ specimen, 4.viii.30.

883a. *Epichnopteryx pulla*, Esp.—Common, 15.iv.29.

**Synanthedon (Sesia) andrenaeformis*, Lasp.—A number of capped mines in April, 1929; one specimen seen in Monsieur Coulet's collection.

896. *Cossus cossus*, L.—Two specimens at light, 25.viii.30.

898. *Zeuzera pyrina*, L.—Very common at light, 31.vii.30.

**Cochlidion limacodes*, Hufn.—About twelve larvae beaten, Reine Jeanne, 12.ix.30.

(To be continued.)

The Local Abundance of certain Butterflies and Caterpillars.

By Miss L. M. FISON.

(1) *COLIAS CROCEUS* (EDUSA).—In the November number of vol. XXXIV. p. 195 of the *Entomologist's Record* we have the following note by my late uncle, Mr. A. J. Fison:—" *Colias edusa*—in great numbers—Airolo, St. Gothard, 8.viii.92."

I rather wonder if the date 1892 should not have been viii.1902—as in the August of that year my father and mother and brothers and I, met our Uncle Albert at Airolo on a butterfly expedition. It was there that we had our first experience of butterfly collecting, at the early age of nine. I have a vivid recollection of racing about in the sun after the "clouded yellows," which were literally swarming in that hot locality. The fields and slopes were alive with them, and their numbers made an impression on my mind which I have never forgotten.

I have never again seen *edusa* in such profusion in Switzerland. However, when we came out to Kabylia, Algeria, in 1919, we soon realised that the valley of the Sebaou between Mirabeau, Tizi-Ouzou, Azazga, and Mékla was a true home of this and other species of "clouded yellow." Here *edusa* flourishes in the utmost profusion. Hundreds and even thousands may be seen flying each year from March onward through the spring and Summer to the end of October or mid-November, spreading in its swift, strong flight up and down the mountains and along the fields and rough ground in the plain, travelling many miles a day, and continuing on the wing undauntedly even when torn and dilapidated. I have no doubt that the race here will be found on further investigation to produce interesting forms.

(2) *HEODES* (*CHRYSOPHANUS*) *VIRGAUREAE* AND *H. (C.) HIPPOTHOË*.—Another instance of the local abundance of certain butterflies, was in the valley of the Arve Chamonix, from June 12th-21st, 1913. Here *Heodes virgaureae* and *H. hippothoë* (probably also var. *eurybia* at that altitude) were flying in abundance. It was a beautiful sight to see these brilliantly coloured "coppers" flying over the fields of rye. The ♀s were particularly numerous and the race was large and fine.

(3) *DRYAS PAPHIA*.—The beautiful "Silver-washed fritillary" flourishes and abounds in the woods at Charpigny—Vaud, Switzerland. It is a fine sight in May, June and July, or even in August and part of September to watch it flying around the lime trees. It usually alights high on the trees and dozens may be seen (on sunny days principally) flying around and settling on the trees, where they remain often for quite a long time sunning themselves and sucking the blossoms. I have observed them frequently during the summers of 1913, 1914, 1920, 1922. Although we know *paphia* to be a generally distributed though somewhat local insect, I do not remember meeting with it in equal numbers elsewhere.

(4) *PARNASSIUS APOLLO*.—We have found this butterfly particularly common in one or two localities of the Rhone Valley region.

(a) On the steep, rocky walk from St. Maurice to Moreles and the Croix de Javerne, *apollo* abounded in June, 1913.

(b) It was also flying in numbers on and around a steep rocky short cut path from Corbeyrier down from Les Agittes (a high Alp) to Roche—in June, 1913.

(c) On the zigzag road and shady slopes between Orsieres and Lac Champex, August, 1913, *apollo* flew in greater numbers than I have seen it elsewhere.

(d) On the zig-zag path up to Barmaz from Champéry at e.vii. and beginning viii. 1922, *apollo* was also plentiful, flying with *Parnassius delius*. I also found *P. delius* in a stream bed at Barmaz on 4.viii.1922, and higher up at Les Crossets above Champéry, 21.viii.1922.

(5) "BLUES."—On 14.vii.13 hundreds of "blues" were swarming on the road and slopes around Huémoz, Aubeus, Glutières, little hamlets between Ollon and Gryon. The countless numbers settling on the road to drink, and then rising in clouds was a sight worth seeing. My father and I were most interested. The most abundant species observed were *Cupido sebrus*, *Polyommatus damon*, and *Polyommatus hylas*. I had never seen such swarms before, nor have I since seen any of the species of "blue" in such great numbers. My uncle in Vol. XXXIV. p. 93, has a note on *P. damon* thus: "One year hundreds at Charpigny." All these species and others are well distributed in that region of the Rhone Valley, and I have frequently found them common but never *prolific* as at Huémoz on 14.vii.13.

(6) *GRINDELWALD*.—One of the finest butterfly grounds I know of is the Faulhorn and its slopes behind Grindelwald.

In August, 1914, and August, 1920, butterflies were abundant in many places around Grindelwald, such as on the Grosse Scheidegg, the slopes around the Upper and Lower glaciers, the slopes of the Little Scheidegg and in the Valley of the Lutschen. But undoubtedly the best locality was the Faulhorn—(the slopes around Hestebühl, the Waldspitz, and the Bachalpsee). As I have already mentioned many of the species

found there in past notes, I will not mention them again. It will suffice to recommend this locality as a prolific hunting ground and one well worth the visit of experts, who would certainly discover much of interest on its slopes.

(7) **THE BUFF-TIP MOTH CATERPILLAR.**—In the summer of 1922 a swarm of "Buff-tip moth" caterpillars appeared on some fine trees in front of the house at Charpigny. In vain we spent days killing them one by one, the next morning other caterpillars appeared equally vigorously; in vain we gave up alpine expeditions to stay at home and get rid of them; in vain we watered them with boiling water; in vain my father organised the "vigneron" and his men to set to work with us to destroy them; still the caterpillars swarmed in hundreds more vigorously than ever. When in the end after days of battling with them we did finally succeed in reducing the numbers, it was alas! too late. Our beautiful trees were spoilt and did not recover from the ravages wrought by those voracious creatures, perhaps because we did not know the right remedy. Curiously, although happily these trees seemed to be the only ones attacked—but I could never quite unravel why the "Buff tip moth" had such a predilection for these particular trees and left others alone.

(8) **AN ABNORMAL INVASION OF CATERPILLARS IN THE SEBAOU VALLEY, KABYLIA.**—At the end of January, 1925, around Azazga (Kabylia) we noticed swarms of small caterpillars. They were very abundant huddled close together, and were covered with a sort of white film. During the next few weeks they became larger and more and more abundant, swarming in the fields, on rough ground, near houses and farms right into the village, and on the edges of the forest.

I did not succeed in identifying these caterpillars, as I do not make a study of moths—but the French colonists tell me it is the caterpillar of a "white moth" which is common in the district in most years, 1925 being an abnormal year.

On February 11th, we went to Tigi-Ouzou about 20 miles away. Here also the same caterpillars were swarming everywhere literally in millions. During the succeeding weeks we discovered that these caterpillars were a regular scourge all along the valley for 50 or 60 miles or even more around Azazga, Tigi Ouzou, Mékla, Fréha, Agrib, Mirabeau, Camp du Maréchal, etc. It is true that the Administration gave strict orders for their destruction, but without success. When they were full grown they ravaged the trees, and during the spring and summer hundreds of plants and trees were destroyed to the great distress of the French colonists and native farmers. In seeing the beautiful green leaves of the trees thus eaten bare by these creatures, we were forcibly reminded of the words in the Bible: "He smote their vines also, and their fig trees; and brake the trees of their coasts. He spake and locusts came, and caterpillars innumerable, and did eat up all the herbs in their land, and devoured the fruit of their ground." Ps.: 105; 33-35.

I have never seen such an invasion and the words of the prophet Joel vividly describe the ravages caused in this valley. "Hath this been seen in your days? or even in the days of your father?"

. . . that which the cankerworm hath left, hath the caterpillar eaten—the vine is dried up, and the fig tree languisheth: the pomegranete . . . and the apple tree, even all the trees of the field are withered." Joel: 1, 4-12.

Further information as to the identity and life-history of these caterpillars would be welcome—also a remedy to keep them under. In Mr. H. S. Premlin's interesting article "The Growing Importance of Entomology" (*Ent. Record*, Vol. XXXV. p. 137) we read the following: "Thousands of acres of crops were blighted by "Aphides" every few years, and part of a county frequently suffered from vast numbers of the "Winter Moth" larvae, which ate the expanding buds and young leaves of oaks, apples, nuts, pears, etc., leaving the trees without either leaves or flowers, and looking as they would in the middle of winter, and so much injured that not only was the crop destroyed for that year, but after the trees had apparently recovered they were too weak to produce a satisfactory crop in the following year. No remedy for either the Aphides or "Winter Moth" was then known." This description describes almost minutely the ravages in the Sebaou Valley, 1925. Could these caterpillars be the larvae of the "Winter Moth?" or if they were not, could any expert having knowledge of the species inform us what they were? These caterpillars do not seem to be found in the high mountains. Since I have lived at Michelet, Kabylia, at an altitude of 3000 feet above the Sea, I have never come across them, but their natural habitat seemed to be the plain.

NOTES ON COLLECTING, etc.

MYRMECOPHILOUS NOTES FROM MONMOUTHSHIRE.—I spent the Easter week-end this year at the little village of Trelleck, which lies ten miles from Chepstow and six from Monmouth. Situated on the old Red Sandstone, about 700 feet above sea level, the district is largely in the hands of the Forestry Commission and is copiously planted with conifers, mostly spruce and larch.

In a ride, the remains of an old drive, between the spruce plantations, I spent most of the time between the frequent showers looking for ants, and I was fortunately able to add the following species to the county list:—

**Myrmica ruginodis*, Nyl.—Plentiful under stones.

**Leptothorax acervorum*, Fab.—Nesting freely in the roots of old pine stumps, in nests of *Formica sanguinea*.

**Formica rufa* var. *rufo-pratensis*, Frl.—Several nests.

**Formica sanguinea*, Latr.—Plentiful under stones or mounds covering old pine stumps. In each nest were workers of *Formica fusca*. This was a very pleasing discovery, as I believe it is the first record for the western side of the River Severn.

COLEOPTERA.—The following Coleoptera occurred with the ants:—

Dinarda dentata, Gr.—Plentiful in the nests of *Formica sanguinea*.

In a huge nest of *Formica rufa* the following beetles occurred:—*Oxyptoda formiceticola*, Mark. (5), *O. haemorrhoea*, Sahl. (5), *Notothecta flavipes*, Gr. (1), *Myrmedonia humeralis*, Gr. (1), *Quedius brevis*, Er. (1), *Leptacinus formicetorum*, Mark. (1).

HETEROPTERA.—In this same nest I found one larva of *Piezostethus formicetorum*, Bob. which so far has only been recorded from Scotland and Kent, and this record consequently greatly increases our knowledge of its distribution.

LACERTILIA.—Under the stone covering a nest of *F. sanguinea*, I found a young slow-worm (*Anguis fragilis*) curled up among the ants.—H. M. HALLETT, 64, Westbourne Road, Penarth. May 8th, 1931.

CALIPROBOLA SPECIOSA, ROSSI; A RARE DIPTERON CAPTURED IN WINDSOR FOREST.—On June 29th last, when collecting in Windsor Forest I noticed a fine conspicuous fly on the wing around a large old dead oak. It appeared to be attracted by a "stink horn" fungus growing under bracken and brambles around the base of the tree, as it twice flew down and endeavoured to get under the herbage. After some trouble I succeeded in netting it. The larva lives in rotten wood. I understand it has only occurred hitherto in the New Forest in Britain, as is the case with a number of the rarer beetles which occur in the two localities.

Some half dozen specimens in the British Collection at the British Museum all come from Brockenhurst.—HORACE DONISTHORPE.

IMMIGRANTS.—There seems to have been a considerable number of species of Lepidoptera immigrant to this country during the past month or two, and we should be pleased to have records of such from our readers, especially may we urge those in touch with the southern and eastern coasts of Britain to be on the look out. So far we have records or have heard of the following species having turned up along the south coast and one or two have reached a considerable way inland. *Colias croceus*, *Pyrameis cardui*, *P. atalanta*, *Phryxus livornica*, *Macroglossum stellatarum*, *Heliothis peltigera*, *Plusia gamma*, *Rhodometra sacaria*, *Nomophila noctuella*, and *Plutella maculipennis* (*cruciferrum*).—Hy.J.T.

SEASONAL NOTES.—On June 27th we went to the Mickleham Downs and then on to the rear of Box Hill. The weather was fine and hot but practically nothing could be stirred out, nothing flying, no larvae could be beaten out, in fact it was the blankest day we have ever experienced in such a usually prolific locality. In the subsequent week we went to Horsley and worked the leas with equally negative results. 'Tis true *Coenonympha pamphilus* and *Epinephele jurtina* were flying with a very few Crambids. A solitary *Toxocampa pastinum* was the only capture of note. Not even Tortrices and Tinea, which are so abundant on the sheep leas at this time of the year, were to be swept. Even flies were only numerous enough to bite once or twice.—A.R., & Hy.J.T.

CURRENT NOTES AND SHORT NOTICES.

The current parts of Seitz *Supplement to the Palaearctic Macrolepidoptera*, 23 and 24, contain the completion of the matter which had been accumulated and arranged for publication. To this has had to be put, as an "Addenda," the descriptions of a considerable number of further new forms in order to bring the work right up to date, before giving the Index. The *Hesperiidae* are included in pt. 23. The results recently attained, particularly in the genus *Hesperia*, have been included, which has necessitated the alteration of the sequence of species as followed in the main volume. The work of Reverdin, Verity, B. C. S. Warren, La Cerf, Oberthür and others has been taken

into account, but it is not always that the rectification of names is accepted nor are the new genera treated as such. The name *sao* is used although *sertorius* is referred to as being more correct, and the genus *Hesperia* is still intact although the species are placed in the new sections which are termed groups with indications of the new Hesperian genera in brackets. Owing to the reinvestigation of specific values in the family, it was found necessary to diagnose all the species by giving the differences of each species from other allied species. All page references to the main volume are included as customary. In the Addenda to the *Supplement* we find the very recent investigations dealt with, such as the most able monograph of *Pieris brassicae*, which was published in our own magazine last year, but we do not find all the more recent emendations made in the nomenclature of the genus *Erebia*, which should, we think, have been mentioned even if not accepted. Much of the results of Verity's work on *Melitaea didyma* has been accepted and used. The two parts contain 48 pages and no plates. The figures illustrating the additional *Hesperiidæ* have been previously given on plate 16.—HY. J. T.

In the recently published *Mitt. Münch. Ent. Gesell.* there is a long article, with a plate on the Lepidopterous Fauna of the mountainous and woody region between Bavaria and Bohemia. It is arranged in rather a novel, but, nevertheless, in a very useful way, that is month by month; Spring, May, June, July, August, and September. The writer gives his own experience of five years collecting and observation and includes the microlepidoptera. Some fourteen figures are given of varied forms of *Larentia (Hydriomena) ruberata*.

The *Catalogue of the Lepidoptera of France* issued by Léon Lhomme as a supplement to *L'Amateur de Papillons* has now reached page 576; the *Acidaliinae* = *Sterrhinae* of the Geometers have been begun. Not only are long lists of localities included, but the named varieties are given with a short diagnosis. A useful list of synonyms and references, with the foodplants and dates of occurrence are added, so that the List when completed will form a most useful and indispensable guide to future collectors in France.

In the March and April numbers of *L'Am. de Pap.* M. J. de Joannis continues his remarks on the Rules of Nomenclature and is dealing with the proposals of the British National Committee. M. Catherine has now completed his valuable contribution on the Mt. Blanc area as a collecting ground with a list of the species reported from it either as imagines or larvae.

The *Ent. News* for March has an interesting article on Thomas Say, an early American Naturalist, 1787 to 1834.

A writer in the *Can. Ent.* for March calls attention to a curious error of orthography which frequently occurs in entomological treatises, that is the use of the word "punctuation instead of punctation" in descriptions, of Coleoptera especially. Surely "punctation" is wrong also. The indentations are not "puncts" but "punctures" and therefore the correct term is "puncturation."

The investigation of the variation in the genus *Dysstroma* continues to take up considerable space in some of the continental magazines. Dr. Heydemann, with his usual acumen, again attacks the problems in

the January number of the *Int. Ent. Zeit.* as also does F. Nordström, the latter gives a valuable plate of variation in *D. citrata* and also a short bibliography. In the February numbers of the same magazine. Dr. Heydemann discusses the occurrence of *Leucania favicolor* in Schleswig-Holstein and gives a plate of the various forms he has taken there. He also discusses the name *lycidas*, Meig. and decides that it is not a form of *sephyrus*, Frv. and therefore Verity's substitute name *trappi* is superfluous.

The *Zeit. Oster. Ent. Ver.* for January contains a long argument to show that *Miana captivuncula* is not a glacial-relict, as had been put forward in the same magazine in 1928. The article is illustrated by a valuable distribution of the species.

With the *Ent. Rund.* (and *Soc. Ent.*) for March the publishers have sent out printed forms for registering facts and observations on a species of Lepidoptera. The various headings comprise:—Under Species: (1) Name of race, form, aberration, etc. (2) Author. (3) Literature. Under Egg: (1) Copulation. (2) Oviposition. (3) Data. Under Larva: (1) Data of larval stadia in different generations. (2) Details of the skin. (3) Locality and foodplant. Under Pupa: (1) Pupation. (2) Emergence. (3) Data of pupal stadium of different generations. Under Imago: (1) Time of flight of different generations. (2) Data of breeding. (3) Data of capture. (4) Data if at light, etc. (5) No. of ♂s. (6) No. of ♀s. A concluding space for special notes and descriptions.

We have received from our valued correspondent Herr Dr. F. Heydemann a copy of a paper he read at a meeting of the Society at Kiel entitled "The Influence of the Atlantic Climate on the Lepidopterous Fauna of N.W. Europe, particularly of Schleswig-Holstein." It is illustrated by two very valuable maps of climate and vegetation.

In a very valuable paper on the "Geographical Variations and Evolution of *Plebeius argus* in *Iris*, March, 1931, Dr. Verity uses the generic term *Lycaeides* in place of *Plebeius*, to us a quite unnecessary change. Dr. Chapman, and J. W. Tutt with the full agreement of our colleague Mr. G. T. Bethune-Baker and at considerable length adequately proved that *Plebeius* was the prior generic term basing their decision on a consultation of the whole of the literature in which the name *Plebeius* or *Plebeii* occurs in a generic sense, that is it prefaces directly the acknowledged specific name. (See *Brit. Lep.* vol. X., p. 150 etc.). Did there exist a properly functioning organisation a definite stay could be placed on all such actions. P.S.—If all these authors works are to be discounted, we suspect *Rusticus*, Hb. stands before *Lycaeides*.

The admirable series of plates which are being issued monthly by *Lamb.* should be in the hands of all Lepidopterists. Most of the figures are aberrations of *Rhopalocera* which have been previously described in the pages of the magazine as having been taken in Belgium. The magazine each month also publishes a separately paged supplement to the *Cat. Lep. de Belg.* of the late M. Lambillion; so far 79 fascicules have appeared.

We are pleased to hear that our colleague Mr. H. Donisthorpe has been unanimously elected a Corresponding Member of the "Nederlandsche Entomologische Vereeniging," the premier entomological Society of Holland.

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

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EXCHANGES.

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

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.*

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—*Albimacula**, *sparganii**.

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

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—*C. Zacher' Erfurt, Weimar, Street 13, Germany.*

DUPLICATES.—Indian Butterflies.—*A. F. Rosa, M.D., 4, Bellevue Crest, Edinburgh.*

WANTED.—Seitz Macrolepidoptera, Vol. 5, Text only.—*Rev. T. W. Adam, Riddlesworth Rectory, Diss.*

CHANGE OF ADDRESS.—*J. F. Bird, "Eastholm," Churchdown, Glos.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 7th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. July 23rd, August 13th, 27th.—*Hon. Secretary, Stanley Edwards, Avenue House, The Avenue, Blackheath, S.E.3.*

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. Visitors admitted by ticket which may be obtained through Members or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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Collecting 1930. (Lepidoptera.)

By H. B. D. KETTLEWELL.

(Concluded from page 115.)

During the next few days *Celaena haworthii* turned up exceedingly commonly at sugar, while *Pelosiia muscerda* disappeared practically altogether till August 26th and 27th when four newly hatched specimens turned up. A few ova were obtained of which I kept two only. Larvae from these fed up well on dead and withered bramble leaves kept slightly damp in an air-tight glass-topped box. They were both alive and healthy in mid-October and about 0.2 of an inch in length.

Leucania brevilinea seems to have a wide distribution over the Broads, where it can be taken easily at sugar or at light, but undoubtedly the most successful way of taking them in any numbers is at 'dusking' over one of the larger "reed-fields" which they frequent. I was singularly unsuccessful this year after this species, varying from a complete submergence in an unexpected dyke on one occasion to another evening when we worked to the drone of an ever-increasing cloud of mosquitoes, which shadowed us individually and finally won by driving us off the Broad. Nevertheless, we took quite a few during our visit as they steadily threaded their way low down among the reed stems. It is out at the end of July and throughout August, and has even been taken in fresh condition during mid-September. One or two ab. *alinea* were taken [by Mr. Wiltshire].

I will now record some interesting observations on the larva of *Spilosoma urticae* made during past years by Mr. Gane and Mr. Mellows. The larvae always occur in damp grassy fields by the edge of a Broad. Certain fields only contain the larvae—perhaps one in ten—and when they are present they occur usually in hundreds. Not the same field every year is frequented by the species. The larvae are partial to Ragwort and in infected fields can be found at early dusk till dark in countless numbers on this foodplant. On certain nights none are to be seen at all.

Acting on these past observations we finally found a field with a few larvae wandering about. We then went there on the night of August 21st and found the larvae common on the plants of ragwort. The following day, by gently separating the grass around the foot of plants of ragwort we took on an average four or five per plant—curled up deep down near the roots. Our next visit—on the 30th, most of the plants of ragwort in this field having been already searched, we started to search ordinary clumps of grass and to our surprise found the larvae equally abundant here. We collected a hundred in a little over half an hour. They were all practically confined to the outer limits of the field—the centre square having been cut for hay. I have learnt since that this field, which was excessively water-logged then, is under a foot or two of water for the most part of the winter. Acting on this Mr. Gane has actually kept the pupae in a glass of water for a period of ten days with apparently no ill-résults!

The only other inhabitant of this watery meadow was *Eumorpha elpenor*, whose larvae were fairly common on water bedstraw.

Towards the end of my visit we had two most enjoyable nights—

on August 28th and 29th using a couple of brilliant petrol-vapour lamps, one on each side of a sheet which had been fixed up lengthways in a rowing boat. The boat was towed into the heart of the reedbeds and fixed in position by two other similar boats alongside the first.

Both nights were absolutely perfect—hot and still as only those who know the Broads can appreciate. You could hear the eels “sucking” a hundred yards away, and close at hand a reed bed was practically flattened with a thousand swallows roosting there—four or five per reed.

Great big fish came up to enquire of the sudden illumination, while around each lamp a steadily thickening carpet of too inquisitive midges seethed, as each in turn, scorched, fell apterous to the ground, and in ever increasing numbers.

Every few moments a *Nonagria cannae* came buzzing straight at the sheet and after a few moments of extraordinary liveliness would settle more or less battered somewhere nearby, and out of some twenty or thirty we took as ‘perfect’ only a mere half-dozen were kept on closer examination the following day and it is useless to try and get cabinet specimens this way. *Nonagria typhae* does not come to light till well after midnight and then in fewer numbers. I took one jet black specimen (ab. *fraterna*) and also bred a similar one on September 1st along with four or five dark reddish brown varieties.

We also had another equally pleasant evening after *N. cannae* in company with Mr. Mellows on his houseboat. A lamp was fixed at one end of the boat and we simply sat and smoked and awaited the arrival of this species. It is an interesting fact that small oil lamps placed at different parts of the boat seemed to attract just as many moths as a more powerful petrol lamp. We thus finished up our stay on the Broads with three very pleasant evenings in a very pleasant trip.

On September 7th—in company with Mr. Lees of Streetly, Sutton Park—I went over to Cannock Chase after *Calocampa solidaginis*. We were entirely unsuccessful—as also on the 14th—in spite of the miles of moorland we traversed. At one time this species used to be exceedingly common in this locality (Tutt). Mr. Lees informed me that *Noctua dahlia* and *N. glauca* had been exceedingly common in his garden—just outside Sutton Park, Birmingham—both at sugar and Buddleia bloom and gave me a fine series of both which he had taken on September 5th and 6th. We sugared here on September 14th and were surprised to take a few *Xanthia gilvago* along with *X. circumscripta*, *Amathes lychnidis*, *X. fulvago* and one fine melanic *Hadena protea*. No *N. dahlia* appeared, probably due to the late date and appalling wet and stormy night.

On October 4th and 5th Mr. Demuth and I succeeded in capturing nine or ten specimens of *X. circumscripta* in Norfolk and Suffolk along with numerous *Amathes helvola* and others.

On October 19th, while en route for London near Godalming, Surrey, a particularly good bunch of ivy bloom fell into the beam of my headlights—on stopping and beating a hundred or more insects fell into the tray, including a fine *Xylina semibrunnea* and *Orrhodia rubiginosa*, along with fullfed larvae of *U. argiolus*.

Subsequent miles of beating produced nothing!

In conclusion I should like to sum up the year by certain

questions:—The year 1930 was “a year for varieties of *Brenthis selene*.” They occurred simultaneously in localities far distant from each other. What factor causes a species to behave in this way? *Nonagria dissoluta (arundineta)* was practically absent from the Broads this year although it is usually one of the commonest fen insects. Why? What conditions made this a year for *Noctua dahlii* after eight or nine years of extreme scarcity?

It is only by yearly observations such as these and a yearly census of the abundance or scarcity of a species in conjunction with the accompanying (or preceding) meteorological conditions, temperature charts, etc., which will enable future collectors to forecast, “This will be a year for such and such species.” And to these ends each one of us must aim.

Draguignan and St. Aygulf, Var. France as collecting centres in April-May, 1930.

By Lieut. E. B. ASHBY, F.E.S., F.Z.S.

Leaving London on April 12th I reached Draguignan on the afternoon of the 13th, and put up at the Hotel Bertin. On April 14th I went by an early train to Carnoules, but the day was about as bad for collecting as it could be. Under a persistent Mistral I caught 3 specimens of *Thestor ballus*, and a few *Euchloë belia* which were in perfect condition. Also a few specimens of *Scolitantides baton* just emerged. The day was cold throughout, made worse by a heavy hail storm at 10 a.m. *Ascalaphus longicornis* were common and I took the Hemipteron *Piezodorus incarnatus*, Germ., and the Hymenopteron *Tenthredopsis stigma*.

April 15th.—Today I went by early train to Le Muy and revisited the *Zerynthia cassandra* ground (which I mentioned in *Ent. Record*, Vol. 41, No. 10, October, 1929), with great success, as this year I found the species quite fresh in both sexes, and succeeded in taking a nice series of both; I also took the moths *Pseudophia lunaris*, W.V., and *Euborellia moesta*, Serv. The day became very fine until about 2 p.m. when I returned.

April 16th.—This afternoon on the new Grasse Road at Draguignan I found a nest of *Odynerus parietinus* which I hope in time will yield me a series. Many larvae presumably of a species of fritillary were sunning themselves on the stone walls by the roadsides, and I took a fresh female of the Noctuid moth *Pseudophia lunaris*, W.V. I also took the Hymenopteron *Osmia melanura*, Mer., and the Rhyncotid *Carpocoris fuscispinus*, Boh.

April 17th.—By autobus at 7 a.m. this morning beyond Montferrat to about one kilometre above the signpost, where the road to Bergemon branches off. Here about 9 a.m. and until 1 p.m. when the sun went in *Erebia epistygne* were flying in good numbers. I managed to get 18 fit for setting at this late date, many of them females; the imagines are prone to settle on a low growing dandelion flower about midday. *Callophrys rubi* were much in evidence and mostly fresh at this height. About 2 p.m., descending to the Bergemon Road, I got one good specimen each of *Z. cassandra*, *Leptosia sinapis* and *Melitaea dia*; also the Hymenopteron *Polistes gallica*, which is everywhere common; with

a single specimen of *Ammophila hirsuta*, Scop. (*viatica*, De Geer) I took 2 specimens of the beetle *Sisyphus schäfferi*, L., as they were busily engaged in rolling along their pellet of mud.

April 18th.—Good Friday. Rain throughout the day.

April 19th.—At Carnoules to-day I found *T. ballus* over a large area in odd specimens, but naturally enough more abundant where its food plant was more concentrated; males and females and some of the males were very fresh, which I did not expect at this late date.

April 20th.—At Draguignan on the new Grasse Road to-day *Euchloë euphenoides* was much in evidence. I also took 4 good *Zerynthia medesicaste*, 1 fresh *G. melanops*, several fresh *B. dia*; and *L. sinapis*, but I looked in vain for *L. duponcheli*. A brilliantly fine Easter Day. I stayed again at the Hotel Bertin at Draguignan. It is commodious, clean and and reasonable. The proprietor and his wife are particularly obliging and he speaks English fairly well. On the road to-day at the *Odynerus* nest I secured a number of the imagines.

April 21st.—By the 7.11 a.m. train to Les Arcs; thence I walked some 2½ kilometres to the bridge over the river Argens, crossed it and turning to the left (too soon) made my way, with considerable difficulty in places, along the bank of the river to Le Muy. Parts of the walk are pretty, but I don't recommend it much, as the going is very bad in places, and much the best collecting is at the Le Muy end from the entrance to the Gorge de l'Argens. The day was beautifully fine, no one about, Easter Monday. There being no direction marks en route, it is very easy to lose one's way, as there are several tributaries that fall into the Argens river en route and I counsel anybody else who attempts this walk to consult an ordnance map first, which I did not unfortunately possess. En route I got two fresh *Pararge aegeria*, several good though small males of *Z. medesicaste*; 2 *Z. cassandra*; *E. cardamines* and *E. euphenoides* were absolutely fresh and plentiful all the way, with a few *B. dia*. I was uncommonly glad to reach Le Muy. I was much struck en route by the large number of hibernated *Euranessa antiopa* on willow trees by the river, and rising from the path; also a fair number of hibernated *Polygonia c-album*. I took several of the common beetle *Melasoma populi*, L., also a single specimen of the interesting moth *Exaereta ulmi*, W.V., the only European representative of this genus, I believe.

April 22nd.—On the new Grasse Road to-day at Draguignan, I secured a fine fresh specimen of *E. euphenoides*, several females of *E. cardamines*, a rather worn male of the large moth *Pseudophia lunaris*, W.V., and a fair number of *Aporia crataegi* larvae, which are now getting a good size.

April 23rd.—4 kilometres out on the old Grasse Road. Cloudy. I managed to beat some Hairstreak larvae from *Prunus spinosa* which I did not succeed in rearing. I also found more larvae of *A. crataegi* some of which produced good imagines after my return to England; *Prunus spinosa* also yielded a larva of the Stick Insect. A few Coleoptera were found on the roadside, amongst these were *Cleonus grammicus*, Panz., and *C. ophthalmicus*, Reiter., also *Colaspidema atrum*, Oliv.

April 24th.—I left Draguignan early this morning and arrived at St. Aygulf via St. Raphael about 8-30 a.m. I stayed at the Grand

Hotel here, which proved very satisfactory throughout my visit. A strong wind off the sea made collecting almost impossible and I had perforce to content myself with 1 fresh *Brenthis euphrosyne*, and a female of the Dipteron *Merodon clavipes*, Fabr.

April 25th.—By the 6.27 a.m. train to Le Muy via St. Raphael. No sun all day but a bag of 25 including 2 fine *Z. cassandra*; *Hesperia malvoides*; the beetles *F. populi*; *Morimus tristis*, (= *funestus*, Fabr.) which I took for the first time; *Capnodis tenebrionis*, L., and *Amara acuminata*, BK., ♀; the Neuropteron *Ascalaphus longicornis* was common. I also took the Dipteron *Bombylius ater*, Scop.; the Rhyncota *Spilostethrus equestris*, L.; *Eurygaster austriacus*, Schk.; and the Hymenoptera *Melecta luctuosa*, Scop.; a female of *Hylotoma cyanocera*, Forster; specimens of *Tenthredopsis stigma*; *Tenthredo meridiana* ♀, and *Mnorpa meridionalis* ♂. The best part of the collecting ground in the narrower part of the Gorge de l'Argens has been spoilt by a cart road having been cut in the hottest part, thus destroying a great quantity of foodplant. A hard day of 13 hours before I reached St. Aygulf.

April 26th.—To Saint Maxime. Rain up to 8.30 a.m. made insects slow to rise. I took the morning train to St. Maxime and walking along the road which goes towards Le Muy, I ascended the hills to the right returning by the vicinity of the golf course and the Sud Railway track. *M. cinxia* and *E. belia* brood *ausonia* were much in evidence to-day. I secured a specimen each of the Hymenoptera *Tenthredo meridiana* ♂, and *Ichneumon xanthorius*, Forst., ♀; a fly very closely resembling the Dipteron *Pamponerus germanicus*, L., and also the Rhyncotid *Verlusia rhombea*, var. *quadrata*, Fab.

The most interesting feature of the days walk was the partial observance I succeeded in obtaining, thanks to my quiet movements in the neighbourhood of a quiet stream below the golf course, of the chase of the large green Lizard, which inhabits all Provence, by a greenish coloured snake of apparently about 2 yards length. The snake was gaining on the lizard by gliding movements of great rapidity; if it had reached and paralysed the lizard I might have got them both for the London Zoo, but the snake becoming aware of my presence, raised its head and stopped, and diverted its course and both escaped me. A heavy thunderstorm drove me back along the line to S. Maxime, but just as it began to threaten I nearly walked on a good specimen of *T. medesicaste* as it was settled near to the ground and most inconspicuous.

(To be concluded.)

Notes on one or two Swiss butterflies.

By the late A. J. FISON.

(Communicated by Miss L. M. FISON.)

It may be of interest to Swiss entomologists to record the following localities in Switzerland for one or two species found there by my late uncle Mr. A. J. Fison supplementary to those already published in the *Entomologist's Record* and in Mr. Wheeler's *Butterflies of Switzerland*.

I have also included in these notes Mr. Fison's descriptions of certain species and varieties thinking these might be of service to young collectors who like myself may sometimes find a difficulty in identifying varietal forms of collected specimens.

Hesperia malvae ab. *taras*: Tram gorge.

Heodes (*Chrysophanus*) *hippotoh *: Diablerets.

H. (C.) alciphron: Gspon.

H. (C.) amphidamas: 1200 ft above Villars-sur-Ollon, under the Berbolene Cow-chalets 7. VI. 06.

Polyommatus meleager: Les Valettes (2) 23. VI. 11. Description of this race of *Polyommatus meleager*. "The ground colour of upper-side is the blue of *Polyommatus hylas*, fringes white (on edge) with black border, which is conspicuous with ill-defined inner edge. The black rays near first edge are well-defined, as also on the extreme edge of hindwing, where they have black dots between them. The underside is grey like that of *Polyommatus donzelii* or a little lighter than *Polyommatus damon*. The upper wing has two rows of spots; the outer row being ill-defined. Below its centre the hind-wing is crossed by a rather straight row of white encircled spots. Beyond these spots are pale arrow-heads in pairs pointing to them. There are three or four well separated black-ringed spots above the angular discoidal spot."

Polyommatus pheretes ab. *maloyensis*: Schafberg.

P. amandus. "In *amandus* the central row of spots is regularly curved, but in *alcon* it turns up and then down at lower end."

Polyommatus escheri: Savi se.

P. donzelii: "Black borders very deep and wide."

Polyommatus eumedon: Zermatt.

Plebeius (*Rusticus*) *zephyrus* var. *lycidas*: Saasthal.

Lycaena arion: "A distinguishing characteristic is a double row of spots on the outer-margin underside.

Lycaena alcon: approaches this, but "has smaller spots in a more regular wavy line. *Lycaena euphemus* has but one marginal line of spots, and *Lycaena arcas* has only the central line on both wings."

Pontia daplidice: Saxon.

Parnassius mnemosyne: Montana. I got 12 at Lac Lioson, 1-20. VIII.05.

Colias palaeno: "Very abundant on Stockhorn in the Binn-thal, 8-15.VIII.05. On the 8th and the 10th they were very fresh; the ♀s were white and of two or three shades of yellow. The ♀s began to fly on *Vaccinium* at 9 a.m. but no ♂ appeared until 10.30 a.m. On the 10th I got 30 by 3 p.m., half fresh and half were old. By August 15th most were old. Most were on the W. and on N.E. sides.

Colias croceus (*edusa*) ab. ♀ *helice*: Bex, 27.IX.11.

Dryas paphia ab. ♀ *valesina*: Roche.

Argynnis niobe: Sefinenthal. "As a distinguishing characteristic of *niobe* note generally on the under-side hindwing, and close to base a small oval silver spot (yellow in var. *eris*) placed between four larger spots and often having a black pupil."

Issoria lathonia: "The Rev. Pilson at Ch si res (6.IX.11) caught a "Queen of Spain" Fritillary (a ♂) with the three larger and innermost spots of silver under-side hindwing enlarged and elongated. As it had not also the black spots confluent, it was probably not ab. *valdensis*."

Brenthis euphrosyne: Le Pont, Jura.

Melitaea phoebe: "In the underside of *phoebe* the yellow ante-marginal band has orange centres, but in *Melitaea cinxia* black."

M. deione var. *berisalensis*: Bovernier 23.VI.11. "In *berisalensis* the thickening of the second outer black lines of the under-side hind-wing is very strong and distinctive between each black ray. It occurs also in *phoebe* but is slight and usually wanting in *athalia*. Note too how the angular spot always touches the larger spot below it. In some few specimens the clubbed spot of the upper wing underside is divided in two."

Melitaea athalia ab. *navarina*. Val Solda 26.V.03. "Notice on the underside dark spots accentuated, and on the upper-side the black in straight bands."

Melitaea cynthia: Dent de Morcles. Staffelalp.

M. aurelia: "In *aurelia* the third inner black line is very crooked, and has a clear fault generally."

Melitaea dictynna: "Note the pure white of three or four spots on the hindwing."

Araschnia levana ab. *porima*: West of Flims.

Polygonia c.-album: "The ♀ of this species is much less varied in its markings underside—which consist of two broad bands or divisions—the interior one being darker."

Apatura ilia: Half-way to Aigle by marsh path on three tall oaks. I took 8 in about 1½ hours though the sun was often hidden. Pfynwald.

The Swiss form of var. *clytie* is a transition between *clytie* and *eos*.

Pararge megera ab. *alberti*: "Marsh W. of St. Triphon Rock," 30.V.06.

Pararge aegeria: "type is marked like var. *egeides* but the ground colour is a more tawny brown."

Satyrus statilius: Very abundant at Martigny, Bâtiaz, end of August to mid-September, 1905. "The ♂ *statilius* has, parallel to the antennae, the peculiar dark markings so often seen in its sex. It can be viewed however only in a certain light."

Satyrus circe: Top of Les Pleiades-sur-Clarens, Cubli, 1901. Dombresson-sur-Neuchâtel on one bit of hot stony road, very local. August.

Enodia dryas: Visp. Kunkel Pass and to the north of it.

Oeneis aello: Below Lac Fully 1889: Hautande Ferpèche.

Epinephele ida: Iselle.

E. lycaon: Binn in July.

Coenonympha tiphon: I note in *tiphon* that the body of the ♀ is shorter and thicker than in the ♂ and that there is a second spot near anal angle on the underside front wing.

Coenonympha arcania var. *insubrica*: "Insubrica is larger than the type. The colour is brighter, but with much dark colour also. The white borders are large and dark on upper side. The under wing has 2 or 3 eyes and the yellow line near the edge is well-marked, on the under wing is the costal eye (underside) like the type outside of the white band." Taken at Iselle. Typical *arcania* from Berne: Le Prese: Brusio.

Coenonympha arcania var. *satyrion*: Much smaller than *arcania*.

Erebia eriphyle: Dischmathal, 27.VI.-2.VII.01. The spot where I took it was north of the road above two little marshes. *Eriphyle* differs from *melampus* in that it has diffused yellow towards the base under-side front wing and is larger.

Erebia eriphron var. *valesiana*: Rhone glacier.

Erebia euryale: In *euryale* sometimes the light ante-marginal band is almost gone, and though the tooth may still be there it is not so always. Fringes chequered.

Erebia gorge var. *triopes*: Dischmathal.

Erebia christi: The wings of *christi* are larger and narrower than those of *mnestra*.

Erebia manto: Varies greatly in size.

The specific names and the Geographical Variations of *Melitaea parthenoides*, Kef. (=parthenie, auct. nec Borkh.) and of *parthenie*, Borkh. (=aurelia, Nickerl).

By ROGER VERITY, M.D.

(Continued from page 105.)

I. Geographical and Seasonal Variations of *M. parthenoides*, Keferst. = *parthenie*, auctor. nec Borkh. :—

In Central Europe this species varies, locally, considerably more than its nearest allies. There is, first of all, a broad range of variation within the same area, evidently produced by differences of surroundings in the various localities and especially by the amount of dampness or of aridity. It can be divided conveniently into three groups or races with clearly different aspects, chiefly due to the size, the shape of the wings, the tone of colour and more particularly to the extent of the black pattern on both surfaces.

Race *parthenoides*, Kef. : We have already seen that the validity of the name of *parthenoides* does not rest on any description, but on the references to Godart and Herrich-Schäffer. The former is mentioned first and it happens that I have unconsciously restricted the name to his figure, as far as individual and local forms are concerned, by giving the name of *plena* to the form figured by the latter (*Ent. Rec.*, 1921, p. 213). As I have mentioned above, Godart has described and figured from the North of France a decidedly unusual race of very small size (length of forewing in his figure of a male 15mm. and ranging up to 18 in female specimens), with short stumpy wings, a dull, pale, tone of fulvous and very thin, though complete, black pattern. A series of specimens of the II. gen. of this race, sent to me by Dupont from Pont-de-l'Arche (Eure), had struck me by its peculiar appearance and I had named it *inanis* in the *Ent. Rec.*, l.c. It now becomes obvious that the race must be named *parthenoides*, Kef., on the strength of this peculiar second generation and that it is the nominotypical one of the species. My name of *inanis* falls as a synonym of it. Its first generation, of larger size, richer in colouring and with a fuller black pattern, is quite similar to the well-known *communis* described below. If Borkhausen's second description applies in reality to this species, his extraordinarily diminutive II. gen., the size of *argus*, would be an extreme form of *parthenoides* = *inanis*.

Race **completa**, nom. nov. : The second generation of the broad-spread race, which one has been in the habit of considering the nominotypical one of the species, has quite a different look from the

really nominotypical *parthenoides* = *inanis*; it is not as small, the wings are very much more elongated and pointed, the tone of colour richer and the pattern bolder in both sexes, so that it must be distinguished by the name of *completa* and I take as typical an August series from Lardy, near Fontainebleau (Paris) in my collection. Freyer's figure on pl. 295 gives a fair idea of its aspect. The second generation of Angers and of Rennes seems to be transitional between those two races and thus answers the description of *completa* trans. ad *parthenoides*.

As noted above, the first generations of these two races are, more or less, alike and are constituted precisely by the form one has for many years taken to be nominotypical "*parthenie*." It now becomes necessary, as a result of the remarks I have made, to give it a name and I call it **communis**. It differs markedly from nominotypical *parthenoides* by its much larger size (17 to 18mm. in the male and up to 19 in the female) and by its narrow and elongated wings (this is usually stated in text-books to be a distinctive feature of the species, but many individuals have the same shape as *athalia* even in *communis* and furthermore the stumpy wings of nominotypical *parthenoides*, as well as those of *plena*, make it quite impossible to consider it a specific character). Form *communis* varies very much by the tone of the fulvous and by the extent of the black pattern. In the north of its area the fulvous is, as a rule, very much of the same pale and dull tinge as nominotypical *parthenoides* of the second generation and the black pattern is complete and even, but thin, so that the two pre-marginal and the marginal streaks stand well apart from each other and the central elbowed one is not thicker than the former; in the female the fulvous varies more in tone, but the pattern differs less from that of the male than it does in the southern races. I take the first generation of this northern form as typical of *communis*, selecting my male holotype and my female allotype in a series of specimens from Angers (Maine-et-Loire). Oberthür figures a perfectly similar couple from Rennes in the *Ét. Léop. Comp.* IV., figs. 347 *bis* and *ter*. Seitz and Berge-Rebel figure a similar form too, except that the richer and brighter fulvous of their figures gives one more the impression of southern specimens, transitional to *sphines* and *semiplena*. Southwards it must also be noticed that the pattern becomes more variable individually and, in some cases, locally, on account of the tendency to approach either *sphines* or *semiplena*, and I observe that even a few spring specimens I have from Lardy, near Fontainebleau (Paris), are of a deeper fulvous and have a more heavy pattern than the form described above from the west, so that they can be called trans. ad *semiplena*, to be described below.

Race *sphines*, Fruhst., *Archiv für Naturgesch.*, 82, Abt. A., 2 Heft., p. 12 (Dec. 1916) can be considered the southern one of dry localities. It is described from "the neighbourhood of Geneva; type from Gex," 700m. in the Jura; Tramelan is also mentioned and Pralognan, in Savoy, but this last locality must be a mistake, as it is at 1440m., near glaciers, where one could only expect some race of *varia*: Curiously enough, there is room for a mistake of this sort, because *sphines* somewhat points to the superficial appearance of the western race of *varia*: it is decidedly smaller than *communis*, the wings are on an average still longer and narrower, the tone of fulvous is light, but brighter;

the black pattern of the male is sharp in outline and dark, but usually very thin; the elbowed line is perhaps a little thicker, whilst the premarginal ones are very thin and the inner one is often partly obliterated and occasionally entirely so on fore and hindwing, such as it is in many *varia*, but as a rule, never in *communis*; on the contrary the pattern of the female is decidedly thicker than in the latter and the fulvous in many specimens tends more to be of various shades in the different spaces. All this and particularly the variation of the two sexes in opposite directions, accentuating the sexual dimorphism, produces a certain amount of resemblance to *varia*, although it cannot be due to the influence of the latter nor even of the Alps, for a female I possess from a dry locality of the Lozère, 1030m., in the Cévennes, collected by Foulquier in July, certainly seems to belong to *sphines* and a series of both sexes from Mouthiers sur Boême (Charente) is absolutely identical with my Geneva ones, showing it is a broadspread southern race. These also confirm Fruhstorfer's statement that there exists no detectable difference between the two generations. Lang, in his *Butt. Europe*, pl. XLV., f. 5, shows a male with an unusually complete pattern, whereas Meyer-Dür's figures I 3 and I 4 of his *Schmett. d. Schweiz* represent very well both sexes of an extreme form, with the black pattern reduced to the utmost extent of thinness, and Meigen's rough fig. 3 of pl. XI. illustrates this race too, although the fulvous paint has turned blackish in my copy of the book.

Race *beata*, Caradja, *Iris*, 1893, p. 181: The original description translates as follows: "In the valleys of the Pyrenees, near Bagnères de Luchon, 622m., Sost, Saint Béat, 520m., *parthenie* is of very large size and usually of a light colour; my specimens average 39mm. (the largest female nearly 51mm.), whereas my German specimens and those from the northern part of the department of the Haute Garonne only have an expanse of 34-35mm. Very likely this large, light-coloured local form will turn out to be worthy of a name, which I suggest should be *beata*."

I possess no specimens from those localities, but I have little doubt that this name applies to the race of St.-Côme, near Bazas (Gironde), of which I have received a very large number of specimens from the Abbé Sorin. The largest females measure precisely 41mm. between the two apexes, the mass measures 39 and a few are smaller; this corresponds to a length of forewing, from base to apex, according to the more practical and exact modern way of measuring, of 22 and 20mm. The largest males (about 40%) measure 19 to 20, but they do not look as large as the females, on account of their narrower wings and consequent lesser surface; the rest measure about 17 to 18, which is, more or less, the same as the average *communis*. The tone of fulvous and the extent of the black pattern varies much more than in any other series I have seen, in both sexes; they range from the pale yellowish of nominotypical *parthenoides* to the rich, red fulvous of *plena*; the pattern of the males varies too from the thinnest of *sphines* to the less highly marked *plena*; most of them can be described as being of a richer fulvous and as having a bolder pattern than *sphines*; nearly all the females have a decidedly thicker pattern than those of the latter and its outlines are less sharp, contributing to darken the general appearance.

Another large series I have from Dombresson, 700m., in the Jura, near Neuchatel, can only be called *beata*, as both sexes are perfectly similar in size and aspect to the average ones of St.-Côme, so that the only differences consist in greater uniformity and lack of the giant individuals, although they are all very much larger than *sphines*. A few specimens I collected in July 1906, on the Mount Revard, above Aix-les-Bains, seem to be *beata* too, so that it is very likely Fruhstorfer was right in using this name for the race of the Maritime Alps as well. Here again, as in the case of *sphines*, the racial features reappear in distant localities, wherever local conditions are such as to produce them, and *beata* is apparently the race of damp ones in the southern area of the species. Its II generation at St.-Côme does not in the least exhibit the peculiarities of the I, as it is similar to that of Fontainebleau by its narrow and pointed wings and by the extent of the black pattern, which contrasts in the female sex with the heavy one of *beata*, and it only is a little larger than in the latter locality, it can thus perfectly well be referred to *completa*. This is instructive, because it shows how in cases of this kind even the races which differ most from each other are simply due to the direct effects of different surroundings on individual development: slow growth, feeding on soft leaves, which are easy to chew and to assimilate, results in large size and 'on damp soil, when their tissues are succulent, the dark pattern of the butterfly is increased by the abundance of fluid in its body and by the longer time the wings take to form in the chrysalid, during which the oxydation of the uric compounds is presumably increased; the heat of the summer, on the contrary, forces development and the assimilation of tough food is insufficient to keep up with the rapid growth, so that small size and a frailer build are the result. If a change of season is sufficient to turn one of these races into another, there can be no hereditary differences in their constitutions, as there is in the cases of the large groups I have designated by the term of exerges, which have lived for hundreds and thousands of years in different climates and which, apparently, may end by becoming allied species, when sterility sets in between them. This species has a very limited range (from Moravia to the Pyrenees), as compared to most other *Melitaea*, so that it consists of a single exerge, apart from the distinctly glacial *varia*, and it may be on the way to extinction, not having been as adaptable as the parallel branch *athalia*, which has presumably sprung from the same *sindura*-like ancestors.

Race *plena*, Vrty, *Ent. Rec. l.c.*, is the most melanic of all. The little series of specimens labelled "Gironde" I gave this name to in 1921 is the darkest I have seen, particularly as regards the two pre-marginal black streaks on all the wings; the fulvous spaces between them are reduced to small round spots, instead of being long rectangles; the spaces between the outer one of the two and the marginal band are also reduced to very small round spots, instead of the usual lunulate shape; the fulvous is of a richer and deeper tinge than in any other race, particularly in the male; both sexes are broadly suffused with black at the base. The most striking feature is perhaps the aspect of the underside, where all the pattern is well pronounced on the forewing, including a complete central row of oval black spots across it, and the usual capillary and sharp black streaks of the hindwing are

thick and shaded in outline. The shape of the wings is shorter and more rounded than it is usual in the species, except in the nominotypical *parthenoides*, so that the insect looks smaller than *communis*. All these features give it such a peculiar appearance that I was at first quite doubtful as to its being a *parthenoides* and I sent the genitalia to Reverdin to be dissected; the answer was they were perfectly typical. A few individuals of both sexes have been found, since, at St.-Côme amongst the *beata*, but as a race I have only seen its exact equivalent from the Puigmal in Spanish Cerdanya, above Carals, so that the females from the Upper Haute Garonne, described by Caradja as having the wings nearly entirely suffused with black, and those called *varia* by Rondou in his *Cat. Lép. Pyr.-Or.* for the same reason, are certainly *plena*.

Race **semiplena**, nom. nov.: On the other hand I do not think it would be at all correct to apply the same name to the race of Gèdre, as represented by a large series in my collection, nor to a little series collected for me by Gaillard on June 12th at La Séreyrède, at 1200 to 1300m., on the Mount Aigoual, of the Cévennes, nor again to Herrich-Schäffer's figures 136 and 137 of the upper- and underside of a German example. All these are a near approach to *plena*, but they just fall short of it by the general extent of the black pattern on both surfaces and notably by the premarginal streaks not being as thick and blent together and with the marginal one and by the females never reaching the extreme degree of melanism of *plena*. On the contrary, they fully agree with the latter in the shape of the wings and in the very accentuated central row of black dots on both surfaces, as well as by the reddish tinge of the fulvous. I think the designation of *semiplena* is necessary, taking as typical the Aigoual series and noting that Herrich-Schäffer's specimen is transitional to *plena*, for the underside is fully that of the latter.

(To be continued.)

SCIENTIFIC NOTES AND OBSERVATIONS.

A LARVA OF DICRANURA VINULA WITH UNUSUAL MARKINGS.—The larva was found at Enfield on poplar by Mr. T. R. Eagles. On the side of the second and third thoracic somites there is a small semilunar brown mark at the spiracular level. The saddle mark is unusually broad and almost devoid of the thin whitish longitudinal lines; on the third abdominal somite the white border of the saddle reaches the spiracle and below is a large nearly circular brown mark bordered with white. On the fourth abdominal somite an extension of the saddle covers almost the whole of each side, though a narrow wedge-shaped piece of the white border reaches the spiracle anteriorly. On the fifth abdominal there is a very large lobed brown mark separated from the saddle by a narrow white line at the level of the spiracle. Ventrally there is a central brown stripe on all three thoracic somites and a small spot of the same colour in front of each leg. On the first two abdominal somites there is a red-brown central band with a dot on either side of it on the first and a line on the second at the same level as the legs. On the third, fourth, fifth, and sixth is a broad central band

united anteriorly to a narrow stripe of brown at each side, and posteriorly are two large red-brown spots separated in the middle line by a narrow green line. On the seventh, eighth, and ninth are two broad red-brown bands united across the venter at the junction of the anterior third and posterior two-thirds of each somite. There is a small red-brown mark on the outer aspect of each proleg. I have recorded it because it may help to explain the evolution of the very specialized pattern of the larva of *vinula*.—(Dr.) E. A. COCKAYNE, (F.E.S.), 116, Westbourne Terrace, W.2.

NOTES ON COLLECTING, etc.

IMMIGRANTS.—I noticed *Pyrameis cardui* on several occasions at Putney on June 21st in my garden, and on several other dates, as well as elsewhere in the district. I also saw the "Painted Lady" on various dates in Windsor Forest this year. *Macroglossum stellatarum* was noticed on July 9th, hovering over a privet hedge in a road at East Putney. I had never seen the "humming-bird hawk-moth" in this neighbourhood before. A very fine and large specimen of the "Red Admiral" was flying in the road at Putney to-day, August 7th.—HORACE DONISTHORPE.

Phyxus livornica.—On July 27th I had brought to me by Mr. Hatton, an allotment holder, an almost fully grown larva of *P. livornica*, which he had found in a bed of carnations. In coloration it agrees with the description in South's book, with the exception that the dorsal stripe is pinkish instead of yellow. The larva fed on dock until August 4th, when it began to spin among leaves forming a very slight cocoon. On the morning of the 9th I found that it had left the cocoon and I was rather surprisad to see that its skin was peeling off in several places. During the evening of the same day it finally pupated. The pupa is $1\frac{3}{4}$ ins. long of a deep straw-colour, thinly dotted with reddish on the abdominal segments. The areas between the segments are so thickly dotted, however, as to appear reddish brown. The head and wing cases are unspotted; the spike on the tail is short and of the same general coloration.—REGINALD E. G. SMITH, 105, Northcourt Avenue, Reading.

Euvanessa antiopa.—On July 9th outside this house, *Pyrameis atalanta* was fluttering over the muddy gutter resulting from a leaky water pipe. This morning, July 24th, after 11 a.m. when I was leaving the house, I saw *E. antiopa* over the same gutter. As it settled I captured it, easily, with my thumb and finger. I returned to the house and placed the "Camberwell Beauty" butterfly under a darkened belljar.—H. E. BARREN, 78, Lyndhurst Rd., S.E.15.

[It is quite interesting to hear of a Camberwell Beauty once again after so many years being taken in Camberwell.—Hy. J. T.]

TEREDUS NITIDUS, F., IN COMPANY WITH ANTS.—As to whether *Teredus* is really a myrmecophilous beetle I have my doubts; nevertheless I find on looking up my various captures of this insect in Windsor

Forest that on every occasion, where more than one specimen was taken, the same tree was inhabited by the ant *A. (D.) brunneus*.

The remains of this beetle, which I first found at Windsor in 1924, were under bark, and in frass, etc., of trees in which *brunneus* was dwelling. Even a chestnut tree, in which in a burrow of *Callidium variabile* I found one *Teredus*, also harboured *brunneus*. Last year I recorded it in great numbers in an oak log with the same ant. The beetle occurred in the borings in company with the ants' brood. The log in question was eventually burnt; but we had collected from it over 200 of the beetle to give to other Coleopterists.

This year we have again found it in great numbers in the workings of, and with, the same ant in a large oak tree—over 60 specimens of the beetle were taken in a few minutes. I shall be glad again to distribute specimens to anyone to whom I did not give it last year, or whose series I did not fill up.

In this last tree the following wood-boring beetles occur:—*Xestobium tessellatum*, *Ptilinus pectinicornis* (some examples of *Teredus* being found in its borings) and *Anobium domesticum*.

Dryocetes villosus, the supposed chief if not the only host of *Teredus*, we have seldom found in the same tree with it.—HORACE DONISTHORPE.

AROMIA MOSCHATA, L. AB. **versicolorea** new ab.—Head black with blue and green reflections, antennae with basal joint black, the rest violet; thorax black, spines at sides and raised portions on upper half of disc greenish blue, disc and lower raised portions purple—all shining and metallic; scutellum purple; elytra dull, purple, shoulders, sides and apex shot with greenish blue, legs blue. The general effect is that of a blue insect.

I took this aberration of the "Musk Beetle" at the foot of a small willow, a little way up the undercliff at Luccombe Chine, I of W., on September 10th, 1922.

According to Reitter the typical form is metallic green; the ab. *cuprata*, Reitt., is copper-red, with black green, or black blue antennae and legs (I have this and the typical form in my British Collection); ab. *nigrocyanea*, Reitt., is unicolorous dark blue; ab. *nigra*, Schilsky, is all black with feeble green or blue sheen; ab. *picipes*, Reitt., is black with feeble metallic sheen, with reddish brown legs and black brown antennae.—HORACE DONISTHORPE.

LARVAE OF PHRYXUS LIVORNICA AND HELIOTHIS PELTIGERA IN KENT IN 1931.—During the latter part of July I paid a two days visit to the E. Kent coast, where I met Mr. G. W. Wynn, the object of our visit being the larvae of several species of local Noctua. Being quickly successful in our search and having time to spare, we paid a visit to a spot at which, in 1928, the larvae of *H. peltigera* had been very abundant, although I failed to find any there in 1929, or 1930. This time, however, we found these larvae there again very abundant and scattered over a wide area. Some were fullfed and others so small that their presence was not suspected until they appeared 5 or 6 days later on the reserve foodplant which had been cut and put in water.

As was remarked in 1928, when *Senecio viscosus* is present in a locality, it is useless to look for larvae of *peltigera* on anything else. I carefully examined a large patch of *Ononis arvensis* growing close to

the *Senecio*, without finding a single larva. Had it been as attractive to the ovipositing moths as the *Senecio* it would have contained scores of larvae.

When the supply of foodplant brought home had given out, I tried to continue the larvae which remained above ground, on the various plants given in the text books as suitable food, offering *Senecio jacobaea*, *S. vulgaris*, *Matricaria inodora* and *M. maritima* and flowers of *Calyptegia soldanella* and *Convolvulus arvensis*. These all being merely nibbled at and not wishing to lose these last larvae I paid a trip to the coast and obtained a supply of *Oronis*, and also gave them flowers of *Anthirrhinum*, but the larvae were not interested and died off, from which it would seem that once a larva starts on the *Senecio* none of the above plants is an acceptable substitute.

Having seen enough of *peltigera* we decided to visit another locality and cut some pupae of *Nonagria sparganii* and were about to leave when we came upon a patch of White Bedstraw (*Galium mullugo*) upon which two large and magnificently coloured "Hawk" larvae were feeding, fully exposed in the bright sunlight.

We thought these must be *P. livornica*, from their size, and our plans at once underwent a complete revision and we began an intensive search of the immediate neighbourhood, examining all the supposed food plants of this species, such as Dock and Toadflax, as well as any species of *Galium* we could find, but without further success until we had travelled at least a mile, when another patch of *G. mullugo* on a bank produced two more larvae, one much larger than the other and very differently coloured from the first two, after which we examined *Galium* only. Several hours elapsed before we found any more of these larvae but by the end of the day we had a combined take of 10. During the search we had found a number of patches of the foodplant which gave evidence that there had recently been a larva, where no larva was, and although of course the larvae of *Macroglossum stellatarum* were plentiful, we were sure from the extent of the feeding and the frass, that a number of *livornica* larvae had recently gone down.

The larvae varied so much in colour that I suspected that we had more than one species and imagined some would prove to be *Celerio galii*, but Mr. Wynn held the view that all were *livornica* and this view proved to be correct.

The following table will give some idea as to the extent of the variation of the larvae of this species.

Larva.	A	B	C
Length of full grown larva	3 $\frac{7}{8}$ in.	3 $\frac{1}{2}$ in.	3 $\frac{3}{8}$ in.
Ground colour	bright emerald green	deep yellow	olive green
Medio dorsal stripe	pinkish white, black edged	pink, brown edged	black
Lateral stripes	paler than ground colour, no darker border	, ,	pale yellow
Eye-like spots	pink, black edged	yellow, black edged	orange
Head & anal claspers	mauve	red	jet black
Belly	dirty white	dirty white	pinkish white
Horn	black and red	black and red	black and red

Each larva as it ceased to feed carried on the same seemingly endless promenade around the large breeding cage. I gave them dry earth, wet earth, stones, sand, moss, etc., but it was not the soil conditions which were wrong, but simply that this wandering (which continued for 48 hours) was natural at least in a larva finding itself imprisoned within narrow limits.

I watched these larvae "make their beds." Having decided at long last upon some special spot, the larva moved its head and front segments about from right to left and vice versa pressing down into the loose earth, which was scooped out and a shallow crater formed. Having composed itself within this hollow the larva would fasten a few strands of the foodplant to the edge of this crater and then lie still to undergo the transformation in this seemingly most inadequate substitute for a cocoon. I was able to see every change that took place quite plainly through the glass top without touching the box. Pupation took place on the 7th or 8th day after a larva entered the puparium. These pupae were at first very pale yellow and transparent-looking, but in a few days became darker yellow and more solid in appearance.—A. J. WIGHTMAN, (F.E.S.), Aurigo, Pulborough, Sussex.

CURRENT NOTES AND SHORT NOTICES.

In the *Int. Ent. Zt.* for April E. Brombacher gives an account of the occurrence of *Nonagria geminipuncta* in the neighbourhood of Freiburg with numerous observations on the life-history. He describes and illustrates a case of four larvae pupating in the same stem, the female above and three males below. There were two entrance holes, one for the female larva and the other for the three male larvae. The same number contains an article on the *Oporinia dilutata autumnata* forms with a plate of 17 figures of imagines, and 3 text diagrams showing the best and ready way of distinguishing the three species *autumnata*, *dilutata* and *christyi*.

In the continuation of his study of the *Hydraecia nictitans* group of Noctuae in the April *Ent. Zeit.*, Dr. Heydemann gives a very useful plate of 26 figures of imagines of *oculea (nictitans)*, *fucosa (paludis)*, *crinanensis* and *lucens*. In the succeeding number the author gives a plate of 21 figures to illustrate the variability of the female appendages from different localities of the two species *fucosa (paludis)* and *lucens*.

In the *Int. Ent. Zeit.* for May and June G. Warnecke discusses the relation of *Cidaria (Xanthorhoe) ferrugata* and *spadicearia*, which latter he shows is not a form of the former, but a distinct species. There is a plate of 16 figures of imagines and several text-figures.

In the *Stett. Ent. Zeit.* Heft. I. 1931, Dr. Urbahn gives an account of the history and habits of *Coenobia rufa*, with a plate of 18 figures, and refers to the work of Edelsten and Bankes in England.

The *Ent. News* for June contains an Obituary of the Late Prof. John Henry Comstock (1849-1931) who was connected with the great Cornell University from its birth and for more than 40 years taught within its walls.

In *L'Amat. de Pap.* for May, M. Lhomme contributes a purely literary article "The Dream of a Winter Evening," which is quite amusing.

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EXCHANGES.

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

Duplicates.—S. *Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—*Albimacula**, *sparganii**.

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

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of British Isles.—C. Zacher, Erfurt, Weimar, Street 13, Germany.

DUPLICATES.—Indian Butterflies.—A. F. Rosa, M.D., 4, Bellevue Crest, Edinburgh.

WANTED.—Seitz Macrolepidoptera, Vol. 5, Text only.—Rev. T. W. Adam, Riddlesworth Rectory, Diss.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 7th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. September 24th, October 8th, 22nd.—Hon. Secretary, Stanley Edwards, Avenue House, The Avenue, Blackheath; S.E. 3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. Visitors admitted by ticket which may be obtained through Members or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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GENUS *Acronycta* and its allies.—Variation of *Smerinthus tiliae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthenie*, and *aurelia*—The Doubleday collection—Parthenogenesis—Paper on *Taeniocampidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the Winter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist for 1890—Lifehistories of *Agrotis pyrophila*, *Epunda lichenea*, *Heliophobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc., 360 pp.

CONTENTS OF VOL. II.

MELANISM AND MELANOCHROISM—Bibliography—Notes on Collecting—Articles on VARIATION (many)—How to breed *Agrotis lunigera*, *Sesia sphegiformis*, *Taeniocampa opima*—Collecting on the Norfolk Broads—Wing development—Hybridising *Amphidasys prodromaria* and *A. betularia*—Melanism and Temperature—Differentiation of *Dianthacis*—Disuse of wings—Fauna of Dulwich, Sidmouth, S. London—Generic nomenclature and the *Acronyctidae*—A fortnight at Rannoch—Heredity in Lepidoptera—Notes on Genus *ZYGENA* (*Anthrocera*)—Hybrids—Hymenoptera—Lifehistory of *Gonophora derasa*, etc., etc., 312 pp.

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

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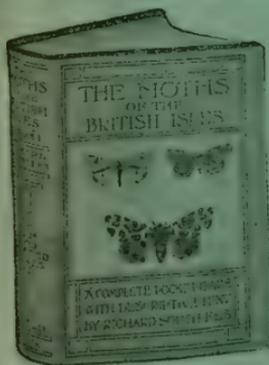
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Notes and Additions to the List of the Lepidoptera of Digne (Basses-Alps).

By Wm. FASSNIDGE, M.A., F.E.S.

(Concluded from p. 122.)

Heinrich's List, as its title shows, stops short at the so-called microlepidoptera, although it includes a few genera which modern systems of classification place among them. All species of *Pyralidina*, *Tortricina*, and *Tineina* captured by me at Digne are here given, in the hope that their publication may be of use to some future compiler of a complete List of the Lepidoptera of Digne. For the *Pyralidina* the order and nomenclature are those of the *Catalogue des Lépidoptères Français* by Monsieur Léon Lhomme, which is in course of publication in parts, and has now reached nearly to the end of the *Geometridae*. I am indebted to Monsieur Lhomme for kindly communicating to me his MS. List of the *Pyralidina* and also for identifying a number of insects belonging to this group. The few captures among the *Tortricina* and *Tineina* are listed in the order of the *Catalog* of Staudinger and Rebel, 1901.

- Hypsotropha vulneratella*, Z.—A few, 2.viii.30.
Anerastia lotella, Hb.—A few, 6.viii.30.
Ematheudes punctella, Tr.—One specimen, 10.viii.30.
Plodia interpunctella, Hb.—A few indoors, 23.viii.30.
Ephestia kuehniella, Z.—Scarce in the Minoterie Moderne, 6.viii.30.
E. tephriella, Led.—A few at light, 27.viii.30.
Homoeosoma sinuella, Fb.—Fairly common, 5.viii.30.
H. binaevella, Hb.—A few at light, 29.viii.30.
H. nimbella, Dup.—Very common at light, 1.viii.30.
Nyctegretis achatinella, H.S.—Common at light, 6.viii.30.
Ancylois cinnamomella, Dup.—A few, 25.viii.30.
Alispa angustella, Hb.—One specimen at light, 3.viii.30, probably quite common.
Pempelia dilutella, Hb.—Common at light, 4.viii.30.
P. italogallicella, Mill.—A few, 26.viii.30.
P. transversella, Dup.—A few, 20.iv.29.; 5.viii.30.
Cateremna terebrella, Zk.—Larvae in spruce cones at the Villa Mexico, bred 9.ix.30.
Seeboldia koryosella, Rag.—One specimen, 12.iv.29.
Asartodes monspessulalis, Dup.—A few, 20.iv.29.
Laodomia combustella, H.S.—A few at light, 6.viii.30.
Epischnia prodromella, Hb.—A few at light, 20.viii.30.
Brephia compositella, Tr.—A few, 12.iv.29.
Psorosa palumbella, Schiff.—Fairly common at light, 8.viii.30.
P. albariella, Z. var. *dilucida*, Stgr.—One specimen at light, 6.viii.30.
P. alpigella, Dup.—Common on the Cousson, 3.viii.30.
Nephopteryx semirubella, Sc.—Common, 18.viii.30.
N. formosa, Hw.—One specimen, 29.viii.30.
N. obductella, Z.—A few at light, 12.iv.29.; 23.viii.30.
Megasis rippertella, Z.—One specimen, 12.iv.29.
Selayia spadicella, Hb.—One specimen, 29.viii.30.
Acrobasis consociella, Hb.—A dark form, 3.viii.30.

- A. sodalella*, Z.—A few at light, 3.viii.30.
A. tumidana, Schiff.—Fairly common at light, 2.viii.30.
A. glaucella, Stgr.—Common at light, 4.viii.30.
A. fallouella, Rag.—A few at light, 12.viii.30.
Myelois hispanicella, H.S.—One specimen, 3.viii.30.
M. constanti, Rag.—A few at light, 2.viii.30.
Phycita spissicella, Fb.—Fairly common, 4.viii.30.
P. coronatella, Gn.—One specimen at light, 29.viii.30.
P. splendidella, H.S.—Three specimens at light, 27.viii.30. This is the insect I have bred from pupae found in resinous excrescences on *Pinus maritimus* in the Gironde.
P. abietella, Schiff.—Larvae common in spruce cones at the Villa Mexico.
Eurhodope marmorea, Hw.—A few at light, 2.viii.30.
F. advenella, Zk.—A few at light, 2.viii.30.
Crambus inquinatellus, Schiff.—Common, 13.viii.30.
C. contaminellus, Hb.—Fairly common, 26.viii.30.
C. tristellus, Schiff.—Common, 13.viii.30.
C. selasellus, Hb.—Common, 9.viii.30.
C. saxonellus, Zk.—Two specimens at light, 7.viii.30.
C. fulgidellus, Hb.—One specimen, 30.viii.30.
C. conchellus, Schiff.—A few, 26.viii.30.
C. pinellus, L.—Common, 3.viii.30.
C. falsellus, Schiff.—Common at light, 1.viii.30.
C. chrysonuchellus, Sc.—Very common, April, 1929.
C. cespitellus, Hb. var. *hortuellus*, Hb.—Fairly common, 1.viii.30.
C. silvellus, Hb.—One specimen at light, 28.viii.30.
Argyria alpinellus, Hb.—Common at light, 20.viii.30.
Ommatopteryx bella, Hb.—Fairly common at light, 10.viii.30.
Ancylolomia tentaculella, Hb.—Probably common but I overlooked it, 6.viii.30.
A. palpella, Schiff.—Common, 1.viii.30.
Endotracha flammealis, Schiff.—Common, 1.viii.30.
Aglyssa pinguinalis, L.—A few, 9.viii.30.
A. cuprealis, Hb.—A few, 3.viii.30.
Hypsopygia costalis, Fb.—A few at light and sugar, 8.viii.30.
Asopia farinalis, L.—A few at light and indoors, 27.viii.30.
Herculia glaucinalis, L.—A few at light and sugar, 3.viii.30.
Actenia brunnealis, Tr.—Both ♂♂ and ♀♀ came freely to light, 23.viii.30.
A. boryyialis, Dup.—A few at light, 1.viii.30.
Botys angustalis, Schiff.—Very common at light, 1.viii.30.
Steniabrugieralis, Dup.—A few at light, 2.viii.30.
S. punctalis, Schiff.—Very common at light, 3.viii.30.
Scoparia crataegella, Hb.—Common at light, 8.viii.30.
Lyptotigris ruralis, Sc.—A few, 12.viii.30.
Margaronia unionalis, Hb.—A few at light, 26.viii.30.
Orobenia sophialis, Fb.—A few, 3.viii.30.
O. frumentalis, L.—A few, 23.viii.30.
O. extimalis, Sc.—One specimen, 26.viii.30.
O. politalis, Schiff.—Two specimens, 2.viii.30.
Nomophila noctuella, Schiff.—Not common, August, 1930.
Phlyctaenodes palealis, Schiff.—Fairly common, 1.viii.30.

- P. verticalis*, L.—Fairly common, 9.viii.30.
Diasemia litterata, Sc.—A few at light, 17.viii.30.
Cynaeda dentalis, Schiff.—Scarce, 4.viii.30.
Metasia suppandalis, Hb.—Fairly common by day, 1.viii.30.
M. corsicalis, Dup.—A few at light, 6.viii.30.
M. ophialis, Tr.—A few at light, 4.viii.30.
Mesographa forficalis, L.—A few, 14.viii.30.
M. institalis, Hb.—Larvae fairly common in rolled up leaves of *Eryngium*, early August.
M. fimbriatilis, Dup.—A few, 6.viii.30.
M. martialis, Gn. (*ferrugalis*, Hb.)—Very common, 6.viii.30.
M. crocealis, Hb.—Fairly common, 1.viii.30.
M. verbascalis, Schiff.—A few, 20.viii.30.
M. numeralis, Hb.—A few, 26.viii.30.
Pyrausta terrealis, Tr.—A few, 6.viii.30.
P. sambucalis, Schiff.—A few at light, 20.viii.30.
P. repandalis, Schiff.—One specimen at light, 26.viii.30.
P. trinulis, Schiff.—One specimen, 2.viii.30.
P. nubilalis, Hb.—A few, 23.viii.30.
P. asinalis, Hb.—Signs of feeding on the madder plants.
P. cespitalis, Schiff.—Common, 18.iv.29; 2.viii.30.
P. sanguinalis, L.—A few, 2.viii.30.
P. castalis, Tr.—Common at light, 2.viii.30.
P. purpuralis, L.—Common, 25.iv.29; 1.viii.30.
P. aurata, Sc.—A few, 29.viii.30.
P. cingulata, L.—Common at light, 4.viii.30.
P. funebris, Ström.—Very common, 2.viii.30.
Noctuella floralis, Hb.—Two specimens, 25.iv.29. Probably overlooked among crowds of *P. cespitalis*.
Heliothela atralis, Hb.—Two specimens, 4.viii.30.
Aphomia sociella, L.—Common at light, 10.viii.30.

PTEROPHORIDÆ = ALUCITIDÆ.

- Oxyptilus pilosellæ*, Z.—Fairly common, 8.viii.30.
O. teucree, Jordan = *heterodactylus*, Vill.—Fairly common, 4.viii.30.
Platyptilia zetterstedti, Z. = *calodactyla*, Schiff.—Fairly common, 3.viii.30.
P. acanthodactylus, Hb. = *cosmodactyla*, Hb.—Common, 4.viii.30.
Alucita pentadactyla, L.—Common, 8.viii.30.
A. xanthodactyla, Tr.—Fairly common, 2.viii.30.
Marasmarcha phaeodactyla, Hb. = *lunaedactyla*, Haw.—Very common, 31.v.i.30.
Pterophorus monodactylus, L.—Fairly common, 3.viii.30.
Stenoptilia bipunctidactyla, Hw.—Common, 31.vii.30.

TORTRICINA.

- Acalla hastiana*, L.—One bred, 10.viii.30
A. boscana, Fb.—One worn specimen, 13.viii.30.
A. literana, L.—One specimen on the Cousson, 9.viii.30.
Dichelia gnomana, Cl.—A few, 12.viii.30.
Oenophthira pilleriana, Schiff.—Common in hedges, 2.viii.30.
Cacoecia unifasciana, Dup.—Common, 1.viii.30.

- Pandemis heparana*, Schiff.—Common, 23.viii.30.
Eulia politana, Hw.—A few, April, 1929; 2.viii.30.
Tortrix pronubana, Hb.—Scarce, 18.viii.30.
Cnephasia peuziana, Thnb.—Fairly common, 8.viii.30.
Lozopera dilucidana, Steph.—Common at light and by day, 4.viii.30.
Conchylis maritimana, Gn.—One specimen, 13.viii.30.
C. subroseana, Hw.—Common at light, 12.viii.30.
Euxanthis meridiana, Stgr.—A few, 10.viii.30.
E. angustana, Hb.—Common at light, 2.viii.30.
Olothreutes salicella, L.—One specimen, 13.viii.30.
O. rivulana, Sc.—A few, 14.viii.30.
Steganoptycha pauperana, Dup.—A few beaten from rose, April 1929.
S. nigromaculana, Hw.—A few, 6.viii.30.
S. trimaculana, Don.—A few, 12.ix.30.
Gypsonoma aceriana, Dup.—A few, 3.viii.30.
Semasia conterminana, H.-S.—Fairly common at light, 2.viii.30.
Notocelia incarnatana, Hb.—One specimen, 29.viii.30.
Epiblema pflugiana, Hw.—A few, 2.viii.30.
Grapholitha succedana, Fröl.—Common, 4.viii.30.
G. internana, Gn.—A few, April, 1929; 29.viii.30.
G. janthinana, Dup.—A few, 1.viii.30.
Pamena splendidulana, Gn.—Common, April, 1929.
P. pinetana, Schläg.—A few, 25.iv.29.
P. rhediella, Cl.—One specimen, April, 1929.
Carpocapsa pomonella, L.—Fairly common at light, 4.viii.30.
C. grossana, Hw.—A few, 29.viii.30.
Ancyliis comptana, Fröl.—A few, 4.viii.30.

TINEINA.

- Simaethis nemorana*, Hb.—A few, April, 1929; 1.viii.30.
S. pariana, Cl.—One specimen, April, 1929.
Hyponomeuta plumbellus, Schiff.—A few, 1.viii.30.
H. malinella, Z.—Very common on fruit trees, August, 1930.
H. cognatellus, Hb.—Common, 3.vii.30.
Cerostoma sylvella, L.—A few, 12.ix.30.
C. persicella, Fb.—A few, 6.viii.30.
Metzneria neuroptella, Z.—A few, 29.viii.30.
lita ocellatella, Boyd.—15.iv.29.
Acompsia tripunctella, Schiff.—12.viii.30.
Anacampsis vorticella, Sc.—16.iv.29.
Stomopteryx detersella, Z.—12.viii.30.
Nothris verbascella, Hb.—Larvae common, 9.ix.30.
Symmoca signatella, H.-S.—4.viii.30.
Oecogonia quadripunctata, Hw.—2.viii.30.
Pleurota schlägeriella, Z.—Very common, 31.vii.30.
P. bicostella, Cl.—April, 1929.
Psecadia bipunctella, Fb.—A few, April, 1929; 2.viii.30.
Depressaria costosa, Hw.—A few, 27.viii.30.
D. prostratella, Const.—9.ix.30.
D. nanatella, Stt.—7.viii.30.
D. rutana, Fb.—27.viii.30.

- D. libanotidella*, Schläg.—2.viii.30.
Carcina quercana, Fb.—13.viii.30.
Lecithocera luticornella, Z.—2.viii.30.
Borkhausenia pseudospretella, Stt.—Common in houses.
Pancalia leuvenhoekella, L.—15.iv.29.
Coleophora cuprariella, Z.—25.iv.29.
Gelechia ocymoidella, Wals.—25.iv.29.
Melasina lugubris, Hb.—20.viii.30.

Draguignan and St. Aygulf, Var. France as collecting centres in April-May, 1930.

By Lieut. E. B. ASHBY, F.E.S., F.Z.S.

(Concluded from page 133.)

April 27th.—This afternoon I collected alongside a long sheet of sea water to the north of the line at St. Aygulf. *L. sinapis* was really common under the low trees amongst bushy herbage and I took 2 very fresh specimens of the spring brood of *Bombyx pulchella*; a female of *Glaucopsyche cyllarus*; and several beetles, among them *Pimelia bipunctata*; *Bostrichus capucinus*, L.; *Tentyria mucronata*, Stev., were taken on the sand of the sea-shore, where I also took a specimen of *Empusa egena*, to the great joy of the children who were staying at the Grand Hotel for the Easter holidays. The day was fine and hot.

April 28th.—To Agay. Unfortunately the sun never shone except fitfully the whole day. Hunting for ant-lion larvae at the locality indicated by Mr. H. Main was fruitless. Ascending one of the hills bestrewn with flowers to the north of the railway I took a freshly emerged specimen of *Hemaris fuciformis*; some nice Hymenoptera including *Odynerus sinuatus*, Fabr.; the Rhyncotid *Lygaeus savatalis*; one specimen of *Pararge aegeria*; the Diptera *Chloromyia formosa* and a male specimen of *Merodon clavipes*, Fabr., the Coleoptera *Tennochila coerulea*, Oliv.; *Cetonia aurata*; *Clythra tridentata*, L.; *Crioceris asparagi*, L.; and *Chrysomela cerealis*, L.; the Ryncotid *Triecophora sanguinolenta*.

April 29th.—After heavy rain early, the day improved. The Plage at St. Aygulf produced the following Coleoptera, *Cicindela flexuosa*, F.; *C. sampestris*, L.; *Ischnomera coerulea*, L.; *Silpha laevigata*, F.; *Telephorus rusticus*, L.; *Phyllobius pyri*, L.; and the Rhyncotid *Pyrhocoris apterus*, *Dolycoris baccarum*, L.; the Hymenopteron *Tiphia olcesia*.

The mouth of the Argens river right bank, some distance farther east, produced the following Hymenoptera, *Melecta luctuosa*, Scop.; *Arge enodis*; *Macrophya rustica*; *Polistes gallica*; *Eumenes mediterranea*, Kriecht.; *Ctenichneumon castigator*, Grav., ♂, and *Psammochares fuscus*, L.; together with 2 good *Z. cassandra* and odd specimens of *P. icarus*, *L. sinapis*, and *Erynnis alcaeeae*. Pupae gathered to-day on grass stems produced *Zygaena stoechadis* at Hounslow from May 28th.

April 30th.—To Agay. Out behind the railway station on to a road leading to the Col de Trayas, kindly indicated to me previously by Mr. Symes, I found *Melitaea cinxia* and *M. aurinia* var. *provincialis*, really abundant and beautifully fresh here and there; further on I met with *Limenitis rivularis*, *P. aegeria*, *Glaucopsyche melanops*.

Further on still after crossing a bridge over a stream, I mounted an incline on the road and came to a Maison Forestière, on right. Continuing down a slope the valley expanded and I found the plant *Aristolochia pistalochia* scattered about in some abundance and then sure enough I netted 5 *Zerynthia* (*Thais*) *medesicaste*. Much the hottest day so far which finished by a severe thunderstorm about 9 p.m. at St. Aygulf. I also took some nice Rhyncota and Hymenoptera to-day.

May 2nd.—To Cogolin, changing at La Foux. But a north wind, added to the fact that most of my best collecting ground of May, 1929 was largely soaked and in some cases still under water, rendered my bag for the day a very small one; the most interesting features being 4 fresh males of *Z. cassandra*; and the Coleoptera *Clytus arietis*, L.; *Onthophagus taurus*; Fab., ♂; *Adelocera punctata*; *Psoa dubia*, Rossi. = *italica*, Dej.; also the Hymenopteron *Utenichneumon castigator*, Grav., ♂, and the Rhyncotid *Tricophora vulnerata*, Germ.

May 3rd.—At St. Maxime to-day insects were not disposed to fly owing to the cold atmosphere even under a brilliant morning sun. 1 *P. machaon*, 1 *E. belia* var. *ausonia* were taken. About 2 p.m. a violent thunderstorm with lightning and heavy rain which lasted for 2½ hours. Just before the storm started I again found a good male of *Zerynthia medesicaste* settled in a position which would have given it no real protection against the storm, a palpable proof of how insects get spoilt by bad weather. The Rhyncotid *Carpocoris fuscispinus*, Boh.

May 4th.—To Agay, and I think, the first day of summer! To the *medesicaste* ground beyond the Maison Forestière, where beside the broad river bed I got 9 good specimens of *Z. medesicaste* by about 12.30 p.m. In this area *Z. cassandra* was sometimes flying with its congener, an unusual occurrence. *Aristolochia pistalochia* is fairly widely distributed at the sides of this river bed, the area beyond and below the Maison Forestière which is perched up on an eminence being most frequented by *Z. medesicaste*. I took a female of *M. aurinia* var. *provincialis*; and the Dipteron *Dioctria oelandica*, and a fresh female of *Athalia glabricollis*, Thomson. Imagines of the latter genus are badly wanted by Mr. Benson of the Hymenoptera Dept., South Kensington Museum, for study. I also took a male of *Hylotoma cyanocrocea*, Forster.

May 6th.—At Le Muy to-day; the sun shone clearly for about 1 minute during which I was able to secure a fine fresh specimen of *Hesperia sidae*, and saw others. I had to content myself with collecting Coleoptera along the gorge, amongst which I have identified the following; *Cicindela campestris*, F.; *Ischnomera coerulea*, F.; *Oxytherea sticticum* = *funesta*, Poda.; *Arinea marginata*; *Valgus hemipterus*, L.; *Exosoma lusitanica*, L.; *Capnodis tenebrionis*, L.; *Psilothrix nobilis*, Ill.; the abundant *Chrysomela hyperici*, Forst.; *Crioceris 12-punctata*, L.; *Oedemera flavipes*, F., ♂; *Galerucella lineola*, F., and larva, possibly of *Silpha quadripunctata*; also the Rhyncota *Tricophora vulnerata*, Germ.; *Spilostethrus equestris*, L.; *Graphosoma lineata*; *Syromastes marginatus*, L.; *Eurygaster austriacus*, Schk.; *Cornutus centrotus*; *Lygaeus leucopterus*; also the Hymenoptera *Tenthredo meridiana*, ♂, *Utenichneumon radatorius*, Illig., ♀, and the Neuropteron *Calopteryx splendens*, Harr.

May 7th.—To Agay. A strong wind from the south-east prevented insects in general from flying. I saw 1 specimen of *H. sidae* near the *medesicaste* ground and I took one fresh specimen of *Zygaena lavandulae* var. *consobrina*, Germ., and saw one or two others on the wing. A large number of *M. aurinia* var. *provincialis* were resting on bushes, as well as *P. astrarche* on flower heads. *T. medesicaste* did not rise. It is apparently much more difficult to find than *T. cassandra* when at rest. *Hesperia sertorius*, *H. (sao)* were fresh and on the increase. I also took the Diptera *Xanthogramma ornatus*, Meig.; and a female of *Bibio hortulanus*, L., and the Rhyncota *Verlusia rhombea* var. *quadrata*, Fab., and *Rhinocoris erythropus*, L., with the Geometer moth *Eucosmia (Scotosia) certata*, Hübn.

May 8th.—At St. Aygulf to-day *L. sinapis* and *M. cinxia* were still fresh. I took one specimen, the only one I saw here, of *Hesperia sidae* quite fresh between the Sud-railway and the area of rushes west of the big sheet of salt water which is now separated from the sea by the Plage. From the 3 records I have made of *H. sidae*, it appears to occur in this district over a wide area, but as it is seemingly only just emerging I cannot say at in what abundance it normally occurs when in full flight. I took a specimen to-day of the Hymenopteron *Allantus (Tenthredo) dahlii*, Klug.; also the Bee *Anthidium laterale*=*A. lobum*; and 2 males of the *Ichneumon*, *Cryptus obscurus*, Grav.; *Ctenichneumon vadatorius*, Illig., ♂; also specimens of the Coleoptera *Ateuchus semipunctatus*, Fabr.; and also *Chrysomela hyperica*, Forst.; and *Opatrum sabulosum*, L.

May 9th.—I left St. Aygulf for London this morning, having set 400 insects in a period of 20 days actual collecting, of which only 5 days were fine throughout the day.

Again my best thanks to those many naturalists who have helped me most kindly to verify the names of insects mentioned in this article.

The specific names and the Geographical Variations of *Melitaea parthenoides*, Kef. (=parthenie, auct. nec Borkh.) and of *parthenie*, Borkh. (=aurelia, Nickerl).

By ROGER VERITY, M.D.

(Continued from page 140.)

II. Geographical variations of *exerge* or *species varia*, Meyer-Dür:—

The nominotypical *varia* is the race of the Grisons ("eastern Bündner Alps, quite near the middle of the glacier-region, at 6,000 or 7,000 ft."), which spreads to the Tyrol and the Upper Adige; it is the most extreme glacial form, of very small size, frail and thinly scaled, so that some females are quite translucent; the black pattern of the male is very thin and partly obliterated; most of the females have the greater part of the wings dusted more or less thickly with grey or black scales and they often exhibit a distinct greenish sheen; on the underside of the hindwings the central white space, or row of spaces, is of a perfectly pure tone and glossy. It is rather surprising no one should as yet have recorded the fact that this race does not exist at all in the western Alps, where it is replaced by another, with a decidedly different

aspect, less small, less frail and more brightly coloured, especially in the female sex. The specimens from the Valais figured by Herrich-Schäffer (figs. 270-4) give a good idea of about the nearest approach to the eastern *varia*, but further southward in the western Alps the difference becomes more pronounced and one also meets in some localities of the Maritime Alps, at comparatively low altitudes (800 to 1,600m.), with the race *piana*, Higgins, *The Entomologist*, 1930, p. 153, pl. II., which is quite twice as broad in expanse as Meyer-Dür's typical figure of *varia*, has broader wings and lacks the shining white underside space, replaced by yellow. Nevertheless Mr. Higgins, with whom I have corresponded about this matter, informs me he has dissected the genitalia and found them to be perfectly typical of *varia*. At the same time, but in a different spot of the neighbourhood of Limone, on the Col di Tenda, he has found *parthenoides*, Kef., so that he has discovered the locality one needed, in which the two come very close to each other and further observations carried on there with this particular view ought to settle definitely whether they are to be considered specifically distinct or not. I do not in the least wish to deny the importance of morphology, as Mr. Warren seems to think I am doing, but, as there exist very marked variations of structure within the range of specific groups, including the genitalia of insects (Warren has himself shown the surprising resemblance of the genitalia of the Spanish *Hesperia alveus* to those of *H. bellieri*, which in the Alps one can, on the contrary, separate at a glance), I fail to see how one can ever establish whether specific distinction exists or not, simply by comparing them. When its existence has been proved, morphology is, of course, the practical way of recognising one's specimens and the value of genitalia is that they reveal differences and analogies that one would not have suspected by other features, but sterility is the only definition which will set the specific conception on firm grounds and till naturalists all realise that the only proofs of specific distinction must be proofs of sterility between two groups of beings, or, at least, of their not interbreeding when they meet under natural conditions, there will be no clue as to what a species is and it will consequently be quite useless to discuss particular cases like that of the *Melitaea*. Constant hereditary morphological differences between two allied groups may suggest the possible existence of sterility between them, but so long as facts are not discovered which prove it, specific distinction cannot be considered certain.

Race *piana* is comparatively local; the most broadspread race at high altitudes in the Maritime Alps and in all the western ones, is the smaller one, different from the eastern *varia*, as mentioned above.

I propose naming it **variabella** on the strength of its larger size and beautiful colours, which by their extraordinary individual variations in the females, make a very pretty insect; the fulvous varies to a rich red tone on the one hand and to yellowish or pinkish or pure white on the other; the black pattern may be nearly entirely obliterated on all the wings, except the two or three marginal bands and some thin streaks on the nervures (form *mundata*, Trti. and Vrty., described in *cynthia*), or it may be so heavy and confluent as to reduce the fulvous or the white to one row of small round spaces across the wings, as in ab. *cymothoë*, Bertoloni (= *navarina*, Selys.) of *athalia*, or the pattern

may not be as thick, but a dark dusting covers most of the fulvous. I possess all these most striking forms, together with others, in my series from Clavières, which I select as "typical," from the Vallasco, 1700m. in the Maritime Alps, above Valdieri, from the mountains above Ventimiglia, and from St. Martin de Vésubie. A single female from Digne is larger and seems intermediate between *variabella* and *piana*, having also the same *parthenoides* pattern and colour as Higgin's figure, but the male is small and quite a *variabella*.

There remains to remark, in connection with *varia*, that Fruhstorfer has described from the Jura, near Neuveville (June), from the Bernese Oberland and from the Berne Canton, a race he has named *gilbon* and which he considered a "transition, connecting the specimens of southern Germany with the *varia* of the high Alps." He says the males are more conspicuous than any of his *varia* from Zermatt, the Simplon, the Engadin or Cogne, usually of a lighter tone than *varia*, but darker and with thinner black markings than the more showy individuals from Württemberg; the females are a near approach to the dark form of the high Alps; the pure white spaces of the underside, with a silvery sheen connects this race with *varia*. It is evidently extremely interesting and anybody who possesses specimens of it should have the genitalia dissected; if they are transitional between *parthenoides* and *varia*, *gilbon* is a synexerge and removes all possibility of considering them two species, just as race *synexergica*, Vrtý., of that very region has proved that *athalia* and *helvetica* = *pseudathalia* can only be exerges of the same species, because it has intermediate genitalia.

Race *varissima*, Vrtý., of very high altitudes (1200m. to 1800m.) in a few of the mountains of Central Italy which are more alpine in nature, such as the Piano Astore, near Bolognola, in the Sibillini Mountains of the Marche, whence I have described it, and the Gran Sasso in the Abruzzi, stands nearest to *variabella*. It differs from it by its lighter colouring in both sexes and on both surfaces of the wings, so that it has a less rich appearance; on the underside, however, the russet markings are more extensive and have a much clearer and brighter red tone; the black pattern is generally thinner and this is particularly striking on the upperside of the male sex; some females are quite as variegated as the Alpine ones both as regards the tone of fulvous and the black pattern; in the highly melanic individuals of this sex the basal suffusion invades most of the wing surface, but the actual pattern rarely becomes as thick as it often is in the Alps.

Race *reletaensis*, Ribbe = *nevadensis*, Spuler (homonym of Oberthür's *dejome*) of Central and Southern Spain, has an extremely distinct aspect of its own: the general appearance is usually very discoloured and more markedly so on the underside, where the russet colour is replaced by yellow of different shades; the black pattern varies very much in the male sex, as it may be thicker than it ever is in *varissima*, or extremely thin; most females have a thin pattern together with a yellowish and nearly white ground-colour and this combination makes them look very peculiar; highly melanic females do not exist, as in the preceding races.

III. Geographical and seasonal variations of *M. parthenie*, Borkh. = *aurelia*, Nickerl:—

There is no doubt that local races are anything but sharply distinct in this species, whereas individual variation is broad and striking everywhere in both sexes, so that it is not easy to define the features of the local aggregates and to classify them under definite names, although comparing large series of specimens from various localities one cannot deny that differences do exist between them. The chief reason for this blending of the races evidently is that the species has always kept entirely to one zone and precisely to the Northern one, so that it consists of a single exerge with constant hereditary factors and all its variations are probably due to the direct influence of different environments on the development of each individual; the species is apparently highly anabological and thus very susceptible to them, so that it shows their effects at once and it cannot face changes of climate greater than those occurring within the Northern Zone. Frubstorfer has erected several races and compared them carefully in a little monograph on *aurelia* in the *Archiv für Naturgeschichte*, 83, Abt. A, 3 Heft, p. 170 (July, 1919), but his descriptions show how broadly they must be taken; in the Valais, for instance, four series of specimens from different localities are said all to be different from each other and intermediate between nominotypical *parthenie* = *aurelia* and *rhaetica*, so that none could bear either of these names correctly. Nevertheless the collection I have before me confirms the distinctness of the races he has recorded and, apart from a few corrections, which further knowledge suggests, his monograph is excellent.

The most important remark to be made is that his race *marussia* of the Volga region must be removed and shifted to *M. britomartis*, Assm., as I have explained above, together with race *seminigra*, Seitz, which I have already shown to belong to that perfectly distinct species in the *Ent. Rec.* of last year.

Races *amurensis*, Stdgr., and *mongolica*, Stdgr. remain as the Asiatic ones of *parthenie* = *aurelia*. In connection with the second I am sorry to find that I have erected a synonym in replacing Staudinger's homonym by the name of *mongolicola* in the paper just mentioned: Wunkowsky had already made the same remark and substituted it by that of *centralasiae* in the *Zool. Anzeiger*, 1929, p. 222.

Races *valsunga*, Frhst. and *nigroobscura*, nom. nov. are the most melanic European ones, from Southern (Upper) Bavaria; *valsunga* is described from the Barmsee. Osthelder has made a special study of them in his *Schnett. Südbayerns* (*Mitt. Münchener Ent. Ges.*, 15, p. 89 of 1925) and figures a number of specimens, but unfortunately no undersides. He quotes Lenz's observations amounting to the fact that it is a strikingly different insect from the "*aurelia*" of northern Germany by its much lighter, greyish larva, and by the much darker butterfly on both surfaces of the wings; he notes particularly that the "Nymphalidae row of eyes," which I take here to be the russet spots, of the underside of the hindwings are often surrounded by a completely closed ring, whereas in "*aurelia*" this never happens and there is always the usual crescent around them. This feature, which is the most characteristic one of the form *dictynnoides*, Hormuz., of *Melitaea*

britomartis, Assm., now quite clearly made out to be a distinct species by the genitalia and by the other proofs I have pointed out in this *Journal* of last year, makes one wonder whether the latter species does not reach Southern Germany and has not been the chief cause of the difficulties entomologists have, apparently, all met with, when working out this group of *Melitaea* from that region. It seems likely that *britomartis* occurs there, as it does in Piedmont, quite close to genuine *parthenie*=*aurelia*, or possibly even mixed with them, as in the Ural Mountains. The genitalia alone can settle this question, as Suschkin has done with his specimens from the latter locality. Its remarkably variable aspect could easily have given rise to the hybrid theories, which parallel variation has often caused to be put forward as a label to embarrassing specimens, but which, in my experience, are scarcely ever correct.

Staudinger, followed by Seitz, had applied the name of *britomartis*, Assm., to the race of *parthenie*=*aurelia* from Southern Germany and made a thorough confusion of it with the true *britomartis* and its localities, admitting, however, he could make nothing of all this, by a series of interrogations. Fruhstorfer had pointed out this must be a mistake, because *britomartis* had been described from Silesia, where "*aurelia*" is quite similar to the nominotypical one of Bohemia, and he thus named the mountain form of the present race *valsungæ*. We, of course, now know that he was quite right in doing so, for the much more important reason that *britomartis* is another species. Unfortunately Lenz and Osthelder did not take the same view and they carry on Staudinger's mistake, as is usually done! They state this race spreads from the Alpine Valleys of Southern Bavaria to as far north as the Danube, at all altitudes, and that at Regensburg and in the Jura it is found mixed with the nominotypical *aurelia* form. Osthelder, moreover, makes a clear distinction between the small and dark "form of high altitudes" and the much larger one of lower localities and rightly applies Fruhstorfer's name, in a foot-note, to the former, which he illustrates on pl. III, fig. 4 and 5, where the forewing of the male measures 15mm. in length. He then figures two couples from Herrsching, which are very much larger (male 17mm. and female 18mm.) and highly melanic and which, it seems to me, ought to be designated as race **nigrobscura**, for it is one of the most extreme and striking forms produced by the species. His three specimens from Rohrseemoos of figs. 13-15 are much less heavily loaded with black and, apparently, answer the designation of *nigrobscura* trans. ad *aurelia*. Fruhstorfer refers one to Hübner's figs. 17 and 18 as exactly representing his *valsungæ*; there evidently is a *lapsus calami* for figs. 19 and 20 of the same plate, because 17 and 18 are really an *athalia*, as stated by Hübner in the text, page 7; he also very rightly says 19 and 20 are Borkhausen's *parthenie*, as in his days the misuse of this name had not begun; Fruhstorfer's statement that they are drawn from the lesser Bavarian race is perfectly correct too, the forewing measuring 15mm.

(To be continued.)

Recently-described Forms of British Species of Lepidoptera.

Melitaea aurinia, Rott. ab. *semigriseis*, Cab.—“The hindwings upperside are pale and discoloured, the usual black markings have become grey, and the antimarginal band has become yellow. The forewings are typical.” Hockai, Belgium. *Lamb.* XXXI. 3.

Venilia macularia ab. *krombhalzi*, Sternck.—“Marginal area widely golden-brown, basal area of the forewings also widely golden-brown.” The usual numerous spots are suffused into the band and basal area with one or two exceptions. Bohemia. *Int. Ent. Zeit.* XXV. p. 37 (1931) fig.

Timandra amata f. *canae*, Anton Schmidt.—A characteristic feature is the accentuation of the apical dash above and its obsolescence beneath. The ground colour is somewhat darker and of a more reddish ochre-yellow. *Int. Ent. Zt.* XXV. 57, 2 figs.

Bryophila (*Metachrostis*) *perla*, r. *gazeli*, D. Lucas.—Forewings with white, and not yellowish or greyish, ground as in other races, with the markings clearly impressed in black. The lower wings with the marginal band of a blackish grey. Corsica. *Bull. Soc. ent. France* 1931, p. 95.

Chiasmia elathrata, L. ab. *aequifasciata*, Jacquimin.—An equal number of bands on both fore and hindwings owing to the obsolescence of the basal band on the forewings. The bands present are more or less developed. Belgium. *Lamb.* XXXI. 22 (1931).

Chrysophanus dispar, Haw. race *batavus*, ab. ♀ *posticeoatrata*, Mezger.—“The hindwings are of a uniformly fine velvety black except for the antimarginal band which is normally developed.” Holland. *Lamb.* XXXI. 22 (1931).

Chrysophanus dispar, Haw. subsp. *rutilus*, Werne. ab. *hyalina*, Mezger.—“On the forewings above the red colour has become pale yellow, and the lower wings have a grey to grey brown tone. Below the forewings have the orange yellow modified to pale yellow and on the hindwings the grey coloration has remained, but the antimarginal bands are no more than very pale yellow and are badly developed.” Near Berlin. *Lamb.* XXXI. 23 (1931).

Chrysophanus dispar, Haw. subsp. *rutilus*, Werne. ab. *fulgurata*, Mezger.—“This aberration has on the underside of the forewings and below the median nervure from the base a black mark reaching nearly up to the middle of the wing.” Near Berlin. *Lamb.* XXXI. 23 (1931).

Coenonympha pamphilus, L. ab. *nigromarginata*, Lempke.—“A Dutch specimen in which the margin, instead of being a blackish brown, is of an extremely dark coloration.” *Lamb.* XXXI. 68 (1931).

Pieris rapae, L. ab. ♀ *conjuncta*, Mezger.—“The discal spot on the forewing is joined to the apical spot by a slight black line.” *Lamb.* XXXI. 82 (1931).

Aglais urticae, L. ab. *impuncta*, Lempke.—“The two discal spots of the forewings are wanting; all other characters are typical.” Belgium. The form *ichnusa* which similarly has the two discal spots absent is a particular subspecies peculiar to Sardinia and Corsica, whereas *impuncta* is purely an aberration. The ground colour of *ichnusa* is quite distinctive. *Lamb.* XXXI. 98 (1931).

NOTES ON COLLECTING, etc.

PHRYXUS LIVORNICA.—A fine specimen of *P. livornica* was brought to me the other day for identification. The specimen seemed to have just emerged from the pupa. It was found on waste ground near Milford, a village about 4 miles from Farnham by Mrs. Jones of Farnham, whose son, of 15 or 16, is a budding entomologist.—H. TUNALEY, (F.E.S.) "Castleton," Searle Rd., Farnham. (Sept. 18th.)

HELIOTHIS PELTIGERA AND MANDUCA ATROPOS IN CORNWALL.—On July 15th last I found in the garden a larva feeding on sage, which was new to me and could not be identified with any of the figures in Owen Wilson's "Larvae of the British Lepidoptera," but fitted Newman's description of the larva of *Polia flavicincta* fairly well, as it was sprinkled with white dots, but was rather dark velvety green instead of apple green and no reference was made to the bristly whitish hairs. As I had taken one *flavicincta* in the house on September 1929, I welcomed the prospect of more and kept a lookout for further larvae. On July 16th I found another on sage; on the 18th one large and one very small one on American Currant: on the 19th two on *Achillea eupatorium*: on the 20th another on sage; on the 22nd a fourth one on sage; eight in all. I was struck by the taste of these various larvae for such strong-flavoured plants and searched the mint for further specimens, but without success! I gave them sage and American currant and they fed up well, except that the small one and one of the others died. The remainder pupated and 2 nice *peltigera* emerged on September 3rd—a very great surprise! A third came out on the 9th, but was found to have the hindwings only half developed and crumpled. The remaining 3 are still pupae. Had I been aware of the identity of the larvae I could have looked on the restharrow in the neighbourhood and also on the marigold and our magnificent plant of deadly nightshade—probably the only one in Cornwall!—and I am rather sorry now that the *Senecio viscosus*, which was common in the garden when we arrived in 1928, had been cleared out with most of the other weeds. I see to-day that there are still two seedlings which shall be looked after with a view to further favours! I may add that these larvae remained green to the end and Buckler's green figure is not at all like them.

On August 19th one of the villagers found a fine yellow larva of *Manduca atropos* on a privet hedge and she sent it to me. I went to see where it had been found and the twigs round about were stripped of leaves, so it had evidently fed up on privet, an unusual foodplant, I believe, but has been recorded. The larva had a few mouthfuls of deadly nightshade with which it was supplied and went down on the 21st in a large flowerpot nearly full of soil.

On the following day the same woman gave me a larva of *Sphinx ligustri* which had been found near here and was obviously full-fed. This was provided with a pot full of soil but it had gone too far to burrow, and has since died without pupating.

On August 29th a nearly full-fed larva of *Smerinthus ocellata* was brought to me from a Tresillian garden; it fed on apple for three days and then went down in a pot of earth.

Both the *atropos* and the *ocellata* "carried on the same seemingly

endless promenade" as A. J. Wightman so aptly says (p. 144) around the inside of the pot for about 24 hours before going down. This appears to be characteristic of large Sphingid larvae and I have noticed it in *Biston betularia* and some others also, particularly those which feed on trees and shrubs. I have always thought that it represents the crawling necessary to descend from the foodplant—I have seen *Mimas tiliae* so descending lime trunks and an *ocellata* descending a poplar—and to find a suitable place in which to burrow. In our breeding cages, of course, there is no need for such perambulation, but no doubt the habit is a fixed one and has therefore become a sort of ritual without any excuse in some cases.—C. NICHOLSON, Tresillian, Cornwall.

Since the above was written I have heard of two brown larvae of *Eumorpha elenor* being seen in the village. One of these was in a garden and the woman of the house was particularly struck with its large black and white eyes; the other was found crawling on the road by a boy and eventually reached me. I tried it with willow-herb and bedstraw but it was evidently full fed and had probably done most of its perambulating, for it only travelled a little more around in a pot of earth, and then spun an apology for a cocoon under a piece of paper on the surface.—C.N.

CURRENT NOTES AND SHORT NOTICES.

A Meeting of the Entomological Club was held at Speldhurst Close on July 4th, 1931—Mr. H. Willoughby-Ellis in the Chair. The Members present were Mr. H. Willoughby-Ellis, Mr. Robert Adkin, Mr. Jas. E. Collin, Mr. H. Donisthorpe, Dr. Harry Eltringham, and Mr. W. J. Kaye. The Visitors were Messrs. Ernest E. Fox, E. E. Austen, F. Laing, W. H. T. Tams, B. W. Adkin, W. Rait-Smith, R. W. Kennedy, and Capt. N. D. Riley.

The guests arrived in the early afternoon, and were received by Mr. and Mrs. Willoughby-Ellis. A tour of the grounds and woods was made, during which a large number of Lepidopterous larvae were observed feeding on the many species of trees and shrubs, which are especially grown in the woods for the purpose. Tea was served in the house at 4 o'clock, and during the remainder of the afternoon the Chairman's large collection of Coleoptera, Lepidoptera and Hemiptera, and also the ornithological collections, were on view and were inspected with much interest. The Blatch collection of Coleoptera, which comprises most of the British species and is very rich in the smaller species of *Staphylinidae* received much attention. Supper was served at 6.30 p.m., after which Mr. Donisthorpe exhibited the following rare beetles:—*Cephemium edwardsi*, Donis., a species new to science, taken at Slapton Fey 13.vi.31. *Brachypterolus villiger*, Reitt., several taken at Dawlish Warren 12.vi.31.—only one specimen had been previously taken in Britain, at Bournemouth. *Ludius ferrugineus*, L., reared from larvae taken in Windsor Forest in 1929, emerged 18.vi.31, the right antenna being two-branched. *Malachius elegans*, Ol., ♂ and ♀, a species new to Britain taken at Slapton Fey 13.vi.31. Mr. Collin also reported that he had taken an *Anthomyid* fly new to Britain at the last Entomological meeting at Eastbourne, on *Silene maritima* growing

on the Crumbles. A long and very pleasant evening was spent. Some of the guests remained at Speldhurst Close for the week-end, the remainder leaving for their various destinations at a late hour.—H.W.-E.

The Annual Exhibition of the South London Society will be held on October 22nd at their rooms, Hibernia Chambers, London Bridge, S.E.1. Visitors are welcome especially if they bring exhibits with them. Forms for exhibitors may be obtained from Mr. S. N. A. Jacobs, "Ditching," Hayes Lane, Bromley, Kent. The forms if sent in will ensure that space is provided for the exhibits. This annual function is practically a Reunion of London entomologists and gives an opportunity for provincial brethren of the net and pin to meet and compare notes and show their treasures with mutual advantage. The invitation is given to all.

The *Supplement to the Palaearctic Section of Seitz Macrolepidoptera of the World* is slowly going on. Part 25 has just come to hand. It consists of 16 pp. and 1 pl. of 76 coloured figures of *Metachrostis* (*Bryophila*) and allied genera. The text completes the additional matter on these genera and includes our three native species *perla*, *muralis* and *algae*. The *Agrotinae* (*Euxoimae*) come next and we have a valuable introduction by Dr. A. Corti, whose collection of the species of this subfamily is the most complete in the world and whose knowledge of them is second to none. He does not agree with the views of Hampson and Warren on the classification of the Agrotids both of whom took no inspiration from the examination of the genitalia, and expresses himself in no measured terms on the inadvisability of multiplying the names of aberrations such as has been the case to such an extraordinary extent of late. One of the most important observations he has made is that he considers the structure of ♂ genital organs to be one of the most valuable helps in differentiating the Genera rather than the species. The British species reviewed in this part are the Agrotids *aquilina*, *obelisca*, *cursoria* and *nigricans* and will be illustrated by numerous figures on a future plate.

In the *Int. Ent. Zeit.* for July, Dr. Heydemann endeavours to prove that the Lycaenid *Plebeius insularis*, Leach (1893) is the *ismenias* of Meigen (1830). The article is well illustrated by a plate of 27 figures of imagines and another with 19 anatomical figures. It is unfortunate that the name *idas* is introduced after it has been shown over and over again to be absolutely invalid.

In the January number of *Lamb.* p. 5, our friendly correspondent M. Derenne has written a comprehensive account of *Polyommatus thersites*, *P. icarus*, ab. *icarinus*, and *P. alexius*, which places clearly before readers the characteristics of these three. In the same number M. Lempke continues his informative notes on the nomenclature of Rhopalocerous aberrations. From the references given it would appear that many of our ordinary aberrations have been named once or twice additionally.

The Annual Report of the Eton College Natural History Society, 1930-31, is quite up to the standard of the last, and is full of records and observations of its student members, with here and there contributions from the outside. The entomological matter has been well done. There is a list of the Lepidoptera of the District observed during 1928-30; a List of the Coleoptera in the summer of 1930; and

a List of Hymenoptera. All these lists have dates, localities and other particulars attached. There are 12 very well-executed plates and several text figures. The Report is a credit to those concerned in its production, and worthy of the College whose name it bears.

The huge *Lepidopterorum Catalogus* steadily continues its publication, 44 parts having now been produced. Part 43 *Satyridae*, I. This part appears to be one of the more perfect ones to which we have previously referred in this magazine. The lists of references are wonderfully complete and the current errors in the spelling of specific names to which we have recently called our readers attention are here treated in full detail. The *Coenonympha*, *Satyrus*, *Melanargia*, *Epinephele*, *Aphantopus*, *Pararge*, *Lethe* and allied genera are dealt with, the *Hebia* being deferred to the succeeding portion. Anyone doing detailed work on a species must of necessity consult all available references and an encyclopedic work of this nature no library of any pretence can afford to be without. The get up of the work is convenient for reference and as perfect as one expects from the well-known firm of Herr Dr. Wm. Junk.

The annual volume of the *Proceedings of the S. London Entomological Society* for 1930-31 (1931-32 in error) appeared somewhat earlier this year than of late. The Report of the Council tells us as usual that the condition of the Society is still "in a satisfactory condition," which statement is substantiated by the stable membership of about 250 and the Balance of "£86 carried forward" in the revenue account. The Society were unfortunate in losing their President-elect early in the year. He had been one of the most regular attenders at the meetings for many years. An excellent portrait of him is the frontispiece of the year. The two papers printed were (1) "The British Species of *Nonagria*" by H. M. Edelsten, F.E.S., and (2) "The Ova of British *Lepidoptera*." The latter deals with the Families in the so-called Bombyces and is illustrated by 3 plates of ova, excellent examples of the perfect work done by the author Mr. A. E. Tonge, F.E.S. Its a pity that the editor did not see that legends were attached to these plates and we hope that the omission may be rectified. The Annual Address was read by the retiring President Mr. C. N. Hawkins, F.E.S., who, after dealing with the objects of the Society at length, read a valuable paper on the "Numerical Variation in the Ecdyses of *Lepidopterous Larvae*." This is followed by more than 50 pages of matter, notes, and comments, mainly lepidopterous, on the exhibits at the twenty-three ordinary meetings of the year. An index both of the matter and specific conclude the record of the 59th year of the existence of this popular Society.

Vol. IV. of the *Bull. Ins. Royals d'Hist. Nat. a Sofia-Bulgaria* is a volume of outstanding merit dealing with the Fauna and Flora of Bulgaria. The first article gives the history of King Ferdinand II. as a naturalist generally and as an entomologist particularly. This is succeeded by another on the Royal entomological institution at Sofia, both being illustrated by most enlightening photographic illustrations. Articles follow dealing with Zoology and Botany of the country. Other contributions treat of *Coleoptera*, *Thysanura*, *Hymenoptera*, etc. The get up is excellent and there is no dearth of illustration where it is needed.

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Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
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sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—*Albimacula**, *sparganii**.

Desiderata.—Ova of *D.oo. pupae* of *X. gilvago*, *D. caesia*. *A. J. Wightman, "Aurago,"
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Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first
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EXCHANGES.—Living Eggs of *Catocala fraxini* and *sponsa*, exchange for butterflies of
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DUPLICATES.—Indian Butterflies.—*A. F. Rosa, M.D., 4, Bellevue Crest, Edinburgh.*

WANTED.—Seitz Macrolepidoptera, Vol. 5, Text only.—*Rev. T. W. Adam, Riddlesworth
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MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. October 21st, November 4th, 18th.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
October 22nd. Annual Exhibition. November 12th, 26th.—*Hon. Secretary, Stanley
Edwards, Avenue House, The Avenue, Blackheath, S.E.3.*

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On the "Illustrations of Varieties of British Lepidoptera" by
S. L. Mosley (1878-1885?).

By FRANCIS J. GRIFFIN, A.L.A.
(Registrar, Entomological Society of London.)

Illustrated works on the varieties of British Lepidoptera are not common, and Mosley's book, which was issued in a limited edition to subscribers only, has become very rare. The following notes give a collation of what is believed to be a complete copy of this work, so that interested persons may see what species have been dealt with. This copy, now in the Library of the Entomological Society of London, was formerly in the Library of W. F. Kirby, an original subscriber.

It still has the original wrappers preserved and bound in.

The dates of publication of the parts are given as far as I can at present determine them.

MOSLEY (S. L.).

Illustrations of varieties of British Lepidoptera. A series of hand-painted figures executed for subscribers only. 1. 8vo. Huddersfield (1878-1885?). T.P., 1+ [iv.] (mss. index)+73 (1, 1a, 2-72) pls. col., with explanations. XIV parts as under

- Pt. I. *Colias edusa* pl. 1.
Smerinthus populi pl. 1.
Callimorpha hera and *dominula* pl. 1.
Chelonia caja pl. 1.
Liparis dispar and *monacha* pl. 1.
Abraxas grossulariata, pl. 1.
Dated March, 1878.
- Pt. II. *Vanassa* (sic) *urticae* pl. 1.
Chelonia caja pl. 2.
Bombyx callunae pl. 1.
Hybernia defoliaria and *leucophæria* (sic) pl. 1.
Trypbaena orbona pl. 1.
Plants: Primrose, Hairbell, Thistle, Oak, and Ivy.
Dated September 28th, 1878.
- Pt. III. *Anthocaris cardamines* pl. 1.
Colias edusa pl. 2.
Vanassa (sic) *io*, *atalanta*, and *cardui* pls. 2, 3.
Zygaena trifolii, *filipendulae*, and *loniceræ* pl. 1.
Plants: Varieties of Milk-thistle and Nettle.
Dated February 22nd, 1879.
- Pt. IV. *Abraxas grossulariata* and *ulmata* pls. 2-6.
Plants: Varieties of Blackthorn, Elm, and Anemone.
Dated May 26th, 1879.
- Pt. V. *Papilio machaon* pl. 1.
Argynnis paphia, *adippe*, *euphrosyne*, and *selene* pls. 1-5.
Plants: Varieties of Cow Parsnips and Violets.
Dated September 12th, 1879.

- Pt. VI. *Crocallis elinguaris* pl. 1.
Strenia clathrata pl. 1.
Fidonia atomaria, pimarica (sic) and *conspicua* pls. 1, 3.
Gnophos obscurata pl. 2. ? *err. typ. pro. pl. 1.*
 Dated January 21st, 1880.
- Pt. VII. *Lycaena aegon, agestis, alexis, adonis, corydon, argiolus*
 and *arion* pls. 1, 5.
Thecla rubi, quercus, w-album and *betulae* pl. 1.
 Dated June 7th, 1880.
- Pt. VIII. *Chelonia caja* pls. 3-7.
 Dated October 8th, 1880.
- Pt. IX. *Arctia mendica, lubricipeda, urticae* and *menthastris* pls.
 1-4.
Smerinthus tiliae pl. 2.
 Dated January 18th, 1881.
- Pt. X. *Vanessa urticae* pls. 4, 5.
Polyommatus phlaeas pls. 1-2.
Hesperia malvae, sylvanus, comma and *linca* pl. 1.
 Dated June 18th, 1881.
- Pt. XI. *Cidaria* pls. 1-3.
Lomaspilis pl. 1.
Eubolia pl. 1.
 Dated March 1st, 1882.
- Pt. XII. *Gonepteryx* pl. 1.
Colias pl. 3.
Melitaea pls. 1-3.
 Dated in MSS. March 1st, 1883.
- Pt. XIII. *Vanessa* pls. 6-8.
Limenitis pl. 1.
Arge pl. 1.
 Dated, in mss., (November 5th, 1883).
- Pt. XIV. *Pieris* no number given on wrapper.
Antrocharis (sic) pl. 2.
Argynnis pl. 6.
Satyrus pls. 1-2.

("Rec'd May, 1885" in Kirby's handwriting.)

Up to and including Pt. XI. the contents are printed on p. i. of the wrappers, from Pt. XII. to Pt. XIV. they are written on p. ii.

In this copy the work has been bound in the following order:—

Pl. 1. *Papilio* Pl. 1. Pt. V. 12.ix.1879.

P. machaon.

1a. *Anthocharis* Pl. 1. Pt. III. 22.ii.1879.

A. cardamines.

2. *Pieris* (No number.) Pt. XIV. (Rec'd v. 1885).

Antrocharis (sic) Pl. 2. *P. brassicae. A. cardamines.*

3. *Gonepteryx* Pl. 1. Pt. XIII. (iii., 1883).

G. rhamni.

4. *Colias* Pl. 1. Pt. I. iii.1878.
C. edusa.
5. *Colias* Pl. 2. Pt. III. 22.ii.1879.
C. edusa.
6. *Colias* Pl. 3. Pt. XIII. (iii.1883).
C. hyale. C. edusa.
7. *Argynnis* Pl. 1. Pt. V. 12.ix.1879.
A. paphia.
8. *Argynnis* Pl. 2. Pt. V. 12.ix.1879.
A. adippe.
9. *Argynnis* Pl. 3. Pt. V. 12.ix.1879.
A. euphrosyne.
10. *Argynnis* Pl. 4. Pt. V. 12.ix.1779.
A. selene.
11. *Argynnis* Pl. 5. Pt. V. 12.ix.1879.
A. selene.
12. *Argynnis* Pl. 6. Pt. XIV. (Rec'd V. 1885).
A. aglaia. A. adippe. A. euphrosyne. Melitaea artemis.
13. *Melitaea* Pl. I. Pt. XII. (iii.1883).
M. artemis.
14. *Melitaea* Pl. 2. Pt. XII. (iii.1883).
M. cinxia.
15. *Melitaea* Pl. 3. Pt. XIII. (iii.1883).
M. athalia.
16. *Vanassa* (sic) pl. 1. Pt. II. ix.1878.
V. urticae.
17. *Vanassa* (sic) pl. 2. Pt. III. 22.ii.1879.
V. atalanta. V. io.
18. *Vanassa* (sic) pl. 3. Pt. III. 22.ii.1879.
V. cardui.
19. *Vanessa* pl. 4. Pt. X. 18.vi.1881.
V. urticae.
20. *Vanessa* pl. 5. Pt. X. 18.vi.1881.
V. urticae.
21. *Vanessa* pl. 6. Pt. XIII. (5.xi.1883).
V. c-album. V. urticae.
22. *Vanessa* pl. 7. Pt. XIII. (5.xi.1884).
V. atalanta.
23. *Vanessa* pl. 8. Pt. XIII. (5.xi.1883).
V. cardui. V. io.
24. *Limenitis* pl. 1. Pt. XIII. (5.xi.1883).
Apatura (same plate). *L. sibylla. A. iris.*
25. *Arge* pl. 1. Pt. XIII. (5.xi.1883).
A. galathea.
26. *Satyrus* pl. 1. Pt. XIV. (Rec'd. v.1885).
S. aegeria. S. megeria. S. semele. S. janira.

27. *Satyrus* pl. 2. Pt. XIV. (Rec'd. v.1885).
S. tithonus. *S. hyperanthus.*
Coenonympha.
C. davus. *C. pamphilus.*
28. *Thecla* pl. 1. Pt. VII. 7.vi.1880.
T. rubi. *T. betulae.* *T. w-album.* *T. quercus.*
29. *Polyommatus* pl. 1. Pt. X. 18.vi.1881.
P. phlaeas.
30. *Polyommatus* pl. 2. Pt. X. 18.vi.1881.
P. phlaeas.
31. *Lycaena* pl. 1. Pt. VII. 7.vi.1880.
L. aegon. *L. argiolus.* *L. arion.*
32. *Lycaena* pl. 2. Pt. VII. 7.vi.1880.
L. agestis.
33. *Lycaena* pl. 3. Pt. VII. 7.vi.1880.
L. alexis-icarus.
34. *Lycaena* pl. 4. Pt. VII. 7.vi.1880.
L. adonis.
35. *Lycaena* pl. 5. Pt. VII. 7.vi.1880.
L. corydon.
36. *Hesperia* pl. 1. Pt. X. 18.vi.1881.
H. malvae. *H. sylvanus.* *H. comma.* *H. linea.*
37. *Smerinthus* pl. 1. Pt. I. iii.1878.
S. populi.
38. *Smerinthus* pl. 2. Pt. IX. 18.i.1881.
S. tiliae.
39. *Zygaena* pl. 1. Pt. III. 22.ii.1879.
Z. filipendulae. *Z. trifolii.* *A: lonicerae.*
40. *Callimorpha* pl. 1. Pt. I. iii.1878.
C. dominula, hera.
41. *Chelonia* pl. 1. Pt. I. iii.1878.
C. caja.
42. *Chelonia* pl. 2. Pt. II. ix.1878.
C. caja.
43. *Chelonia* pl. 3. Pt. VIII. 8.x.1880.
C. caja.
44. *Chelonia* pl. 4. Pt. VIII. 8.x.1880.
C. caja.
45. *Chelonia* pl. 5. Pt. VIII. 8.x.1880.
C. caja.
46. *Chelonia* pl. 6. Pt. VIII. 8.x.1880.
C. caja.
47. *Chelonia* pl. 7. Pt. VIII. 8.x.1880.
C. caja.
48. *Arctia* pl. 1. Pt. IX. 18.i.1881.
A. mendica.

49. *Arctia* pl. 2. Pt. IX. 1881.
A. lubricipeda.
50. *Arctia* pl. 3. Pt. IX. 18.i.1881.
A. lubricipeda. A. urticae.
51. *Arctia* pl. 4. Pt. IX. 18.i.1881.
A. menthastris.
52. *Liparis* pl. 1. Pt. I. iii.1881.
L. dispar. L. monacha.
53. *Bombyx* pl. 1.
B. quercus, var callunae. Pt. II. ix. 1878.
54. *Tryphaena* pl. 1. Pt. II. ix.1878.
T. orbona.
55. *Crocallis* pl. 1. Pt. VI, 21.i.1880.
C. elinguaris.
56. *Gnophos* pl. 1. Pt. VI. 21.i.1880. ? the "Pl. 2"
mentioned on the wrapper of Pt. VI.
C. obscurata.
57. *Strenia* pl. 1. Pt. VI. 21.i.1880.
S. elethrata.
58. *Fidonia* pl. 1. Pt. VI. 21.i.1880.
F. atomaria.
59. *Fidonia* pl. 2. Not mentioned, probably issued with
Pt. VI.
F. atomaria.
60. *Fidonia* pl. 3. Pt. VI. 21.i.1880.
F. pinivaria. F. conspicuata.
61. *Abraxas* pl. 1. Not mentioned.
A. grossulariata.
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A. grossulariata.
63. *Abraxas* pl. 3. Pt. IV. 26.iv.1879.
A. grossulariata.
64. *Abraxas* pl. 4. Pt. IV. 26.iv.1879.
A. grossulariata.
65. *Abraxas* pl. 5. Pt. IV. 26.iv.1879.
A. ulmata.
66. *Abraxas* pl. 6. Pt. IV. 26.iv.1879.
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67. *Lomaspilis* pl. 1. Pt. XI. 1.iii.1882.
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H. defoliaria. H. progenmaria. H. leucophaeria.
69. *Cidaria* pl. 1. Pt. XI. 1.iii.1882.
C. immanata.
70. *Cidaria* pl. 2. Pt. XI. 1.iii.1882.
C. russata. C. sagittata.

71. *Cidaria* pl. 3. Pt. XI. 1.iii.1882.
C. populata. *C. corylata.* *C. fulvata.* *C. suffumata.*
72. *Eubolia* pl. 1. Pt. XI. 1.iii.1882.
E. mensuraria. *E. palumbaria.* *E. lineolata.*

Notes on Algerian Butterflies with Special Reference to some Localities in Kabylia.

By Miss L. M. FISON.

When I came out to Algeria for the first time some 12 years ago, to work as a missionary amongst the Kabyles under the *North Africa Mission*, I hoped in spare moments to be able to learn much of the butterfly fauna of the country. Alas! however, this desire has not been fulfilled to the degree I had hoped for.

I soon found in the early days that any spare time had necessarily to be given to the study of the Kabyle language (a dialect of Arabic) and even when I had gained a fair knowledge of the language, the results of malaria fever, which I unfortunately took in my second year out, left me far too tired for several years to be able to do anything in the way of collecting under the hot African sun. However latterly things are looking better, and in the near future I shall hope to give more time than formerly to this fascinating study.

These notes therefore are not nearly as complete as I should have wished, and are intended merely to be suggestive of localities in the Djurjura Mountains of Kabylia which undoubtedly hold many interesting and as yet undiscovered secrets, waiting to be sought out of those who have pleasure therein.

The French colony of Algeria is divided into the 3 political divisions of Alger, Constantine, and Oran and is geographically divided into (1) the region of the Tell, or coastal mountainous region where the vine, olive, fig, cereal products thrive on a fertile soil; (2) the region of the Hauts Plateaux, or high steppe land, where grain is grown abundantly and sheep and cattle reared; (3) the region of the desert, or the great Sahara, an arid mountainous region inhabited by nomad Arabs and the mysterious Touaregs or veiled men of the Desert.

Kabylia is situated in the Tell Region and lies to the East of Algeria. It is a fertile mountainous land—the principal range being the Djurjura Mountains, which rise to a height of about 7,000 feet above sea-level. The inhabitants are known as Kabyles, a race of Berber mountaineers, in contrast to the Arabs of the plains and towns of Algeria. (Berber tribes are also to be found in the Aurès Mts., and in parts of Morocco.) They profess the Moslem faith, are very independent, being the last to submit to the French domination—insurrected in 1870, and cling tenaciously even to-day to their local "Kanouns" (laws). Amongst this people civilisation is slowly spreading, and Christianity is becoming known if not practised.

It is in the course of our itinerary journeys amongst the villages in these Djurjura mountains—in endeavouring to carry the Gospel to these wild tribes that we have been able to observe something of the butterfly fauna of the region. The missionary is able to penetrate far off the beaten track of the ordinary tourist into the heart of the

mountains to reach these people, who have built their villages perched on the summits of the mountains as a protection against their inter-tribal enemies in the past. We travel generally on the back of the sturdy Algerian donkey, as the paths are for the most part just rough tracks, but the scenery is marvellously grand.

Thanks to the kindness of Mr. Henry J. Turner who sent me a list of Algerian butterflies some years ago I have known what to look for.

I have therefore now made use of his list and added some more localities to it. In the list which follows the localities observed by myself, will be marked by the initials (L.M.F.), otherwise the localities are those given me by Mr. Turner, and which may prove useful to fellow entomologists.

Charaxes jasius.—I have twice observed this magnificent insect, and both times curiously it was on the sea-coast. At end of September, 1921, a friend and I saw 2 specimens on the road by the sea between Tigzirt and Port Gueydon near the Kabyle village of Taksebt. The other specimen observed was on October 28th, 1930 (last year), on the beautiful Corniche Road between Bougie and Dji-djelli, at a point where there was forest between Cavallo and Dji-djelli. (L.M.F.)

Papilio machaon.—S. Algiers, spring and summer—Plateaux: Tell: Sabara. We have seen this butterfly in spring and summer at Djemaa Sapridj, Chaib, near Mékla, also at Azazga. It seems to be less common however than the "Scarce Swallow-tail," *P. podalirius* which is very abundant (L.M.F.). Tlemçen, Plateaux, Tell, also ab. *lotteri*, Algiers, Sebdo, Guelma.

Zerynthia (Thais) rumina.—We have observed this butterfly several times in March, April and May in the valley of the Sebdo, Kabylia, near Mékla, in the cork forest near the native village of Aboubroun, on the upper reaches of the Sebdo river, Azazga, May, 1922; near the Col d'Agoni Cherki above Fréha at end of May, 1924; and here at Michelet in the valley of the Oued Djemaa, May, 1930.

Rumina seems to frequent localities where the *Cistus* grows. (L.M.F.) Mr. Turner mentions the ab. *canteri* as having been found at Blida, Bougie, Teniét-el-Had.

Aporia crataegi.—Teniét, etc.

Pieris brassicae.—Spring and summer. Hamman, Tlemçen, Philippeville.

P. rapae.—Spring and summer. Biskra, Algiers, Blida. These two whites are abundant in Kabylia, and the latter some years is a regular scourge to the French colonists. (L.M.F.)

Pieris glaucome.—Oued Mya.

P. napi.—Spring and summer, cedar forests, Blida, Michelet. (L.M.F.)

(To be concluded.)

Stray Notes on Erebiid species.

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

(1) Forms of *jeniseiensis*, Tryb.

In the May number of this magazine I described a subspecies of *jeniseiensis* occurring in the Altai mountains and some distance to the west of those mountains under the name of *fasciola*. It may be

remembered that Goltz had previously described it as a form of *ligea* under the name *altaica*. I may point out in answer to the query appended as a footnote to my article (*Ent. Record*, p. 99, 1931) by members of the Editorial Staff, as to why the name *altaica* could not stand, that according to article 11 of the present rules of nomenclature specific and subspecific names "are subject to the same rules" and from the standpoint of nomenclature are of the same value. It is therefore equally incorrect to retain two subspecific names which are identical, as two specific ones, in the same genus. *Altaica* had already been used in *Erebia*.

I have, since I last wrote, obtained a pair of the insect that Goltz described as *euryle minima*, also from the Altai. It is very remarkable that this insect turns out to be a form of *jeniseiensis* also, very similar to, but much smaller than *fasciola*. The likeness between the latter and *minima* is so great that it is hard to understand why Goltz can have placed them under separate species, especially as they seem to have been sent out by Bang-Haas as *euryle*. So little is known of the actual distribution of these insects in the Altai that one cannot say if *minima* occurs in the same localities as *fasciola*, in which case it is probably, only a dwarf aberration of the latter, and the fact that *fasciola* varies a little in size seems to support this theory. But on the other hand it is possible that *minima* may be a racial form of higher altitudes, first because the pair Goltz described seem to correspond exactly in size with my pair, in both sexes; and also though the markings are reduced in proportion to the size the black spots in the band retain their full size. Further, the series of "*euryle*" (*fasciola*) taken by Elwes in the Altai in one locality only, on the Kurai Pass, and that taken by Jacobsen at Ongodai do not include any of these dwarf specimens. Until further data are available it seems best to retain *minima* as a high-level race, a course which is further supported by the fact that the largest *fasciola* seem to come from the lowest levels in Semipalatinsk. The transference of *minima* to *jeniseiensis* confirms an idea I have held for some time, that true *euryle* does not occur east of the Ural mountains. Every specimen I have so far seen from Central or Eastern Siberia has proved to be some form of *jeniseiensis*, which is a very variable species. I have a very remarkable aberration of the typical form which represents the other extreme to *fasciola*, and considering how little is known of the species it is worthy of description.

E. jeniseiensis ab. **obliterata**, nov.

A ♂ from the Saján mountains, in which the markings on the upperside are reduced to two very small apical, orange spots, showing a trace of a black pupil, and one still smaller round, orange spot, on the hindwings between nervures 4 and 5, otherwise no markings. On the underside the forewings have a short and indistinct band of reddish-brown, running from the apex to the 2nd nervure, with two black apical dots. The hindwings show the four bands characteristic of *jeniseiensis*, but are entirely without any trace of the usual row of red-brown spots or their black centres. The fringes are less clearly chequered than usual. A remarkable specimen, so unlike the typical form that Bang-Haas from whom I got it, would not hazard a guess as to what species it was. Type in my collection.

(2) *Euryale isarica*, Heyne.

It is necessary, once more, to refer to this name. When I last wrote about it, I pointed out that the subspecies of the Bohemian Forest, erroneously called "typical" *euryale* in the past and which I had described as *böhmerwaldensis*, occurred in the mountains of S. Bavaria also, and I thought kept distinct from the insect known as *clanis*, Frhst. In making this statement, however, I mentioned that the so-called *clanis* occurred in the Bohemian Forest too, and was very close to *isarica*, to which my *böhmerwaldensis* fell as a synonym. Since then, thanks to the kindness of Dr. Müller of Linz, who lent me a long series of *euryale* from Upper Austria, I have found out that the characters which I had depended on to separate *clanis* and *isarica* do not hold good, but were so intermingled in the Upper Austrian series that they could not possibly be separated. The position therefore is; the variable form of *euryale* previously known under the names *clanis* and *isarica* must all come under the latter, for in spite of the faulty and misleading description attaching to it, it has priority over *clanis*. As before, my *böhmerwaldensis* remains a synonym, as the insect of the Bohemian Forest has also to be included in *isarica*; but this fact, that this brighter-looking insect has to be included with the duller form of the Austrian Alps, is a final proof that it most certainly is not typical *euryale*. Outside the districts mentioned, *isarica* also extends into Switzerland, the Savoy, as well as being widely distributed in the Carpathians. The Swiss races *tramelana* and *segregata*, however, stand distinct from *isarica*.

(3) Some forms of *embla* and *disa*.(a) The *embla* of Irkutsk.

Ménétries, writing in the "Catalogue of Lepidoptera of the Petersburg Museum," was the first to call attention to the fact that the race of *embla* occurring in Irkutsk formed a remarkable transition to *disa*, in the marking of the underside of the hindwings. Elwes later referred to this in his "Revision of the Genus *Erebia*" and "Lepidoptera of the Altai Mountains," but since then this very interesting race has been ignored by all writers; probably because specimens of it are not frequently available. It must be recognised, and I propose to describe it as:—

E. embla subsp. **dissimulata** nov.

On the underside the yellowish band of the forewings is continuous in both sexes, as in *disa*, but is not so much developed as in the ssp. *succulenta*. The underside of the hindwings, however, show the principal feature of *dissimulata*, for they differ from typical *embla* in the presence of what might be called the "*disa* line." This feature is a strongly dentated dark line, dividing the grey antimarginal band into two parts, and running parallel to the outer margin of the wing from the costa to the anal angle. It is constant in all forms of *disa*, though sometimes only slightly marked in *mancinus*; but it does not occur in any other race of *embla*, though indications of it can be seen occasionally in specimens from other localities, but in these it is never developed into anything approaching a complete line. The markings of the upperside remain typical of *embla*, especially on the hindwings where the spots are fully developed. Types from the Sajan mountains, in my collection.

(b) A new Asiatic ssp. of *disa*.

Among other specimens recently received is a pair of a magnificent subspecies of *disa*, without exaggeration the finest known form of the species. It is in some respects suggestive of a transition between *disa* and *mancinus*.

E. disa ssp. **festiva**, nov.

♂. Upperside forewings with the four black spots normal to the species set in a pale *golden-yellow* band, which is continuous and decidedly broader than usual, with both outer and inner edges very softly marked and somewhat suffused with the ground colour. There is a slight golden-brown suffusion over the basal area of the wings, such as is seen in a pronounced degree in *mancinus*. The upperside of the hindwings is unicolorous dark brown. The underside is typical of the species excepting that the band on the forewings is a very much paler yellow than is usual. It is sharply outlined and the four black spots in it are centred with white. On the upperside only mere specks of yellow (not white) appear in the two apical spots, the two lower ones being blind.

♀. Upperside as the ♂ but the band is much broader still, attaining a width of practically 7mm. at the apex. The *mancinus*-like suffusion is stronger than in the ♂, and there are 5 black spots, the two apical ones showing the faintest traces of golden points. The hindwings differ strikingly from the ♂, in having a large somewhat pear-shaped spot of brownish-yellow at the anal angle, with a pronounced black centre of the same shape, and two very small golden-brown spots just above the large one. The underside only differs from *disa* in that the band of the forewings is a pale yellowish-white, and as in the ♂, is very sharply marked and the five black spots situated in it strongly pupilled with white.

The striking features of *festiva* are, of course, the fine development of the markings on the upperside of the forewings, where the band in the ♀ considerably surpasses that of *embla* subsp. *succulenta* in width and even in the ♂ equals it; together with the tendency to produce a *mancinus*-like suffusion, and the presence of spots on the upperside of the hindwings in the ♀; such spots only occurring extremely rarely in typical *disa*.

This subspecies is in many ways suggestive of being an Asiatic form of *mancinus*, but it is very different from the latter in the beautiful pale colour of the bands and their great development. Types from the Yablonoï mountains, east Siberia, in my collection.

(c) *E. disa* ssp. *steckeri*, Holl.

While writing of *disa* it may be of interest to refer to the recently described *Erebia steckeri*, Holl. (*Trans. Ent. Soc. America*, p. 153, 1930). I am greatly indebted to Dr. Holland who very kindly sent me a pair of co-types of *steckeri*, the examination of which establishes the fact that *steckeri* is a form of *disa*. This is of considerable interest, as it seems probable that typical *disa* occurs in N. America also, while *steckeri* and *mancinus* are very distinct both from the type and each other.

(4) A subspecies of *discoidalis*.*E. discoidalis* ssp. **yablonoica**, nov.

The largest form of the species as yet known; in ssp. *lena* which is much larger than the type from America, the expanse is 44-46mm. in the ♂ (centre of thorax to tip of forewing $\times 2$.) and *yablonoica* measures ♂ 52-54mm. and ♀ 56-58mm. The upperside is browner than *lena*, with the reddish central suffusion on the forewings of the same extent, but much less deep in colour. The red markings along the nervures of the hindwings much less pronounced than in *lena*, but still quite visible along nervures 3 and 4 and at the end of the discoidal cell. In the extent of these markings *yablonoica* is transitional between the type and *lena*, having more than the former and less than the latter. On the underside the markings of the hindwing in *lena* might be described as a blackish basal area followed by a greyer outer area, the apex and outer margins of the forewings also being grey, while in the type the markings are softer, less black and grey, and have a much browner appearance, the central reddish suffusion not extending so near to the costa as in *lena*. In all these respects the underside of *yablonoica* is very similar to the type, but it has still less grey visible and no division, as it were, of the hindwing into two areas: the whole being a more uniform brown with faint grey mottling. The central reddish suffusion is only faintly visible on the forewings and the apex and outer margins are more brown than grey. The ♀ corresponds exactly with the ♂, but is much larger and the coloration of the underside lighter. Types from the Yablonoï mountains, in my collection.

(5) Variation in *theano*.

(a) *E. theano* ssp. *approximata* ab. **simulans** nov. Type from W. Altai.

Colour as in *approximata* but all markings much reduced. On the upperside forewings the patch of colour in the discoidal cell is wanting and the spots of the band are only about half their usual size, though still retaining their respective formations which are characteristic of the species. A similar change is exhibited in the markings of the hindwings. On the underside of the forewings there is a small patch of colour at the end of the discoidal cell, and the other spots are a little larger than above. On the hindwings the basal row of spots is wanting, and the marginal row of more or less the same dimensions as above. The general effect produced is a close resemblance to *pavloskii*, on the upperside.

(b) *E. theano* ssp. *pavloskii* ab. **ultima** nov.

In this aberration the spots which form the marginal band on the upperside of both wings are scarcely visible, except the three at the apex of the forewings which are fairly distinct, though reduced to less than half the normal size. All the others are practically obliterated, only the merest indications of them being discernable. On the underside they are somewhat reduced, but to nothing like such an extent as above; those on the hindwings being only a little smaller than usual. This aberration may be said to be the terminal point, in the direction of loss of markings, in the wonderful group of forms developed by *theano*, which are so variable that even recent writers have classified some of

them as belonging to no less than four different species. The other extreme is *theano* f. *lederi*, in which the brilliant, spreading markings, cover the greater part of the whole wing area. The links in the chain which connect these two extremes, beginning from the strongest marked form, would be: *lederi*, Gltz.—*theano*, Tausch.—*connexa*, Warr. (= *tunkuna*, Gltz.)—*elwesi*, Stg.—*approximata*, Warr. (= *hilaris*, Gltz.)—*simulans*, Warr.—*ethela*, Edw.—*pawloskii*, Mén. (= *sajana*, Stg.)—*sofia*, Str.—*alaskensis*, Holl.—*ultima*, Warr.

The type of *ultima* is in my collection, and comes from the E. Sajan mountains.

It is unfortunate but the name *sofia*, Str. falls as a secondary homonym to *sophia*, Acerbi (= *embla*). There is still but little known of the distribution of *sofia* (as distinct from *ethela* and *alaskensis*) though it certainly extends from the west coast of Hudson Bay right over to Yukon and into Alaska. In spite of the latter record there can be little doubt that the principal area of its distribution will lie in Canada, so I propose the name **canadensis** nov. pro *sofia*, to emphasise the distinction between the two principal American forms of the species; the fine southern ssp. *ethela*, of Colorado and Wyoming; and the more poorly marked northern ssp. *canadensis*, of N. Manitoba, (? the North West Territories), Yukon and Alaska. Finally there is the subspecies *alaskensis* of the extreme north west, in Alaska; a very poorly marked arctic form, the features of which suggest that it is a product of local conditions, to which all forms of *theano* seem to be more than usually sensitive. It is not likely that it will be found to have any extensive distribution.

NOTES ON COLLECTING, etc.

LARVAL HABITS OF *DICYCLA* OO—I have managed to rear some *Dicycla oo* from ova and can quite understand the difficulty in beating this larva. It lives in a balloon of leaves so tightly woven together that when pulled open it is the leaves which break, not the joints. It is a very beautiful larva but spiteful, and must be kept separate for when changing to fresh leaves they bite one another with fatal results.—A. J. WIGHTMAN (F.E.S.), Pulborough, June 1st.

EMERGENCE OF *PHRYXUS LIVORNICA*.—My *P. livornica* are emerging as to three and lying over as regards two. The first emerged 40 days after pupation, and is a good deal larger than the illustration of the species in South's book. The second one out was also 40 days in pupa and is exactly the size of South's illustration. The third is about to emerge (Sept. 23rd), also 40 days after pupation. For a period of ten or fifteen days they gave no sign of colour change in the pupa. First the eyes began to show a sort of internal darkening which gradually became more obvious and at the same time the pupa generally darkened a little. Ten days before emergence the pattern of the wings began to show faintly on the pale background, and this intensified until in three days the pattern was sharp and well-defined but pale in ground colour. Then the wing cases turned black and the pattern was lost. But 24 hours before emergence they again cleared and the full pattern of the wing was apparent and it could be clearly seen that the moth was ready to emerge at an instant's

notice. Emergence in each case took place about 2.30 p.m. summer-time and development was rapid. They sat quite still till dusk and then gently buzzed around the large breeding cage. I placed a bright light near the cage, and this at once caused them to sit quite still again. I was able to chloroform them without the least attempt on their part to flutter and bang themselves about. It is a lovely thing bred.—A. J. WIGHTMAN (F.E.S.), Pulborough, Sept. 23rd.

[P.S.—I kept the pupae bone dry and near a stove day and night, and I am sure they need to be so kept. The largest emerged quite wet in spite of this treatment and was several hours getting properly dry. But in the end it was perfect and lovely like the other two which were smaller. I feel sure in nature all the pupae were this year killed by the dreadful weather we had in August and September.—A.J.W.]

FOODPLANT OF *XYLOPHASIA POLYODON*.—With reference to Dr. Cockayne's footnote in the September *Record* p. 196, I am able to corroborate his view regarding the larvae of *Xylophasia polyodon* feeding on blades of grass. Having obtained ova from a female var. *infuscata* for my friend Dr. H. B. Williams of Esher in June, 1930, I retained a few of these for experiment. The resultant half-dozen larvae were kept in a metal, glass-topped box, in a warm living room all through the winter, and supplied only with blades of couch grass. They grew slowly but surely, and kept very healthy. In the Spring when they had increased in size, they were shifted to a larger tin box, where they completed their growth, and pupated under small dry sods introduced for the purpose. The imagines emerged in June, all typical, except one inclining to var. *infuscata*.

I was rather surprised that the warm conditions under which they were kept, had apparently no effect in hastening their metamorphosis. We begin to take the species here in June in the woods, but it occurs over a very extended period, coming to sugar from then until early September. The larvae spun a thick web of silk over the glass lid, evidently to obscure the light.—JAMES C. HAGGART, Forest Villa, Shawlands, Glasgow.

HABIT OF LARVA OF *X. POLYODON*.—Re the editor's note on *X. polyodon* larvae, I can confirm the fact that the larvae are often to be found in the roots of grass. At Eastbourne one can get full fed larvae and pupae on the Crumbles by pulling up the isolated and dead grass tufts.—A. J. WIGHTMAN.

POLYGONIA C-ALBUM IN BUCKS.—On August 1st a specimen of *P. c-album* was seen in a garden at Wooburn Green, Bucks about 4 p.m.—M. BURR (D.Sc., F.E.S.).

CURRENT NOTES AND SHORT NOTICES.

The Annual Exhibition of that popular Entomological Society, the S. Lond. Ent. and Nat. Hist. Socy., took place on October 22nd, at the Society's rooms, Hibernia Chambers, London Bridge. The large hall was filled with nearly 250 members and friends of whom more than forty brought exhibits. There was no formal business and the exhibits were placed on tables. As usual the exhibits were largely of

Lepidoptera although other orders were represented by one or two exhibits of each. Members of thirty or forty years standing brought up choice specimens of their breeding while the younger men of a few years' membership brought the years' captures and well exemplified the facilities afforded by the modern means of locomotion in aiding the investigation of distant out-of-the-way places with a minimum of time and exertion and a maximum of result. The old time week-end collecting beginning with the Saturday's long tramp, the night's work, the next day's work and the long tramp home, is a thing of the past for ever.

The *Revue Russe*, begun in 1906, has now completed its twenty-fourth volume. It contains 236 quarto pages and a large number of diagrams, maps and detailed figures in all orders. Unfortunately for the dissemination of the contents to the world, the use of the old Russian characters is a very great limitation, as so very few naturalists in any country are able to translate the contents. Previously it has been customary to give a summary of each article in German, French or English, but this has recently apparently been practically abandoned.

The *Ent. News* for July contains the obituary of Dr. Friedrich Ris, the great Swiss neuropterist "truly the successor of de Selys, Brauer and MacLachlan." Had he lived, in 1932 he would have retired and with leisure to carry out his long-time wish of compiling a Catalogue of the world's Neuroptera for which he had already assembled a large amount of material and notes. The notice includes a portrait.

In the *Boll. Soc. ent. Ital.* for July Dr. Rocci contributes a series of notes on Italian Lepidoptera and Dr. Verity on the Distribution and Nomenclature of *Gegenes nostradamus*.

The *Ann. Soc. ent. France* pts. 1 and 2 (1931) contain some very useful papers on Hymenoptera and Coleoptera and a summary of our present knowledge of the genus *Plebeius* = *Lycæides* dealing with (1) the species *argus* (*argyrognomon*), *ligurica* and *armoricana* and with *bellieri* (semblable à *argyrognomon*) and *insularis* (semblable à *ligurica*) of Reverdin: (2) the species *argus* (*argyrognomon*), *aegus*, *micrargus*, *melissa* and *sareptensis*, of Chapman's conclusions. We note that a *lapsus calami* has made *argus*, L. = *argyrognomon*, Brgstr. (p. 123) and *argus*, L. = *aegon*, Schiff (p. 125). What a dreadful trap the use of the name *argus* is, one never knows which species is intended. The suggestion of Seitz (*Pal. Rhop.* p. 300) if carried into effect avoids all confusion.

The Literature on Entomology continues to crowd our table. Scarcely a day passes but some magazine, some excerpt, some important work, some serial, arrives either in exchange or review. It is impossible to notice all adequately and some regrettably have to be omitted altogether. The output increases week by week and the increase of knowledge is immense, and all nations are taking part in the work. The opinion that insects are a dominant power on the earth is gradually gaining ground, and it is being realised that in the future they may contest the possession of it with the human. The struggle is a real menace already in some tropical lands. Before us lies a quarto *Memoir of the Department of Agriculture in India*, containing a "Contribution towards our knowledge of the White-flies of India" with 38 plates giving the life-histories, biological details, Systematic Notes, etc., dealing with many species and concluding with a Bibliography, without which now-a-days

no extended paper even of medium importance, can be considered of use for future workers. Another work of some 80 pp. "Studies on *Platyedra gossypiella*, in the Punjab" is of the utmost importance to the cotton growers. An extremely useful amount of statistical work is included upon which the statements and recommendations are based. The Introductory matter deals with the definite establishment of the fact of short and long cycles in the life history of this small lepidopteron. There is a preliminary account of the Cotton Crop, the areas under crop, the sowing period, the season for growth and the picking period, all considered in relation to this pest. The seasonal history of this Boll-worm is detailed, its winter quarters during the "long-cycle" thoroughly investigated, the hibernation quarters described in full detail, the alternative food plants stated and observations on the control in the circumstances of the Punjab cotton-growing fully given. Altogether a summary by many trained observers, and of the utmost practical usefulness to aid the human in the contest with the insect. The paper first appeared in the *Indian Journal of Agricultural Science*, in April 1931.

A huge Catalogue of the *Carabidae*, part 18 of the *Cat. Insects of India*, lies before us. The author's name, H. E. Andrews, F.E.S., is sufficient to guarantee its reliability. No work on this extensive and attractive family is ever attempted without reference to this talented author whose study of these beetles is world-wide.

The Austrian *Zeit. oestr. ent. Ver.* for July gives a capital black and white plate of seventeen aberrations of *Geometridae* in the collection of Herr Kautz. There are also contributions on the Micro-lepidoptera of Andalusia and the Corsican Mountains.

REVIEWS AND NOTICES OF BOOKS.

MY NATURE NOOK.—W. S. Blatchley, 15 pls., 302 pp. The Nature Publishing Co., Indianapolis, U.S.A. \$2.00.—This is one of the best nature books we have ever read. It is full of original field observations by a life-long naturalist in new and unfamiliar surroundings, and not a hash-up of old and well-known facts arranged for the simple. It contains much of interest to the general reader, and will be very useful to those winter visitors to Florida, who, while not claiming to be students of anything in particular, like to know something of the things seen when taking their walks abroad. The author had spent most of his life in Indiana until December, 1913, when he bought a "patch of mother earth" near the beach at Dunedin on the Gulf (a plot of saw-palmetto scrub-land, on which to build his winter home). This and the immediate neighbourhood has been and is his happy hunting-ground (in spite of the rattlers, copper-heads and mocassins disturbed now and again) for the wild fauna and flora of that part of the Coast.

The book comprises the Nature notes made by the author during the five winter months of the last 17 years. Every opportunity for observations of nature was seized and later, when necessities of life were assured, such occupation was the dominant factor of his stay each season. Although primarily an entomologist, and a goodly number of scarce or local insects are recorded, the author's observations deal with the whole field of natural history. The records are intermittent and bestrewn with soliloquies, and apt quotations in prose and verse; never

tedious. He speaks of the joy of work, the pleasure in his garden in which his wife until recently so much delighted, the seasons as they come and go. But the candid remarks on weather conditions (in this land of sunshine, with its fine days, devastating frosts and bone piercing winds) may make ones' sojourn there, disappointing and uncomfortable.

He early chose a "nature nook" in an old and leaning tree, where he could observe, think and write in solitude with nature and 'twas there the present book was written. He describes the Pioneering Days, the Days of Leisure, the Days of a Naturalist, all with the delightful simplicity of one whose love of nature is of the fullest. In the last day of his recorded notes, he speaks of his letters (2 duns for subns. to societies) of the fish hawk careering along the bay, of his ripening strawberries and the feasting mocking-birds, of the burrowing owls which feed on large insects, of the early spring love-making of the doves, and concludes "Here, in my nature nook, it is my life that I have lived, my thoughts that have been born, my cells that I have burned. It has been a place for dreams and quietness. Here the birds and my soul have had their sanctuary. Here sunshine and solitude have both been ever welcome. Here I have been careless of the world and all its doings. Here that I hope to spend other happy hours before there come forgetfulness, the peace of everlasting sleep, and my soul goes back to the vast spaces of the universe, back to the void from whence it came." A good index makes reference easy.—H.M. and Hx.J.T.

(2) BITUARY.

Auguste Forel.

Dr. med., Dr. jur.h.c., Dr. phil.h.c., anc. Prof. de l'Université de Zurich, hon. fellow Ent. Soc. Lond., lauréat de l'Académie française des Sciences.

Forel was born at the little village of Lonay, near Morges on the shore of Lake Geneva on September 1st, 1848, and died in July last. He studied in the Universities of Zurich and Vienna. In the latter under Meynert he became a specialist in psychiatry, brain anatomy, "hypnotism, and pathology. He obtained a post at Munich and was afterwards appointed in 1879, director of the Zurich lunatic asylum, and became Professor of Psychiatry at Zurich University.

He was a strong supporter of anti-alcoholism, and a leading advocate for the sterilization of criminals. One of his works which was, perhaps, translated into more languages, and more widely read than any other, was that on the "Sexual Question."

We of course know him best as the specialist on the *Formicidae*, of which he made a life-long study and published numerous books and papers.

His first work "Les Fourmis de la Suisse" (1874) will always remain a standard work. One of his latest books "Le Mond Social des Fourmis" (1921-23) was translated into English by C. K. Odgen in 1928. In the preface of this work will be found an account of his early life, and how he came to take up the study of ants.—H.D.

* When I had the pleasure of staying with him at his house "La Fourmilière," Yverne, Switzerland for ten days in 1912, I was very interested in witnessing some of his medical practice in hypnotism; though he had almost given it up at that date.

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Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.*

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—*Albimacula**, *sparganii**.

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

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first
class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of
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EXCHANGES.—Living Eggs of *Cateocala fraxini* and *sponsa*, exchange for butterflies of
British Isles.—*C. Zacher, Erfurt, Weimar, Street 13, Germany.*

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

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

Duplicates.—*Ocellatus** 5, *Hastata* 1, *Cambricaria* 3, *Blandina* 12, *Protea** (melanic)
2, *Camelina** 2, *Dromedarius** 1, well set on black pins with data.

Desiderata.—*Betulae*, *Trepida*, *Diluta*, *Or* and *Myricae*. *Geo. Nicholson, 24, Nun's
Moor Crescent, Newcastle-on-Tyne.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. November 18th. December 2nd, January 20th, Annual Meeting.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
November 26th. December 10th. January 14th—*Hon. Secretary*, Stanley Edwards,
Avenue House, The Avenue, Blackheath, S.E.3.

The London Natural History Society.—Meetings 1st and 3rd Tuesdays in the
month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel
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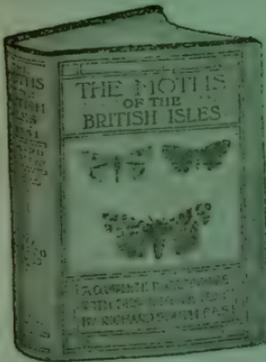
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Coleoptera, etc., in Moorhens' and Swans' Nests.

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

Having searched several moorhens' nests in Windsor Forest for beetles, etc., the results are given below. It will be remembered that Mr. Bedwell took *Aglyptinus agathidioides*, Blair, in a moorhen's nest at Potter's Bar; we however did not find this beetle at Windsor. It is rather curious that such, comparatively speaking, small nests made of a few wisps of sedge, leaves, etc., should harbour quite a number of species; though all of them, no doubt, are only there for purposes of shelter. We also worked a swan's nest again this year, but it was not as good, nor so well built, as that of last year.

In both lists those species marked with an "s" were also taken in a swan's nest last year, and those marked with an * were new to the Windsor list. I am indebted to my friend Mr. Keys for the names of the species of *Atheta*.

MOORHENS' NESTS.

COLEOPTERA.

Carabidae.—s *Acupalpus luridus*, Dj., *A. meridianus*, L., **Anchomenus thoreyi*, Dj., s *A. puellus*, Dj.

Hydrophilidae.—*Anacaena limbata*, F., *Limnebius nitidus*, Marsh., *Helophorus brevipalpis*, Bed., **Ochthebius bicolon*, Germ., *Cyclonotum orbiculare*, F., *Cercyon flavipes*, F., *C. lugubris*, Pk., twice, and in some numbers.

Staphylinidae.—*Ocyusa maura*, Er., *Atheta elongatula*, Gr., **A. clancula*, Er., *A. celata*, Er., *Myllaena* sp.? *M.* sp.? *Tachinus marginellus*, F., s *Philonthus umbratilis*, Gr., s *Actobius cinerascens*, Gr., *Lathrobium brunnipes*, F., *L. terminatum*, Gr., twice, *Stenus cicindeloides*, Gr., s *S. latifrons*, Er., twice, *Oxytelus tetracarlinatus*, Block.

Trichopterygidae.—*Trichopteryx* sp.? *T.* sp.?

Coecinellidae.—s *Rhizobius litura*, F., s *Coccidula rufa*, Hbst.

Lathridiidae.—*Enicmus minutus*, L.

Mycetophagidae.—s *Typhaea fumata*, L.

Dascillidae.—*Scirtes hemisphaericus*, L.

Curculionidae.—*Tanyssphyrus lemnae*, F.

TRICHOPTERA.

Hydropsychidae.—*Cyrnus trimaculatus*, Curt.

SWANS' NEST.

COLEOPTERA.

Hydrophilidae.—s *Cercyon anatis*, Pk.

Staphylinidae.—**Atheta hygrotopora*, Kr., s *A. nigella*, Er. abundant, **A. exilis*, Er., *A. inoptata*, Shp., *A. basicornis*, Rey., s *A. pygmaea*, Gr., *Myllena* sp.?, *Xantholinus linearis*, Ol., *Lathrobium terminatum*, Gr., s *Trogophloeus corticinus*, Gr., *Lesteva heeri*, Fauv.

HETEROPTERA.

Lygaeidae.—*Ischnodemus sabuleti*, Fall. in numbers; found plentifully later on rushes.

Noctuae and their Variation in 1931.

By A. J. WIGHTMAN, F.E.S.

Just as 1930 proved to be the best year I had ever experienced for collecting Noctuae, so 1931 has proved to be the worst and much the worst.

Even in the Spring weather conditions were abnormal, the ash trees were so late in coming out, that I fear *Cirrhoedia xerampelina* must have been hard put to it to survive at all. At the usual date for full-fed larvae I was unable to find a single tree on which the buds were sufficiently forward to be suitable as food, and even when the buds did expand I failed to find any larvae of the species.

Except the marsh-frequenting species which feed on or in reeds, rushes, etc., which have been as plentiful as ever, and about normal as to date, but more heavily parasitised than usual, every species I have looked for has proved to be late, rare or has eluded me altogether. I specially tried for larvae of *Aporophila lutulenta*, *Xylina semibrunnea*, *Platenis subtusa*, *Aeronicta leporina*, *Craniophora ligustri*, and *Cucullia gnaphalii*, all of which are usually to be found in the localities I worked for them. Yet I drew a blank in every case.

Immigrant species which gave so great a promise in the Spring, failed to make the show expected of them in the autumn. No doubt the wet and cold proved too much for all but the few larvae which having got an early start reached the perfect state comparatively early in the year.

In July larvae of *Heliothis peltigera*, *Plusia gamma*, *Macroglossum stellatarum* and *Phryxus livornica* were found on the Kent coast and all were certainly present in good numbers, but while in confinement they produced the perfect insects, apparently in the wild state the bulk failed to mature. I found Sugar, Ivybloom, and Yewberries useless for Autumn collecting.

Fortunately I had a good number of ova, larvae and pupae from 1930 to deal with in 1931 and it is from these that my best insects of the year have been bred. But even among these, emergence was often erratic. *Dianthoecia* species, which should have emerged early in June, had an extended emergence well into August, and *Xanthia aurayo* did not pupate until mid August instead of at the beginning of the month.

Dicycla oo.—From ova laid by a 1930 Peterborough ♀, larvae hatched on May 2nd, and were at once offered small unexpanded oak leaves which at first they seemed to reject, as they continued to roam all over the glass-topped box in which they were placed. I introduced various other things I thought they might need, such as lichens from oak trunks, but they finally settled down on the oak buds and spun fine silky webs among them.

For some days it was difficult without unduly interfering with them to see just what was taking place, but the presence of frass satisfied me that all was well and in a matter of ten days it was obvious that these small larvae were feeding within tiny balloon-like structures formed by fixing together small oak leaves. This method of feeding continued until the larvae were quite large ($\frac{3}{4}$ "), at which period of their existence I thought it safe to tear open some of these "balloons" and look inside. The larva in each was now almost black in colour

with beautiful white or creamy-white oval patches along the medio-dorsal line each somite having the forepart of one of the marks and the rear part of another.

Having been disturbed, some of these larvae wandered about in the box and I actually saw what appeared to be a cannibal attack, one larvae biting another with, as it proved, fatal results. Supposing the species to be a cannibal, I now put each larva in a separate tin and provided them with small Geometer larvae, but none of these were touched and when later I opened a "balloon" containing a nearly full-fed larva and introduced a small larva as food, the *oo* larva put its head to the opening, and moved its head from side to side opening and shutting its mandibles but in spite of this menacing attitude, it made no attempt to bite the intruder, which latter quickly withdrew.

These larvae were full fed one month after emerging from the ova, and for the whole period, had been tightly concealed. Their tenements remain unbroken until the larva has consumed the leaves enclosed within it, and are only opened for the larva to emerge and find a fresh group of young leaves, which change over I am sure is always performed at night. The beating of the larvae of this species would be impossible except under abnormal circumstances, so tightly are the covering leaves fastened together, that when torn apart by force, it is the leaves and not the joint made by the larva which break; nothing less than a fatal blow to the larva would knock it out of such a place.

When full-fed the larvae which were now deep purplish-red in ground colour, left these retreats and descended to the fine loose mould in the box, quickly buried themselves and almost as quickly reappeared again, repeating this manoeuvre time after time before making the final plunge.

The pupae were fully formed at the end of 6 days and in shape reminded me of those of *Aporophyla lutulenta*, but were paler in colour, being rich red-brown, very shiny and extremely active. They were just below the surface in very slight cocoons or merely under moss.

The moths emerged a month later, always just before dusk, developed quickly and were flying before dark.

Taeniocampa gracilis.—I had a very interesting experience with larvae of this species in July. I had noted in other years that wild taken larvae of the red form from the New Forest bogs produced a very much larger percentage of moths, than the larvae of the grey form taken wild in the Pulborough marshes, but had never taken the trouble to find out why. This year I took a batch of approximately a hundred red *gracilis* larvae from *Myrica gale* in the New Forest and a similar number of grey *gracilis* larvae from *Spiraea ulmaria* in the marshes at Pulborough, and kept both batches under careful observation, feeding all on *Salix*. When these larvae were taken they were about half grown and by the time they were full fed I had removed some fifty larvae or pupae of the ichneumon *Spudastica kriebbaumeri* from each cage. At this time I counted the *gracilis* larvae which had survived and found I had 46 of the red form and 48 of the grey one, and these duly went down.

On turning these out later I found I had :—Red form, 44 healthy pupae, 2 dead larvae, no fly pupae. Grey form, 2 healthy pupae, 1 dead larva, 45 fly pupae; these last are quite a different species from *S. kriebbaumeri*, being long oval and black in colour. Mr. K. G. Blair

has seen one of these pupae and refers it to the genus *Ophion*. It is impossible from this isolated result to say that this second species of parasite does not attack the larvae of the red form, but it is evident that this form if destroyed at all is not destroyed by it in any great numbers, while the grey form is all but completely destroyed by it. I hope to repeat the experiment in 1932.

Agrotis ripae.—In spite of the good advice I had received about dealing with this species, I could not resist the temptation to investigate the pots in which the larvae had gone down (September 1930) at the end of May and to my disgust found that I had very few pupae but plenty of unchanged larvae. I placed these larvae on the sand and a fair percentage went down again, but the bulk lay on the surface and pupated there during June, quite successfully as far as I could see. These pupae gradually developed until the pattern of the wings could be seen, but then began to die off for some reason. I had found all the larvae dead in a pot the sand in which had got rather dry during the winter, so I tried damping these pupae but without success, and at last in desperation paid a visit to the coast where I had taken the larvae to see what the natural conditions would be like. I found the sand quite damp at a depth of 3 or 4 inches at 10 a.m. but by 3 p.m. when the sun had been on it for 5 hours it was bone dry and quite hot to double that depth. Obviously therefore in nature the pupae get plenty of moisture at night and dry out a good deal on a fine day. As the summer advances this drying out becomes an everyday affair and the depth to which the sand dries gets greater, so I placed my pupae on damp sand and then put 2 or 3 inches of dry sand over them and daily placed the box in the sun which at that date was strong for a few days. After about a week the moths began to emerge, at first with a high percentage of cripples but later in good condition. I am now sure that while the waiting larvae must be reasonably damp all the winter and early spring, once they have pupated they need to be dried out by the heat of the sun on the sand and cannot emerge otherwise and must therefore have had a bad time of it this year apart from the fact that the August storms washed away a great many sand-hills in Sussex on which the larvae occurred in abundance last year. Fortunately this species in common with most Agrotids, occurs in great profusion in suitable spots and larvae were in great numbers again this autumn at several spots I sampled, which were beyond the reach of the waves.

So variable is this species, that hardly any two are quite alike, nevertheless they can be roughly divided up into groups as under.

All are bred from Sussex larvae.

A. White slight creamy tinge, outlines of the stigmata in faint ochreous, submarginal line represented by a row of fine faint dots, no other markings; this form also occurs in several shades of cream and pale ochreous ground colour, but costa is always pale=ab. *obotritica*, Schmidt.

AA. As above but inner and outer lines well marked=*weissenbornii*, Frr.

B. Bluish white, stigmata well developed in pale brown, central shade distinct, area between this and outer margin heavily dusted with ochreous, nervures white, costa white, giving a rayed appearance, sometimes the orbicular and reniform stigmata nearly unite to form a longitudinal streak.

C. Pale bluish grey, inner, outer and submarginal lines in darker grey, whole wing mottled with pale grey and ochreous. Costa paler than rest of wing. This form is very like the allied *A. cinerea*; the darkest examples of this form would = ab. *grisea*, Tt.

D. Rich ochreous stigmata and transverse lines darker, pale greyish white costal streak.

E. Pale red, white costal streak and a second white costal streak from the base under orbicular stigmata to reniform stigmata, subterminal line blue grey.

F. Reddish brown, much mottled with fuscous, markings in a darker shade of brown, pale whitish costal streak. Tutt called this form ab. *brunnea*, but his specimens were without pale costa.

G. Pale ochreous, three stigmata clear in darker ochreous. Subterminal line composed of short longitudinal streaks so that the insect is banded. A variation of this last form has these streaks extended almost to the outer margin so that the submarginal area is much darker than rest of wing.

H. Reddish ochreous, very little distinct marking, apart from the whitish costa = ab. *desillii*, Pier.

From the above it will be seen that all my Sussex *ripae* belong to a pale costa group, though often the costa is only just paler than the rest of the wing.

Heliothis peltigera.—Having found the larvae of this species in great abundance in Kent this year, I decided to force a batch of pupae under conditions of great dry heat, to test the theory put forward in the April number of this magazine page 62, that dry heat tended to produce pale forms and damp heat dark forms.

A batch of pupae having been dug up ten days after the larvae had gone down, 50 were placed in a wooden box, one end of which had been removed and a piece of perforated zinc fixed in place. The bottom of this box contained slightly damp mould half an inch in depth, so that the drying process should not be too sudden. After an interval of ten days for the pupae to get hardened this box was placed on the edge of a wooden table and an oil stove kept burning day and night near enough to keep the temperature in the box at approx. 100° F. In the course of a day at most the mould was quite dry and the glass lid of the box ceased to steam.

On the eighteenth day of this forcing (thirty eight days after the larvae had gone down) the moths began to emerge and all were out in the course of a week, except three, two of which had dried up and one which refused to be forced and subsequently emerged six weeks later without further artificial heat. All but one of the moths bred were fine and perfect, the usual hour of emergence was 10.30 a.m., but a few appeared both earlier and later in the day. These moths do not support in any way the above theory as to the cause of dark and light forms being bred. There is only one specimen which can fairly be described as pale for this species. Twenty eight are medium in colour and agree well with those bred without artificial heat in 1928, while eighteen are distinctly dark, in fact the darkest and most richly marked I have ever bred or seen*.

* Series of these two breedings lie before me and have been exhibited at the S. London Annual Exhibition and at a meeting of the Entomological Society of London. Those bred this season are, as stated by Mr. Wightman, much the darker.—Hy. J. T.

The principal forms are as follows.

- A. Rich ochreous ground colour, usual marking in red.
- B. Rich ochreous ground colour, usual markings in dark brown.
- C. Dark smoky brown markings much obscured.
- D. Pale reddish, markings nearly obsolete.
- E. Dark red, usual markings in darker red.
- F. Dark reddish brown ground colour, area between outer margin and submarginal line pale, giving insect a pale outer band.
- G. Dark reddish brown as above but central fascia darkest part of wing forming a dark band.

A percentage of the larvae taken proved to be parasitised and I sent a few of the flies bred to Mr. K. G. Blair who has kindly informed me that "two species are present, *i.e.*, *Orthostigma pumila*, Nees and *Aspilota insidiatrix*, Marsham, and that both these species are recognised as diptera parasites and it is suggested that they may have been introduced into the breeding cages with diptera larvae which were feeding in the leaves of the *Senecio*, but while I cannot be dogmatic, I am confident from all the circumstances that this was not so and that they came from the *peltigera* larvae and pupae, quite possibly however as super parasites, although I bred no other species of parasite.

A Structural Character of the Larval Cuticle and its possible bearing on the Classification of the Noctuidae.

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

Many years ago I noticed a peculiarity of structure common to the larvae of *Chloridea peltigera* and *Pyrria umbra* and was surprised to find that, while some authors placed them in the same or neighbouring genera, others put them into different sub-families. Recently I became interested in the matter again and examined the larvae of a number of species, some in my own collection and, by the kindness of Mr. Tams, others in the British Museum. The following is a description of the structural character to which I refer. The skin of the dorsal and lateral surfaces of the larva is more or less thickly covered with minute circular plates raised in the centre and smooth or culminating in a short sharp point. Interspersed amongst these are others usually fewer in number but larger and more perfectly developed so as to form cuticular spines, broad at the base, flattened or compressed laterally and curved backwards resembling a shark's tooth in shape. In the larvae of some species there is great variation in the size and length of the spines; some arise from a small base and are short, others arise from a large base and some of these have a much longer and finer tip than others, while in other species there is greater uniformity. In the different species there are differences in the number and to some extent in the size and shape of the spines. In *Heliothis* for instance they are very numerous and the majority are long and pointed and arise from a small base, while in *Chloridea* they arise from a larger base and are shorter and more sparsely set. In some species they are all brown or blackish, but in others they vary in colour matching the surrounding skin and may be pink, yellow, white or black. However much they vary in detail they are laterally compressed and curved in

all the species in which I have found them. They are seen most clearly with a magnification of about 40.

They are present in *Heliothis imperialis*, Stgr., *H. purpurascens*, Tausch. (in both species they are numerous, long and slender with a long fine point), *Rhodocleptria incarnata*, Freyer. (rather sparse and short), *Chloridea dipsacea*, L., *C. peltigera*, Schiff., *C. armigera*, Hüb. (numerous and rather short), *C. virescens*, Fabr. (small), *Chariclea delphini*, L. (sparse and both short and long), *Melicleptria scutosa*, Schiff. (many spineless small plates with relatively few larger ones with short spines), and no doubt they occur in other allied genera and species. They are absent in all the other noctuid larvae I have examined including *Actinotia radiosa*, Esp., *A. polyodon*, Clerck. (*perspicillaris*), and *A. conjuncta*, Püngl. with the exception of *Pyrrhia umbra*, in which they are rather numerous and of all sizes and shapes, though the pointed tip is generally short.

The character is so unusual and so similar in all the larvae possessing it that I think it is a real indication of close affinity. It is unlikely to have arisen independently by mutation in two different sub-families and equally unlikely to be a primitive character that has been lost by the majority of noctuid larvae. Support is lent to the view that it is a sign of relationship by the fact that in other structural characters the larvae of the *Heliothis* group are like that of *Pyrrhia umbra*, and they also resemble the larva of that species in their fondness for the flowers rather than the leaves of plants as food. The structure and the unusual range of colour variation through various shades of green, pink, and brown is very much the same in the larvae of *Chloridea dipsacea* and *Pyrrhia umbra* and to a less extent in *C. peltigera*. The general shape of the wings and the facies of some of the *Heliothis* group is also very like that of *Pyrrhia*.

Newman places *dipsacea*, *peltigera*, *armigera*, *scutosa*, and *umbra* (*marginatus*) all in the genus *Heliothis*, while both Kirby and Barrett put the genus *Chariclea* comprising *delphini* (*delphinii*) and *umbra* (*marginata*) next to *Heliothis* comprising *dipsacea*, *peltigera*, *armigera*, and *scutosa*, which seems to me a much more natural arrangement than that adopted by later authors, though *umbra* should have been placed in a different genus from any of the others. Warren in Seitz Palæarctic *Noctuidae* follows Staudinger and places *Pyrrhia umbra* in one sub-family and *Chloridea*, which includes *dipsacea*, *armigera*, and *peltigera*, and *Melicleptria*, which includes *scutosa*, in another.

Hampson in his "Catalogue of the Lepidoptera Phalaenae" places *Heliothis*, *Rhodocleptria*, *Chloridea*, *Chariclea*, and *Melicleptria* in the *Agrotinae* and *Pyrrhia* in the *Acronyctinae* or *Zenobianae* as they are now called. He puts the *Heliothis* group of genera at the highest point of one branch of the *Agrotinae*, but *Melicleptria* is placed on another branch and on both branches are genera with spineless larvae. This however is comparatively unimportant, and, if I am right, it only necessitates a little rearrangement within one part of the *Agrotinae*.

The really important matter is the relegation of *Pyrrhia* to the *Zenobianae*. One of the main points of differential diagnosis between the *Agrotinae* and the *Zenobianae* is that in the former the tibiae are more or less spinose and in the latter are without spines. The eyes are naked in both and the differences in neuration are probably of secondary importance. I think it is far more likely that *Pyrrhia*

has lost the tibial spines in its imago than that it has acquired the very remarkable cuticular spines in its larva, which are so similar to those of the *Heliothis* group. If so one of the fundamental distinctions between two of the main divisions of the *Noctuidae* is valueless, and it may well prove that some genera of *Agrotinae* really belong to the *Zenobianae* or of the *Zenobianae* to the *Agrotinae*.

Sark Lepidoptera.

By L. HUGH NEWMAN.

It has been the privilege of the writer to spend a season at Sark, collecting the butterflies of this Island, for the Lord Rothschild collection.

The only guide I had, as to the species to expect, was from an essay written by a Mr. Luff, in one of the publications of the Natural History Society of Guernsey. He published these observations over fifty years ago, and it is an interesting fact that all but three of the species he mentioned as being found in Sark were captured this year; this was out of a total of twenty-eight species.

I was able to report to Miss Edith Carey, an active member of the Society, two new species, viz.: *Papilio podalirius* and *Melitaea aurinia*. The three butterflies not seen, that were recorded as natives or usual migrants to the Island, were *Polygonia (Vanessa) c-album*, *Argynnis lathonia*, and *Colias hyale*.

Before giving a description of some of the more interesting forms met with during the sojourn, a complete list of butterflies seen or captured during the season, with the dates of their first appearance, would, I think, be of general interest.

April	23rd.	<i>Pararge aegeria</i> ;
"	27th.	<i>Aglais urticae</i> ;
"	28th.	<i>Pieris brassicae</i> ;
"	29th.	<i>P. napi</i> ;
"	30th.	<i>Callophrys rubi</i> ;
May	1st.	<i>Gonepteryx rhamni</i> , <i>Lycaenopsis argiolus</i> ;
"	2nd.	<i>Vanessa io</i> ;
"	3rd.	<i>Rumicia phlaeas</i> ;
"	5th.	<i>Pararge megera</i> ;
"	9th.	<i>Pieris rapae</i> ;
"	17th.	<i>Coenonympha pamphilus</i> ;
"	22nd.	<i>Pyrameis cardui</i> ;
"	25th.	<i>Pyrameis atalanta</i> , <i>Melitaea cinxia</i> , <i>Aricia medon</i> ;
"	29th.	<i>Polyommatus icarus</i> ;
"	31st.	<i>Lanpides boeticus</i> ;
June	4th.	Migration of <i>Pieris brassicae</i> ; <i>Pieris rapae</i> ; <i>Colias croceus</i> ; <i>Pyrameis atalanta</i> , and <i>P. cardui</i> .
"	6th.	<i>Melitaea aurinia</i> ;
"	11th.	<i>Pararge aegeria</i> (second brood) ;
"	17th.	<i>Papilio podalirius</i> ;
"	19th.	<i>Plebeius aegon</i> ;
"	20th.	<i>Epinephela jurtina</i> ;
"	25th.	<i>Argynnis aylaia</i> ;
"	27th.	<i>Hipparchia semele</i> ;

July	6th.	<i>Epinephile tithonus</i> ;
„	11th.	<i>Aglais urticae</i> (second brood) ;
„	21st.	<i>Pieris napi</i> and <i>Pieris rapae</i> (second brood)
„	28th.	<i>R. phlaeas</i> (second brood) ;
„	30th.	<i>Polyommatus icarus</i> (second brood) ;
„	31st.	<i>Vanessa io</i> , and <i>Pyrameis atalanta</i> ;
Aug.	2nd.	<i>Pararge megera</i> (second brood) ;
„	3rd.	<i>Lampides boeticus</i> (second brood) ;
„	10th.	<i>Eugonia polychloros</i> ;
„	11th.	<i>Colias croceus</i> var. <i>helice</i> and <i>Gonepteryx rhamni</i>
„	28th.	<i>Lycæenopsis argiolus</i> (second brood) ;
Sept.	14th.	<i>Pararge aegeria</i> (third brood) ;
Oct.	6th.	<i>L. argiolus</i> (several fresh : third brood).

It will be seen that there is a complete absence of the "Skipper" family, and that the "fritillaries" and "blues" are not well represented. Such butterflies as *Euchloë* (*Anthocharis*) *cardamines*, *Limenitis sibilla*, and *Aphantopus hyperantus*, which are so comparatively common in the British Isles, are quite unknown in the Channel Islands.

The most interesting species I met with was *Pararge aegeria*, which was not the northern *egerides* form but were all the true *aegeria* form, viz: with the markings a deep orange colour instead of the usual creamy-white. This butterfly appeared to breed continuously during the season. Fresh specimens were taken at the beginning of October, when I left the Island, and they were the first butterfly to be seen as I walked up the winding tree-sheltered valley that leads from the Island's miniature harbour. And this was in early April.

Pararge megera seemed to be in every likely environment on the Island, and had no appearance of localness, as is its usual habit. A very common butterfly on the Island was *Epinephile tithonus*, but apart from the undersides, which were a very dark rich colour, the form was disappointing. Only a small percentage had extra spots, with one exception; this was a fine male with a complete row of spots on the upperside of the under wings, it was also extra spotted on the upper wings.

As a species *Epinephile jurtina* was more interesting. Many of the females were extremely heavily marked with ochreous coloration and the males varied from unicolorous dark specimens to others closely resembling the typical female. The race was a strong one, both sexes being large in size.

In *Pieris napi* almost the opposite was noticed; the form was very ordinary, and not heavily marked as would be expected, and the race was a small one. Whilst writing about the *Pieridae*, a description of a most unusual migration may be of interest. It was on June 4th that this extraordinary phenomenon was seen. I had joined a party of residents, who were making their way to the Northern extremity of the Island, known as the Bec du Nez. The weather was perfect, except for a cold East wind blowing from the French coast. I noticed a number of *Pieris brassicae* flying about as we approached this rocky promontory of the main Island. On reaching our destination, it seemed as though these butterflies were coming out of the void. They came in droves and mostly passed over our heads without pausing to feed on honey from the pink thrift flowers that grew in profusion on the cliff's edge. As the day grew warmer, and the tide came in with

a strengthening of the breeze, the butterflies seemed to come in greater numbers, and a few now paused to feed on the flowers, and gave an opportunity to capture a short series. Other butterflies came with this white host. *Colias croceus* were there in small numbers; they must have migrated with the *Pieris*, as none had been seen previously on the Island although the spell of fine weather had held for many days. Also the specimens caught were worn and faded, proving they had not lived on the Island.

Pyrameis cardui and *P. atalanta* appeared to come at the same time, as they were in numbers in this locality, and they were far fresher specimens than the few remaining to be seen from the migrations that took place in May, of these species.

Undoubtedly *Pieris rapae* were migrating from the French coast too, as they were in great quantities, almost as many as *Pieris brassicae* at one time of day.

Being on the end of the Island, we could watch those flights which overshot the length of the Island, and see them veer round and come up to the point in rather scattered formation. When I left this place at about six o'clock in the evening, a few *Pieris brassicae*, stragglers of the "migration urge," were still coming as it seemed, from out of the sea itself.

The most interesting individual capture was a female *Lampides boeticus* on May 31st. and from which I bred an interesting series of over fifty. My friend, Major T. C. Hinks, of "La Jaspellerie" kindly put his garden at my disposal, when he heard of the "capture." It was noticed that the larvae appeared to prefer the petals of the tree-lupin on which they were fed, often changing their skins inside the blooms. No attempt to rear a second brood was made, as the weather was bad at the time of emergence, and the lupin-pods had ripened and the seeds burst from the pods.

Other species of butterflies, the habits of which were to be double-brooded, were collected in the Spring, and sent to England to be bred on "The Butterfly Farm" at Bexley, Kent. With these bred specimens, and the collected ones, a large and varied collection of SARK butterflies was assembled.

The specific names and the Geographical Variations of *Melitaea parthenoides*, Kef. (=parthenie, auct. nec Borkh.) and of *parthenie*, Borkh. (=aurelia, Nickerl).

By ROGER VERITY, M.D.

(Continued from page 155)

Race **vividocolore**, nom. nov., from Hungary (Holotype of Kisnyir in my collection), is well worth recording on account of its vivid-red tone of fulvous, which I have seen in no other region, even individually, so that it stands out amongst all the other races; the black pattern being thin and sharp the bright fulvous spreads broadly.

Race *aurelia*, Nickerl and race *parthenie*, Borkh. = *minor*, Esp. [prim. homon.] = *lucasi*, Vrtý: We have already seen that the "type" of Borkhausen's *parthenie*, to which the name was explicitly given when

he erected it, is Esper's figure 1 of a specimen from Erlangen in Franconia and that *aurelia* was erected in a Synopsis of the Lepidoptera of Bohemia. Esper's figure represents the smallest individual form of the species, of a pale, dull, fulvous and with the black pattern reduced to the utmost extent: the two premarginal streaks are thin and stand away from each other, the central elbowed row of spots of the forewing is thin and partly obliterated in its central portion; the whole pattern is greyish, rather than black. This rather unusual appearance is probably the cause which has raised doubts in some minds about the species it belonged to, but they are entirely unjustifiable, as some of the French specimens, from the Plateau St.-Claude, near Moreuil (Oise), (collected from the 22nd to the 29th of June 1915 by D. Lucas, under the German guns), which I have named race *lucasi* in the *Bull. Soc. Ent. France*, 1920, p. 272, correspond so exactly with that figure, that it might have been drawn from them and, what is more, in series of specimens from nearly every locality one finds some which are more or less an approach to it by their thin markings and their pale colouring. In my series from Vienna there is a particularly sharp contrast between this individual form and the extreme opposite one, which resembles race *nigroboscuro*, described above, by its rich colouring and its heavy black pattern, reducing the fulvous to rows of small spots standing well apart and to absolutely tiny ones especially on the hindwings: Seitz figures a specimen of this sort on pl. 66h. The race of Vienna, like that of Regensburg, mentioned above, can thus be considered a mixture of the northern and of the southern races of central Europe and can be adequately designated by the compound name of *aurelia-nigroboscuro*, Nick.-Vrty. whereas for races consisting chiefly of a form intermediate between the two, such as the one figured by Osthelder, the *trans. ad* term is most suitable. Lang figures on pl. XLV of his *Butt. Eur.* a large female, transitional to the southern race, but not as melanic, with which several of my Vienna specimens agree perfectly; a few are of a bright colour which somewhat points to the Hungarian one.

North of the Danube the size becomes smaller, the tone of colour paler and duller, the pattern thinner and more like an even network over all the wings, as well as in all the individuals, so that the race has a more uniform appearance. This is usually taken to be the nominotypical *aurelia*, Nick., and, as a matter of fact, it seems absolutely correct and quite practical to use this name for it racially, although we have now, I think, clearly made out that the nominotypical race of the species *parthenie*, Borkh., is not that usual, broadspread, one, but the more local one, obviously produced by unfavourable conditions and, consequently, smaller, frailer and paler, as it is well represented by Esper; presumably such conditions occur, here and there, over the whole area of race *aurelia*, from Silesia, or further east, to Northern and Central Germany and to Northern and Central France; according to what is known for the present this species reaches only as far as the Indre and the Sarthe and, if I am not wrong, the genitalia have been dissected only in my specimens from the Oise, which I sent to Reverdin. The name of *lucasi*, I had erected for them, now must evidently fall as an exact synonym of *parthenie*, Borkh. in its "typical" form figured by Esper. Oberthür in his *Études Léop. Comp.*, IV, figs. 352-3, illustrates a couple of the more usual *aurelia* form from Samoussy in

the Aisne; Herbst's rougher figures of 1800 are drawn from the same sort of specimens and presumably German; Osthelder's photographic figures 11 and 12 (*l.c.*) represent a couple from Coblenz, which is intermediate between the better characterised *aurelia* and the most extreme nominotypical *parthenie* = *lucasi*, whilst his figures 9 and 10 from Jura specimens seems to vary more, by its larger size, towards the southern race *nigroboscuro*, with which that author informs us he found it mixed in that locality.

From the Jura chain race *aurelia* extends also up the Valais valley. Frubstorfer informs us, in his little monograph on this species, that in the lower Valais a race has been found at Chiéboz corresponding to *aurelia*, as sustained by Favre (to my mind, however, it shows distinct signs of transition to race *imitatrix* of the Cotian Alps) whereas in the upper part of that valley the aspect gradually changes entirely in the most remarkable way, considering the short distance, and turns to a race which is a near approach to *rhaetica* even at the lowest altitudes, without, however, becoming quite like it even at high altitudes on the Simplon road. He points out very rightly that the females never exhibit the contrast between reddish fulvous and clear yellow spaces which gives those of *rhaetica* their very variegated look and constitute the only real peculiarity of the latter race, as we will presently see.

Race **poenina**, nom. nov., is thus a name which is necessary to obviate the mistake of calling *aurelia* or *rhaetica* a race which is perfectly intermediate between the two, so that some have attributed it to the first and others to the second. I choose as Holotype the female from Bérisal in my collection, whose genitalia has been dissected by Reverdin (slide N.6236 of his files). Oberthür figures a couple from that locality exactly corresponding to some of my specimens (*l.c.* figs. 359-60), but it would require a full plate to convey an idea of the general appearance of such a variable race as this one. As a matter of fact the best description, one can give of it, is that its broad individual variability constitutes the difference between it and the *aurelia* one of the lower Valais and makes it resemble *rhaetica*, which is still more variable in the same direction and produces a still more alpine-looking form of female, so that *poenina* stands to *rhaetica* very much as *variabella* stands to *varia* in the same regions.

Race *rhaetica*, Frey, named in 1880, has since been constantly mentioned by all the text-books, but the few vague words of description, which compares it with *aurelia* and translates as follows (Wheeler's translation in his *Butt. Switz.* does not seem to me quite to convey the meaning of the German), was evidently the first cause of the vagueness: "subject, very naturally, to a certain degree of variability, smaller, of a brighter reddish brown, less darkened, with a thinner black pattern, the female, not uncommonly, with very light brown rows of spots"; it is described from Chur in the Grisons. Frubstorfer has, at last, furnished us with proper information as regards the race of that region and made it possible to use the name in a correct and definite way. He says variation is enormous in both sexes: one of the extreme forms is so melanic that it is exactly similar to *valsunga* of the Alps of Bavaria, the other, on the contrary, has very broad

brownish yellow spaces. The latter is, of course, the form described by Frey, but I find that the smaller specimens of this sort I possess from Saint Moritz are perfectly identical with my *lucasi* from the north of France, so that, according to the first part of that description, *rhaetica* would be nothing more nor less than Borkhausen's nomino-typical *parthenie*, figured by Esper. Fruhstorfer further remarks, however, that the female form described by Frey is the striking one, really peculiar to the Rhaetian Alps, with some large clear yellowish spaces, contrasting with the deep reddish fulvous of the others, so that the name of *rhaetica* must be applied to this female form in particular and to the race which produces it in general. As stated above, this race is typically of the Rhaetian Alps and it does not extend to the west of them, but it probably spreads considerably eastwards.

(To be continued.)

CURRENT NOTES AND SHORT NOTICES.

We regret that the accidental omission of the figure 8 should have caused Librarians so much perturbation. Had they looked at the cover they would have seen JULY-AUGUST and further, consultation of the pagination would certainly have obviated unnecessary postage.

In the SUPPLEMENT on the *British Noctuae* the consideration of the genus *Apamea* is in hand, and I should be pleased to have any notes on the various species, descriptions of not hitherto recorded aberrations, etc., etc. The species are *A. pabulatricula* (*connexa*), *A. ophiogramma*, *A. gemina* (*obscura*), *A. unanimis*, and *A. didyma* (*oculea*) (*secalis*). These will be followed by the *Miana* species, *M. strigilis* (*M. latruncula*), *M. fasciuncula*, *M. bicoloria* (*furuncula*), and *M. literosa*. Some of these extremely variable species have already been dealt with by Tutt in a very detailed and comprehensive manner, so that there remain only a few new additions, which on close investigation will probably be found redundant. There are possibly two species in *M. strigilis*, but I may not deal with that point fully and it will be next to impossible to allocate the numerous named forms to their proper species if the two species are definitely separated, except after much detailed examination of a sufficient number of each named form.—H.J.T. [Irish *M. strigilis* are much desired.]

We hear that our colleague Dr. Malcolm Burr has published an account of his stay in Siberia, "The Land of Ice and Exile," with an intimate picture of Siberian peasant life to-day. To those who expressed pleasure with his African Notes in our own magazine this book will no doubt not only be very interesting but very informative on the Russia of to-day.

Dr. Verity tells us that he is busily engaged in writing a book; we take it of a more popular nature, on the wondrous biological problems around us.

We have to thank our kindly correspondent Mr. J. Derenne (Brussels) for pointing out an error in the Noctuae Supplement on p. (197). "Austria" is given as the locality of ab. *caeruleascens* of *P. lithoxylea*. It should be "Corsica."

Parts 26 and 27 of the *Supplement to Seitz' Palaearctic Macrolepidoptera* has just been issued. They consist of 16 pp. of letterpress and pls. 4, 5, 6, 7 all relating to Vol. II. The references to the original descriptions of the forms in *Zygaenidae* are completed and additions to the *Syntomidae* (*Amatidae*) and *Arctiidae* (part) are commenced. Plate 4 completes the figures of new forms of *Zygaenidae*, the other plates figure a large number of *Arctiid* forms. In all nearly 250 figures are given several being of species not illustrated in the main volume. The British species treated of are *Celama confusalis* and *C. centonalis*, *Nudaria mundana* and *Comacla senex*. We trust the difficulties of the times will not adversely affect the issue of this admirable summary of work accomplished during the past quarter of a century.—Hy.J.T.

It seems to us that in view of the Revision of the Rules regulating the Nomenclature of Entomology which is in progress (admittedly dreadfully slow progress) writers should refrain from adding unnecessarily to the already overburdened toll of names, many of which will, no doubt, have to be discarded, when these new Rules are promulgated and accepted generally. It is embarrassing enough to entomologists to "unlearn" names under the rule of priority, but that is a small difficulty compared with the jugglery that is carried on under the "wretched homonym" rule. The application of the homonym regulation to specific names may, in some cases, be useful and convenient, but to apply it to any grade lower than specific is to reduce nomenclature to foolishness. Surely nothing can be more convenient and educative than to name the subspecies or race of every generally distributed *Lycaenid*, which is found in Siberia as subsp. *sibirica* or race *sibirica*. In fact every third or fourth grade of a species might as a matter of convenience be given a locality name, e.g., r. *rossica*, subsp. *algerica*, etc. Given the locality or area of capture and one would know the subspecific name at once. Economy of time, increase of efficiency. The general Zoological Rules are unworkable in Entomology and their slavish observation is detrimental to progress from the confusion which arises.

Another three parts, Nos. 7, 8 and 9, of the *Minen Herbarium* issued by Messrs T. O. Weigel of Leipzig and arranged by the talented Dr. Hering of the Berlin National Museum have just come to hand. It is necessarily a slow process to collect for these admirable productions, which can only appear after the close of the collecting season. There are in these parts 60 subjects, 18 being *Lepidoptera*, 35 *Diptera*, 3 *Coleoptera* and 4 *Hymenoptera*. Very great care has been spent in collecting and mounting the specimens, all of which are admirably extended, and the time spent in duplicating specimens for many copies must be very great. The subjects are grouped by the plants affected, those on oak, elm, nettle, poplar, maple, tansy, heracleum, wormwood come together and help reference. We congratulate the compiler on having a publisher who so ably presents the work in convenient form. We might suggest to subscribers to the work to take means to keep the mites away.—Hy.J.T.

The following Fellows have been nominated as Officers and Council of the Entomological Society of London for the ensuing year:—

President: H. Eltringham, M.A., D.Sc., F.R.S. *Treasurer*: Captain A. F. Hemming, C.B.E. *Secretary*: S. A. Neave, M.A., D.Sc. *Other Members of Council*:—H. W. Andrews, Captain E. Bagwell-Purefoy, F.Z.S., Sir T. Hudson Beare, B.Sc., F.R.S.A., K. G. Blair, B.Sc., G. H. Carpenter, D.Sc., M.R.I.A., H. St. J. K. Donisthorpe, F.Z.S., Major R. W. G. Hingston, M.C., A. D. Imms, M.A., D.Sc., F.R.S., R. W. Lloyd, Miss C. Longfield, Sir Guy A. K. Marshall, C.M.G., D.Sc., F.R.S., Professor E. B. Poulton, M.A., D.Sc., F.R.S., O. W. Richards, M.A., V. B. Wigglesworth, M.A., B.Ch., M.D.

We note that, as usual, each of the three entomological magazines and the chief entomological societies of the country have someone directly connected with them in the List.

Two Meetings of the Entomological Club were held at Oxford, on Oct. 3rd Prof. E. B. Poulton in the Chair, and on Oct. 4th Dr. Harry Eltringham in the Chair. *Members* present in addition to the Chairman:—Mr. H. Donisthorpe, Mr. J. E. Collin, Mr. W. J. Kaye. *Visitors* present:—Mr. J. H. Andrewes, Mr. E. Bolton-King, Dr. D. G. Hale Carpenter, Dr. F. A. Dixey, Mr. B. M. Hobby, Capt. A. F. Hemming, Sir Guy Marshall, Mr. A. J. Pomeroy, Capt. N. D. Riley, Dr. Hugh Scott, Mr. W. H. T. Tams, Comm. J. J. Walker, Mr. C. J. Wainwright.

On Saturday afternoon the members and visitors assembled at the Hope Department, where Prof. Poulton and Dr. Eltringham assisted the party in the inspection of the collections; and Tea was served by Mrs. Poulton at 4 o'clock. Apartments were provided for members and guests at Jesus College, and dinner was served at Jesus College at 7.45 p.m.

On Sunday, Oct. 4th, the party made excursions to various parts during the morning, and luncheon was provided at Jesus College. In the afternoon the members and guests journeyed to Cothill by motor car in rather dull weather, where a picnic tea was much enjoyed. During the afternoon some interesting Diptera were captured, but nothing else was on the move except a most virulent and innumerable host of midges. Dinner was served at Jesus College at 7.45, and a very pleasant and entertaining evening was spent. The meetings were very successful, quite in accord with the Oxford tradition. The party broke up on Monday morning.—H.W-E.

An entirely new magazine has reached us from Brazil, the *Revista Entomologia*, published at Sao Paulo and edited by Signor Thomaz Borgmeier. It is written largely in Spanish although there are in Fasc. 2 and 3 to hand articles in English (3), German (4) and French (1). It deals exclusively with the S. America fauna and is well illustrated. We note that of the 17 articles no less than 8 are relating to the Diptera and 5 to the Coleoptera. One of the most useful features is the extensive section devoted to the Bibliography of all papers recently published on the neotropical fauna, each notice comprising a brief abstract. The 3 parts so far published comprise 384 small quarto pages of very well printed matter. The *Revista* does not appear to emanate from any society or from a state establishment. It should be found of great use to students of the entomology of the American fauna.

The *Ent. Rundschau* for June contains an article by Prof. Draudt

on the genus *Palluperina*, Hampson, containing the Noctuids *testacea*, *nickerlii*, *guenéei*, *dumerilii*, etc., and allied species with three plates, one having 19 figures of imagines the other two having numerous comparative figures of the genitalic details.

The *London Naturalist* for 1930 has been published and contains the reports of the proceedings of the various sections into which the activities of the Society are devoted, Archaeology, Botany, Entomology, Ornithology, Plant Galls, Ramblers, and the General Society matters. There is an excellent portrait of the ex-President A. W. Mera who passed away during the year. The Hon. Sec. H. J. Burkill gives a full account of the Plant Galls met with not confined to mere records but full of interesting biological details. The same author has a notice of the more notable butterfly occurrences of the year, and some remarks on the rarer Heterocera. Mr. Niblet has two short articles "Some Gall-causing *Trypetidae*" and "Cynipid Oak Galls of Surrey." The volume is illustrated by several plates with much other interesting matter in its 144 pages.

Lambillionea for July contains a photographic plate of two aberrations of *Limenitis sibilla* and of two of *L. populi*.

The *Ent. Rund.* for August has figures of two fine halved gynandromorphs; *Limenitis populi*, Left *tremulae* ♂, Right *populi* ♀, and of *Huphina nerissa*, L. male, R. female.

REVIEWS AND NOTICES OF BOOKS.

ANLEITUNG ZUM SAMMELN IN TROPISCHEN LANDES. By C. Ribbe, pp. 214, figs. 19. Messrs. Alfred Kern, Verlag, Stuttgart.—"Instructions for Collectors in Tropical Lands." This is a long-needed work and being compiled by an experienced tropical collector, the third generation of travelling collectors, it is full of small practical suggestions as well as all the necessary details of equipment for an extended tour of collecting. The instructions cover all classes of the collecting of natural objects but the bulk of the matter deals with the collecting of insects, after the general instructions as to the necessities required in a lengthened stay in out of the way areas. Starting with packing cases, clothing, tent, bed, bags, cooking utensils, tools, painting, drawing and writing material, microscope, collecting nets, etc., watch, compass, thermometer, barometer, medicine chest, drying case, killing materials, books, diary, setting, preserving, packing, despatching, pins, lanterns, breeding, etc., etc., apparently nothing is omitted, which is thought to be of any use. The most likely localities for successful work are discussed with their special requirements. The modification of all the above instructions for their adoption for collecting "other orders" is subsequently included, and where necessary for clearness illustrations are given, e.g., the arrangements to avoid the damage occasioned by the depredations of ants. Much of the matter although written regarding tropical collecting, will be found most useful by field workers nearer home. We wish it were in English, although most tropical workers, no doubt, can use it easily.—Hy.J.T.

BUTTERFLY AND MOTH BOOK. E. Robertson-Miller. Charles Scribner and Sons, New York. 310 pp. over 200 figs.—This is one of those chatty natural history books well-calculated to imbue a love of insect-life and habits, not only in the young, but in children in entomology of more mature years. Each of the 42 chapters deals with a conspicuous and more or less common lepidopteron and treats of its peculiar life-history and development from egg to imago. The descriptions are an account in non-scientific language of what actually occurred in the breeding carried on by the authoress, and abundantly illustrated by some of her earnest and willing helpers. Only the necessary technical terms are used such as “antenna,” “scales,” etc.; the Latin names are supplied, the species being for instance called lady *luna*, the *cynthia*, the *promethea*, the *juglandis*, instead of coining a new vulgar name. Where a good common name exists it is used e.g., “bag-worms”; although in each case the scientific generic and specific names are added. A book of this nature is a splendid missionary effort and is bound to arouse a love for these fascinating creatures and add many converts to the ranks of our fellow entomologists. It is well and attractively produced.—Hy.J.T.

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The names and forms to be considered are as follow:—

flavago, Schiff. *Verz.* 86 (1775).

aureo-maculata, Goeze. *Beitr.* III (3). 238 (1781).

ab. *ochracea*, Hüb. *Beitr.* I (1). 19. pl. 2. (1786).

rutilago, Fb. *Ent. Sys. auct.* III (2). 75 (1794).

lappae, Don. *N.H. Brit. Ins.* X. 35. pl. 340 (1801).

ochraceago, Haw. *Lep. Brit.* 234 (1806-10).

? race *xanthenes*, Germ. *Fn. Ins. Eur.* XXII. pl. 22. (1839) [Guen. *Noct.* I. 121. (1852)].

ab. *cinerea*, Goos. *Ann. Soc. Ent. Fr.* 155 (1880).

ab. *flavo-auratum*, Tutt. *Ent.* XXI. 271 (1888).

ab. *suffusa*, Warr.-Seitz. *Pal. Noct.* III. 225. pl. 46e (1911).

Tutt deals with (1) *flavago* the real typical form (2) the *ochracea*, Hb. He also says distinctly that his *flavoauratum* is the *flavago* of Guen., Newm., Stain., Hump. and Westw., Haworth (*ochraceago*), hence the name *flavoauratum* must fall to a synonym.

aureo-maculata, Goeze. *Beitr.* III (3). 238. (1781).

FIG.—Sepp. "*Ned. Ins.*" I. pt. 4. p. 13. pl. 3.

ORIG. DESCRIP.—"Cristata; alis incumbentibus: anticis pallide fuscis, aureo-flavo-maculatis, fasciisque; posticis pallide incarnatis." (condensed from Sepp by Goeze.)

This is typical *flavago* from the figure.

rutilago, Fb. *Ent. Sys. emend.* III (2). 75 (1794.)

ORIG. DESCRIP.—"Cristata alis deflexis flavis ferrugineo strigosis: fascia baseos apicisque fusca." The rest of the description is not this species.

As pointed out by Treit. V (2). 335. the citation of *Wien. Verz.* 86. 4 is *marginata* and the larva feeding on poplar is wrong; while the extended description refers most probably to a form of *aurago*. The short description of *rutilago* is that of *flavago*, Schiff.

This is typical *flavago*.

lappae, Don. *N.H. Brit. Ins.* X. 35. (1801).

FIG.—*l.c.* pl. 340.

ORIG. DESCRIP.—"First wings ferrugineous; a broad yellow clouded bar with three yellow eye-shaped spots across the middle. A yellow spot at the base, and another at the apex. Second wings pale, with an obscure transverse streak."

This also is typical *flavago*.

ochraceago, Haw. *Lep. Brit.* 234 (1806-10).

ORIG. DESCRIP.—"Alis aureis rufo dense irroratis, fasciis duabus rufo-fuscis."

"Thorax cristatus cinereo-fuscus maculis quatuor ferrugineis. Alae anticae fasciâ rectâ rufo-fuscâ juxta basin, et vix ultra hanc strigâ obscurâ ferrugineâ; tunc stigmata ordinaria flava ferrugineo parum irrorata: subtus haec, stigma tertium exacte parabolicum et strigae superdescriptae connexum: tandem fascia postica rufo fusca extus dentata, intus marginata lunulis obsoletis confluentibus aureis. Inter hanc fasciam et marginem posticum, color saturatior quam ante fasciam, sed apex

flavescit. Cilia rufo-fusca. Posticae alae albae lunulâ media, strigis duabus obsoletis fusciscentibus, strigâque aliâ lunulatâ ipso margine, et ciliis cinereo-fuscis."

References to Hüb. *Beitr.*, Hüb. *Saml.*, and Don. *Brit. Ins.* for figs.

Again a description of the typical *flavago*.

? race *xanthenes*, Germ. *Fn. Ins. Eur.* XXII. pl. 22 (1839).

NOTE.—According to Goossens, *Ann. Soc. Ent. Fr.* 155 (1880), the *xanthenes*, Germ. is the southern, artichoke feeding form of *ochracea*, of the size of *Hydroceta lunata (leucographa)* and distinguished from it by the relatively darker hindwings, by the waved line not strongly defective on the outer side on vein II₅, as well as by the first short cross line curving towards the base before reaching the costa. Millière's figure much resembles *flavago* but the designs on the forewings are confused and less distinct and recognisable although there in remnants and irregularly emphasised or suppressed. "It is above the average size of *ochracea*."

Spuler quotes Goossens opinion, and accepts his determination.

Herrich-Schäff reports Mann as saying that the figure in Germar's *In.* XXII. fig. 22 is very incorrect in shape, marking and colour.

The description made by Guenée from Germar's figure and Herr.-Schäff. description is as follows:—[*Hist. Nat. Noct.*, V = I. 121 (1852).]

ORIG. DESCRIP.—(Made by Guenée *Noct. I.* 121). "Forewings of a clear violet-grey, with basal space, the median area, except the space between the two stigmata and below the reniform, at the subterminal line, of an ochraceous yellow. The three stigmata of the same yellow; the orbicular surrounded and pupilled with grey, the claviform divided by a strong mark, and the reniform very near the elbowed line, marked plainly by a concentric ring, but never split into parts. Lower wings, of a violet grey in both sexes; the undersides of the same grey, without any trace of deeper lines."

There seems no agreement between authors as to this form (or species). Even Hampson and Warren are at variance.

race *cinerea*, Gooss. *Ann. Soc. Ent. Fr.* 157 (1880).

DESCRIP.—"It is distinguished from the type by the ground colour, which is pale yellow or ferruginous grey; the three stigmata scarcely obvious, indicated only by a small remnant in reddish brown; a large darkened space between the reniform and orbicular; the extra basal line little or not emphasised; the space between the subterminal and the fringe, either of the ground colour, or entirely brown violet without reflection at the apex; the hindwing without marking or discal mark; sometimes white or hyaline; the thorax like the ground colour, that is to say clearer than in *flavago*. It is what *palleago* is to *gilvago*."

Hamp. *Cat. Lep. Ph.* IX. 34 (1910). "Forewing pale yellow or reddish-grey, the stigmata almost obsolete, a dark patch between orbicular and reniform, the terminal area of the ground-colour or violet brown without pale apical patch; hindwing whitish greyish without markings."—Algeria.

ab. *suffusa*, Warr.-Seitz, *Pal. Noct.* III. 225 (1911).

FIGS.—*l.c.* pl. 46c.

ORIG. DESCRIP.—“The forewing is wholly suffused with ferruginous.”

Several species have a facies very similar to *flavago* and have similar life-histories; *xanthenes*, Germ., H.-S., and Mill., from Sicily and Centre of France: *lunata*, Kind., from Turkey and Corsica: *moeslaca*, Friv. from the Balkans. With *flavago* they appear to form a small group of very closely allied species or subspecies of that less local species.

Hampson, *Lep. Phal.*, IX. puts *moeslaca* and *xanthenes* next to *leucographa* in *Hydroecia*, and *lunata* as synonymous with that species.

Hydroecia, Gn. (1852) [*Apamea*, Tr. (1816-25); *Gortyna*, Tr. (1816-25); *Sideridis*, Hb. (1822)] *nictitans*, L. (1767) = *oculea*, L. (1761).

Tutt overlooked the fact that *nictitans* had been previously described under the name *oculea* in the *Fn. Suec.* (1761).

Warr.-Seitz and Hampson put *nictitans* in *Apamea*, Tr.

Tutt, *Ent.* XXI. 309 (1888): *Brit. Noct.* I. 58 (1891); Barr. *Lep. Br. Is.* V. 62, pl. 192 (1899): *Stdgr. Cat.* III. ed. 186 (1901): Spuler, *Schm. Eur.* I. 214 pl. 42 (1906): *South Moths Br. Is.* I. 294 pl. 143 (1907): Hamp. *Lep. Ph.* IX. 27 (1910). Warr.-Seitz *Pal. Noct.* III. 224, pl. 46b (1911): *Culot N. & G.* I(1). 205, pl. 37 (1909-13).

Esper's figures pl. 126 of vol IV. Fig. 5 ♀ is a light example with pale outer margin. Fig. 6 might be anything.

Ernst. and Engram. figs. 394 are not reliable, in fact *a* and *b* are not recognisable. The 11 figs. on pl. 256 which they give as *nictitans* are *didyma* (*oculea*) and other species. (See Werneburg.)

Hb. fig. 221 *chrysographa* is that of an example in which the reniform stigma is difficult to distinguish. I have never seen an example like it. Possibly the yellow reniform has lost colour. It is now ascribed to *lucens*, H.-S., figs. 285-8, by some writers.

Duponchel's figure, vol. VII., pl. 104 is not at all satisfactory, being much more like *umbrosa*.

The figure of Freyer, *Beitr.* III. pl. 141, *fucosa* (not described) is stated to be marked exactly as the dark figure *chrysographa*, Hb. although very different at first glance. Reference is given to Hübner's figure, 688, 689 *macilenta*, but this last is an inexplicable error, for Hübner's figure is undoubtedly *ferruginea* in colour, marking, size and shape of wings.

Wood's fig. *Ind. Ent.* 364, is entirely red-brown, both fore and hindwings.

Hampson's fig. is unusually large. *Phal.* IX. 27.

Draudt-Seitz, *Am. Noct.* VII. pl. 40d, gives a figure of the very orange American form with white reniform and orange orbicular.

The names and forms to be considered are as follow.—
oculea, L. *Fn. Suec.* 321. (1761).

- ab. *brunnea*, Hufn. *Berl. Mag.* no 69. (1766).
nictitans, L. *Sys. Nat.* XII ed., 847 (1767).
xanthographa, Schiff. *Verz.* 86 (1775).
 ab. *chrysographa*, Schiff. *l.c.* 313. Sup. (1775).
pupilla, Fb. *Ent. Sys. auc.* III (2). 69 (1794).
myopa, Fb. *l.c.* III (2). 116. (1794).
cinerago, Fb. *Supp. Ent.* 445 (1798).
 [*chrysographa*, Hb. *Saml.* 221 (1802).]
 [*nictitina*, Haw. *Prod.* 18 (1802)]
auricula, Don. *N.H. Br. Ins.* XII, 397 (1807).
 [*auriculá*, Haw. *Lep. Brit.* 240 (1809).]
 ab. *erythro stigma*, Haw. *l.c.* 231 (1809).
fucosa, Freyer. *Beitr.* III. 152. pl. 141. 2. (1830).
paludivago, Klug. *Symb. Phys.* (1832).
 subsp. *americana*, Spey. *Stett. e. Zeit.* 152 (1872).
 ab. *pallida*, Tutt. *Ent.* XXI. 307. pl. 1. 7-12 (1888).
 ab. *rosea*, Tutt. *l.c.*
 ab. *obscura*, Tutt. *l.c.*
 ab. *lusca*, Smith. *List. Lep. N.A.* 45. (1891).
 ab. *pallida-flavo*, Tutt. *Brit. Noct.* I. 58. (1891).
 ab. *pallida-rufo*, Tutt. *l.c.*
 ab. *rosea-flavo*, Tutt. *l.c.*
 ab. *rosea-rufo*, Tutt. *l.c.*
 ab. *obscura-flavo*, Tutt. *l.c.*
 ab. *obscura-rufo*, Tutt. *l.c.*
 ab. *albicosta*. Tutt. *l.c.*
 subsp. *pallescens*, Stdgr. *Iris.* XII. 342 (1899).
 race *pacifica*, Smith. *Tr. Am. E.S.* XXVI. 17-19 (1899).
 race *atlantica*, Smith. *l.c.*
 race *interoceania*, Smith. *l.c.*
 ab. *conjuncta*, Splr. *Schm. Eur.* I. 214. (1906).

Tutt deals with (1) the typical deep red form with white reniform as *nictitans*; (2) the grey form with white reniform *pallida*; (3) ditto yellow reniform *pallida-flavo*; (4) ditto red reniform *pallida-rufo*; (5) the red form, reniform white *rosea*; (6) ditto reniform yellow *rosea-flavo*; (7) ditto reniform red *rosea-rufo*; (8) the deep red form with yellow reniform *auricula*; (9) ditto with red reniform *erythro stigma*; (10) deep brown or black red, white reniform *obscura*; (11) ditto yellow reniform *obscura-flavo*; ditto red reniform *obscura-rufo*; (13) *albicosta*, clear white costa.

Stephens says III. 8. he can perceive no characters indicative of specific difference between this species and the *erythro stigma* of Haw.

Guenée says that *erythro stigma* differs only from *nictitans* in having the reniform saffron yellow with a reddish tinge.

Of the Variation Barrett says—"Variation in this species is very great. All the variations size, colour and distinctness of the reniform stigma interchange and shade imperceptibly into each other. On the whole the tendency towards orange colouring or darkening of the stigma is perhaps more noticeable in the female, and this sex often has a tendency towards soft browns in the general colouring; but in both sexes every possible gradation seems to occur, from the deepest,

darkest purple-red to dull brown and pale yellow brown. Sometimes the white reniform stigma is unusually large, and then the orbicular is usually orange-coloured and more conspicuous than ordinary, or the lines and nervures are darkened, and the appearance of reticulation made conspicuous. One from the Essex Coast has all the fine lines, seven in number, blackened, and the hind margin very dark, but the stripe before it pale purple grey. Some, from other parts of the coast more particularly, have the reniform stigma altered in shape or partially dark coloured, the outer portion usually, and only an oblique and inner portion white, or even only the inner margin. One is almost unicolorous, the stigmata only indicated by the faintest outlines. Scottish specimens have the reniform stigma very brilliantly white in some cases divided by dark lines into eight or nine separate dots. Some from Sutherland are of a more than ordinarily rich red, with beautifully rich orange-brown stigmata." [Of course Barrett mixed the species subsequently differentiated.]

Again Tutt did not give the original description. In taking his description from Linn. *Sys. Nat.* XIIed. 847 (1767) he overlooked the reference on the next line—" *Fn. Suec. 1215.*"

The original description *Fn. Suec.* p. 321 (1761) reads as follows:—

"*Noctua oculea spirilinguis cristata, alis ferrugineo-griseis macula reniformi nivea: pupilla lunuli lutea.*"

"*Rustica media f. minor. Alae superiores griseo-nebulosae cum obsoleta tinctura ferruginea: macula prior alae orbiculata, ferruginea obsoleta, posterior reniformis in qua lunula lutea margine ferrugineo; in margine crassiore, pone maculas ordinarias, puncta tria minutissima alba. Subtus alae arcu et puncto fusco.*"

It will be noted that the prior name of 1761 is *oculea*, which Linnaeus changed in the XIIed. (1767). Esper about 1788 and Borkhausen in 1792 gave this reference but also do not adopt the name *oculea*. Treit. in 1825 and Herr.-Sch. 1845 both do the same. No doubt this was because at the time no publication earlier than the XIIed. of the *Sys. Nat.* (1767) was held as valid for nomenclature.

ab. brunnea, Hufn., *Berlin Mag.* III., no. 69 (1766).

FIG.—Kleeman (Rösel) *Belust.* I(V.), pl. 17, fig. A-B (1761).

ORIG. DESCIP.—"White spot; bright brown with dark brown shading and marked with a white spot in the middle of the forewing."

Rottenburg, *Naturf.* IX. 131, in his critical review of Hufnagel's notes gives Kleeman's fig. as reference (1776).

Werneburg, *Beitr.* I. 251, says, "without doubt" this description is of *didyma*, Tr. He calls Kleeman's figure a bad one, and that only the reference to the larva suggests that it is *nictitans*. But in his subsequent statement p. 289, when discussing this figure he shows from Kleeman's description on p. 155 it is undoubtedly a figure of a *nictitans* form.

xanthographa, Schiff. *Verz.* 86 (1775).

ORIG. DESCIP.—"The chestnut brown yellow-marked Noctua."

Esper, in noting that the name *nictitans* does not occur in the *Verz.* Schiff., overlooked the "nachtrage" with *chrysographa* and says that he considers *xanthographa*, Schiff. is intended for *nictitans*, and in

the references gives *oculea* of Fab. in *Sys. Ent., Sp. Ins., Mant.* and *Ent. Sys.* all four as *nictitans*.

Fuessly, *Neu. Mag.* follows Schrank in considering *xanthographa*, Schiff. to be meant for *nictitans*.

ab. *chrysographa*, Schiff. 313 *Verz. Nachtrage.* (1775).

ORIG. DESCRIP.—“The orange-brown, golden yellow marked Noctua.”

Illiger, *Neu. Verz. Wien.* I. 281. (1801) says that this is a noteworthy var. of *nictitans*, with the reniform yellow.

[Illiger points out that the no. 20 *xanthographa* of the *Verz.* is *nictitans*, Linn. XIIed. The description made from this Noctua in the Schiff. collection agreed exactly with the descriptions of *nictitans* in Linn. and Bork. and with that of *xanthographa* in Fab. (Mant.), whereas the last description is quite at variance with that of the *xanthographa* given in Fab. *Ent. Sys. auct.*—Schrank. *Fuess. neu. Mag.* II. 217.]

nictitina, Haw. *Prod.* 18 (1802).

This a catalogue name which Haw. did not use subsequently.

pupilla, Fb. *Ent. Syst. emd.* III(2). 69 (1794).

ORIG. DESCRIP.—“Cristata alis planis fusco helvolis; macula anteriore ordinaria pupilla fulva.”

“Media, Caput thorax fusca, nitidula. Alae planae, obscure helvolae, in medio maculis ordinariis, cinereis anteriore rotundata, parva pupilla magna, fulva, posteriori majori, reniformi. Posticae albidae, subtus striga postica, fusca.” Kiel.

Werneburg says, I. 521, “*Fab.* cannot have considered the *N. pupilla*, which was a native of Kiel, anything else than a variety of *nictitans*.” [Possibly *paludis*, E.A.C.]

myopa, Fb., *Ent. Sys. emd.* III. 116 (1794).

ORIG. DESCRIP.—“Cristata alis deflexis fuscis; maculis ordinariis; anteriore fulva: iride alba, posteriori reniformi alba.”

“Parva. Corpus griseum, alae anticae fuscis, nitidulae puncto medio, distincto, fulvo, iride alba at pone hoc macula reniformis, alba, lunula fusca. Subtus omnes cinereae.” Dania.

Werneburg says, I. 521, *Fab.* description passes without any straining for a small example of *nictitans*, which occurs not rarely, but especially in Sweden. (See Zett. *Ins. Lapp.* 943 *nictitans* var. *b.*) and has been correctly well called small, as *Fab.* did his *myopa*.

cinerago, Fb. *Ent. Sys. emd.* Supp. 445 (1798)

ORIG. DESCRIP.—“Cristata alis deflexis obscure flavis fusco undatis punctoque medio fusco.”

“Parva. Antennae cinereae. Corpus cinereum. Alae anticae obscure flavescens strigis undatis fuscis. In medio alae punctum magnum, obscurum. Posticae fusco cinereae.” Italia.

This is identified by the earlier authorities as *chrysographa*, Schiff. (*nictitans*) teste Werneburg.

chrysographa, Hb. *Saml.* 221 (1802).

This is not the *chrysographa*, Schiff. Modern authors ascribe Hb. fig. to *lucens*.

auricula, Don., *N.H. Br. Ins.* XII. 397 (1807).

Tutt ascribed this form to Haw., whereas Haw. *Lep. Brit.* ascribed it to Donovan.

FIG.—*l.c.* 397.

ORIG. DESCRIP.—“Anterior wing subferruginous with a small fulvous spot, and in the middle a larger ear-shaped yellow spot enclosing a lunar ring.”

He considers it specifically distinct from *nictitans*, and gives as a reference Ernst's fig. 394. This figure is a form of *nictitans* with yellow reniform.

On p. 240, *Lep. Brit.*, Haw says:—“This (*auricula*) is probably not specifically distinct from *N. nictitans*.” Strange to say Haw. has not included the description of *nictitans* in his work.

fucosa, Fr., *Beitr.*, III. 152 (1830).

FIG.—*l.c.* pl. 141, 3.

ORIG. DESCRIP.—“The Hübnerian figure cited above accurately depicts this lepidopteron communicated to me by Dr. Schmidt in a single example. Since the name *macilenta* has already been used for the foregoing species, I must choose a new name for it. When one carefully compares this insect with a dark female example of *nictitans*, Hübner's *chrysographa*, they both show uncommon agreement in marking, and yet they are, when closely compared, quite different. The specimen was taken in August.”

paludivago, Klug., *Symb. Phys.*

This reference was given by Herrich-Schäff. as that of a var. of *nictitans* in the Catalogue attached to his *Sys. Bearb.* which he neither described nor included in his text. It was copied by several subsequent workers, but Stdgr. *Cat. Ied.* (1861) omits it. I have been unable to trace it. It is not in the copy of Klug's work in the Ent. Soc. Lond. Library. Probably it was only a catalogue name, and thus invalid.

race *americana*, Spey. *Stett. e. Zt.* XXXVI. 152 (1872).

FIG.—Holland, *Moth Book*. pl. XXVI. f. 2: Seitz *Am. Noct.* VII. pl. 40e.

ORIG. DESCRIP.—“The American form is generally somewhat larger on the average. Its forewings expand 14 to 16mm., typical *nictitans* measure only 12mm. to 15mm. The forewings are a little deeper hollowed out below the very sharp apex, more concave than in the European. The ground colour of the thorax and forewings is lighter and redder, a pale yellowish sealing wax red, tinged with brown or rust colour more or less strongly. Often impossible to distinguish European and American examples.”

“Al. ant. laetius latericiis s. fulvis apice subfalcato.”

Smith says, *Cat. Noct. boreal Am.* 175 (1893), “There seems to be no perceptible constant difference between European and American examples of this species; yet Speyer thought there was enough to authorise a variety *americana* which was never heard of after its description.”

Holland, *Moth Book* p. 212, says, “Has an extensive synonymy. Is found from the Atlantic to the Pacific, and shows in different localities slight differences in ground colour and markings which have

led to the creation of a number of subspecific distinctions by writers."

Hamp. *Cat. Lep. Ph.* IX. 28 (1910) "Forewing rather more orange-red."—E.U.S. and Canada.

ab. *lusca*, Smith, *List Lep. of N. Am.* 45 (1891). Harris MSS.

This is a Catalogue name only, without description. Smith himself says of it in his *Cat. Noct. boreal Am.* 175 (1893) "*A. lusca* is in the Harris collection in the Boston Society of Natural History,"

It was never described and is omitted from Dyar's List.

Draudt-Seitz, *Am. Noct.* VII. 282, says *lusca* = *americana*.

subsp. *pallescens*, Stdgr. "Iris." XIII. 342. (1898)

ORIG. DESCRIp.—"The 20 ♂s sent to me from Irkutsk are so distinctly separable, in that they are all mostly very much lighter coloured than typical European males. The fore-wings are in these light specimens dusky grey-yellow with brownish transverse lines and somewhat brownish suffusion about the reniform stigma, which last is mostly white but occasionally also brownish coloured. These specimens are so conspicuously different from the European examples with mostly wholly dark brown or occasionally light brown forewings, that they are quite worth the name var. *pallescens*. Occasionally transitions to this form occur in Europe as also among the specimens from Chamyl and Irkutsk as aberrations; a few specimens occur with light brown forewings. From a ♀ from Irkutsk lying before me and two somewhat worn ♀s from the Saisan neighbourhood the females of this form have the light-brown forewings; the hindwings especially of the Irkutsk ♀ are far less dark than in European examples. A ♂ from the northern Fergana area (Namangan) is not quite so light as the typical var. *pallescens*."

race *pacific*a, Smith, *Trans. Am. Ent. S.* XXVI. 19 (1899).

FIG.—Draudt-Seitz. *Am. Noct.* VII. pl. 40e.

ORIG. DESCRIp.—"Uniformly more chunky, the body is more heavily built, the thorax is squarer and the primaries are shorter and comparatively broader. Altogether it looks a much more compactly built species. So far as markings go, there is not much difference, and certainly none that would be considered as of specific value. Resembles *nictitans* almost as closely as does its Atlantic cousin." California.

Hamp. *Cat. Lep. Ph.* IX. 28 (1910) "Forewing greyer."—California.

race *atlantica*, Smith, *Trans. Am. Ent. S.* XXVI. 18 (1899).

ORIG. DESCRIp.—"Compared with the European examples of this species, it is almost impossible to say where the difference comes in. Superficially the markings are almost alike, and are certainly well within what is considered the ordinary range of variation. Seems to be a trifle more heavily built than *nictitans*, judging from superficial characters alone, their separation would hardly be justified." Atlantic Coast, E. of Rockies.

Dyar, *Cat.* 175, places *atlantica* as a synonym of *americana*, Speyer.

Draudt-Seitz *Am. Noct.* VII. 282, says *atlantica* = *americana*.

race *interoceanica*, Smith, *Trans. Am. Ent. S.* XXVI. 17 (1899).

ORIG. DESCRIP.—“Look like small dark examples of *nictitans*. Smaller, darker than *nictitans*, reniform is uniformly white marked. Orbicular round in all specimens, considerably paler and more yellowish than the ground colour but without any trace of white markings. Ground colour a very dark smoky brown, the ordinary markings almost blackish.” Winnipeg.

Hamp. *Cat. Lep. Ph.* IX. 28 (1910), “Forewing browner.”—W. Canada.

conjuncta, Splr. *Schm. Eur.*, I. 214 (1906).

ORIG. DESCRIP.—“With the yellowish margined orbicular united to the reniform stigma.” A ♀.

[The above forms are all given under *nictitans*. Possibly some of them may eventually be allotted to the species which have been separated from *nictitans*.]

In fact *americana* (*atlantica*), *pacifica* and *interoceania*, indistinguishable by any stable characteristics from *nictitans*, have been separated as structural or genitalic species. At any rate they are the representatives of the Palaearctic *nictitans* in the Nearctic Region, and if not of specific status must undoubtedly be recognised as subspecies, if other characters are eventually found to support the genitalic differences.

lucens, Fr. : *paludis*, Tutt : *crinanensis*, Brrs.

Continental entomologists seem to have known practically nothing of either *paludis* or *crinanensis*, while in this country our authorities are equally in ignorance, notably South in *Moths of the British Isles*, who merely mentions the saltern or marsh form of *nictitans* the *paludis* of Tutt, and refers to large specimens found in marshes by the sea, without giving a name, presumably referring to *lucens*. He however gives figures of ♂ and ♀ *paludis*, but says of these forms, “I cannot see that they otherwise differ from forms of *nictitans*.”

Hampson omits mention of *paludis* and *crinanensis* and puts *lucens* as an ab. of *nictitans*.

Meyrick, *IIed.*, admits all three as true species.

Of *paludis*, Warren-Seitz says, “Differs from *nictitans* in the apex of forewing being less produced, the outer margin thereby appearing less oblique; in ground colour it would appear to vary from light to dark forms as much as *nictitans* itself, but all that I have seen have been dark; it may at once be separated by the narrowness of the reniform stigma, the inner edge of which is darkened and hardly distinguishable from the brown ground colour; the reniform occurs of both colours, white and orange, but the narrowness is more noticeable in the former case.”

Warr.-Seitz gives ♂ and ♀ figures of *paludis*, the former with white reniform, the latter with orange reniform; both figures have dark ground colour, and the ♀ is considerably the larger.

Warren-Seitz puts *lucens* as a form of *nictitans*; he says, “*lucens*, Fr. resembles *nictitans*, but is larger, and with the ground, as a rule, pale and the reniform white.”

The species *crinanensis* is not recognised by Warren-Seitz.

The following analysis of the genitalic characteristics abstracted from Pierce and Burrows and classified comparatively may be useful.

	N.	P.	L.	C.
pencils	without	present	present	present
harpe	trigonate, rounded	trigonate, angulated	trigonate, angulated	trigonate, rounded
corona	extending half-way along the margin	three-quarter's way along the margin	beyond three-quarter's way along the margin	only on the upper fourth of the margin
cucullus	a large patch of spines at the anal angle	a large patch of spines at the anal angle, which is obtusely pointed	a small patch of spines at the anal angle, which is acutely pointed.	almost filled with spines. Below C. a semicircular flap with serrated edge
clasper	bifurcate with short arms	bifurcate, inner arm short, sometimes very short, outer arm long, generally straight	bifurcate, inner arm long, often curved, outer arm long, often curved	not produced, attached to the skin of the harpe
ampulla	a papilla	a papilla	a papilla, shorter than the preceding	
clavus	produced to a tapered hairy arm	produced to a long hairy arm, pointed at the tip		produced and tapered, hairy part way up, tip naked, attached to base and produced is a pointed plate with dentated edge
uncus	slender, slightly tapered	widest in the centre	widest in the centre	widest at the centre, but wider above than below
vesica	with bunch of 6 or 8 longish teeth	with bunch of short strong-ish teeth	with bunch of fine long teeth	with bunch of shortfish strong teeth

Hydroecia, Gn. *lucens*, Frx.

Tutt dealt with (1) the typical form ; (2) *pallida-albo*, the pale form with white reniform ; (3) *pallida-flavo*, ditto with yellow reniform ; (4) *grisea-albo*, the grey form with white reniform ; (5) *grisea-flavo*, ditto with yellow reniform ; (6) *rufa-albo*, the red form with white reniform ; (7) *rufa-flavo*, ditto with yellow reniform ; (8) the deep red *lucens-albo*, with white reniform ; (9) *lucens-flavo*, ditto with yellow reniform.

I know of no other forms which have been recorded.

Barrett mentions *lucens* but would not recognise it as a species. It was not until Tutt worked it out that it began to be accepted and the examination of genitalia by Burrows and Pierce confirmed his decision.

Hydroecia, Gn. *paludis*, Tutt.

Tutt did not reproduce his original description in *Brit. Noct.* nor even give a description of this species.

paludis, Tutt. *Ent.* XXI. 308 (1888).

FIGS. *l.c.* pl. I. 1-6.

ORIG. DESCRIPT.—“Is generally larger than *nictitans*, and in its different phases of variation is rarely, if ever, of the red coloration which is common in some shade or other to all the varieties of *nictitans*. The reniform of *paludis* is always more narrow, owing to the absence of the outside line on the inner edge of the reniform, which is present in that of *nictitans*; it is also less strongly marked, and always white or orange, never red.”

Tutt deals with (1) *paludis-albo* the typical form with white reniform ; (2) *paludis-flavo* with yellow reniform ; (3) *brunnea-albo*, the brown form with white reniform ; (4) *brunnea-flavo*, ditto with yellow reniform ; (5) *intermedia-albo*, the intermediate form with white reniform ; (6) *intermedia-flavo*, ditto with yellow reniform.

No further form is known to me.

Hydroecia, Gn. *crinanensis*, Burrows.

This species was not differentiated until 1908. *Ent. Record*, XX. 184, by C. R. N. Burrows.

Differentiated by its genitalia with *H. paludis*, and *H. lucens*, from *H. nictitans*.

“Pencils present (absent in *nictitans*). Harpe trigonate rounded ; with corona only on the upper fourth of the margin (*nictitans* halfway) ; cucullus almost filled with spines ; below the cucullus on the inner side, longitudinally, is a semi-circular flap with a serrated edge ; clasper not produced (bifurcate in *nictitans*), is attached to the side of the harpe ; clavus produced and tapered, hairy part way up, the tip naked ; attached to the base, and produced is a pointed plate with dentated edge ; uncus widest at the centre (slender and slightly tapered in *nictitans*), but wider above than below ; vesica with bunch of shortish strong teeth (six or eight longish teeth in *nictitans*).” Pierce, *Gen. Noctuidae*, p. 35 (1909).

Burrows, *Ent. Rec.* XXII. 81 (1910), described *crinanensis* in short as follows.—“Bright brick-red, with darker central area, reniform and orbicular stigmata orange.”

A comparison of a series of *nictitans* and *crinanensis* shows the difference in a striking manner. The latter is larger, more robust, of a rich red colour, while the former appears frail and pale in comparison ;

comparison of the markings only produces individual differences.

The following forms were described in 1910, *l.c.* after sufficient material from various localities especially Scotland and Ireland had accumulated.

- ab. *pallida*, Burrs. Pale yellowish-grey, yellow reniform stigmata.
- ab. *rufescens-flavo*, Burrs. Dull red, dull orange reniform stigmata.
- ab. *rufescens-albo*, Burrs. Dull red, white reniform stigmata.
- ab. *griseoescens-flavo*, Burrs. Grey-red, yellow reniform stigmata.
- ab. *griseoescens-albo*, Burrs. Grey-red, white reniform stigmata.
- ab. *castaneo-flavo*, Burrs. Dark chestnut-brown, yellow reniform stigmata.
- ab. *castaneo-albo*, Burrs. Dark chestnut-brown, white reniform stigmata.
- ab. *nigrescens-albo*, Burrs. Red-black, white reniform stigmata.

Among the localities for this species are Crinan Canal region, Inveran, Aberfeldy, Liddelbank, Ben Beulah, Enniskillen, Londonderry, New Castletown, Lough Neagh, Tyrone, Killymoon, Sligo, Wicklow, Bolton, Burnley, Morpeth, etc.

I know of no further forms.

In *Trans. Ent. Soc. Lond.* 1911. p. 743, Rev. C. R. N. Burrows notes that "The discrimination of the three species (*paludis*, *lucens*, *crinanensis*) from *nictitans* is so difficult (apart from the appendages) that one cannot frame a description that will certainly enable anyone else to distinguish them, and many find it difficult to believe that they are distinct." He then goes on to remark that "Tutt distinguished the three British species long before the genitalia were examined and would doubtless have distinguished the fourth (*crinanensis*) had he had it before him at the same time. But the marvellous critical instinct that Tutt had in such matters is very rare."

Hydroecia, Gn. (1852) [Tutt, Hamps. Barr.: *Gortyna*, Ochs. (1816-25), Curt., Bdv.: *Caradrina*, Ochs. (1816-25), Meyr.: *Apamea*, Tr. (1816-25)] *micacea*, Esp. (1789).

Tutt. *Brit. Noct.* I. 64 (1891): Barr. *Lep. Br. Is.* V. 68 pl. 193. (1899): *Stdgr. Cat.* III ed. 186 (1901): *Splr. Schm. Eur.* I. 214 pl. 42 f. 4 (1906): *South. Moths Br. Is.* I. 294, pl. 143 (1907): Warr.-Seitz. *Pal. Noct.* III. 226 pl. 46e. (1911): *Culot. Noct. and G.* I(1). 205 pl. 37, f. 16-17 (1913).

Tutt did not take Esper's description of his fig. on plate 145 but made his own description from the figure.

Esper's fig. 6. pl. 145. vol. IV., is of good coloration but with rather too definite transverse marking.

Of the Variation Barrett says—"Variable in the ground colour from pale purplish pink to dark purplish brown, except that the stripe outside the second line is always pale; but that *preceding* the same line is sometimes extremely dark and velvety—olive-brown with hardly a shade of purple. Such examples are found more especially in Ireland and the hills of Scotland, and are accompanied by paler brown forms and others in which the forewings are wholly dark olive-brown, except the one pale stripe. I have seen a specimen of a very smoky brown taken near Birmingham in November. Other considerable phases of variation in this species are in size, and in the breadth of the forewings."

Stephens says, *Illus.* III. 70, "It varies much in colour; sometimes the rosy tint is wanting; at others it is very brilliant."

Tutt refers to the figure of Sepp. *Wonderen*, IV. 39 (1810?) "ashy green figure." This I take to be the artist's attempt to produce a mother-of-pearl appearance on the hindwings, on which the almost suppressed green schimmer is most apparent. Traces of the green are seen in some lights on the forewings if very perfect and on first emergence. It is the "Schimmer-glanze" in Esper.

Ernst. and Engram. fig. 407a is large and of a rich coloration, with somewhat too great a contrast between ground and transverse markings. It probably represents *brunnea*, except that the stigmata are unicolorous with the ground and only just indicated by darker lines. Fig. 407b is that of a female and of a lighter ground, fulvous; the markings do not correspond with those of specimens before me. They are incorrectly spaced and wrongly curved.

Hübner's fig. 224, is a very bright fulvous brown with too definite transverse markings, but a much better figure.

Duponchel's fig. 6 pl. 115. vol. VII. is an extremely bright reddish yellow; we have not seen such an extreme example of the *lutea* form.

Wood's fig. 353 is the dull red form, type *micacea*, somewhat fuscous.

Freyer's figs. 117. vol. II. are the dull red form but not fuscous.

H.-S., fig. 521, a very large ♀, has more correct markings, colour a rich brown with markings much too light and whitish clouding on the costal area which I have not seen on any specimen.

H.-S. says Hübner's fig. of *cypriaca* has wings too short, the inner margin of the elbowed line very restricted. Hindwing more yellow.

Spuler has a good figure of the ♀ pl. 42.

Seitz gives 5 figs. of this species, the typical form, *grisea* ♂ and ♀, *brunnea* and *intacta*. The fig. of the typical form is asymmetrical. There is also a fig. of *amurensis*, which has been ascribed to this species.

Culot. *N. et G.* I(1). pl. 37, has two beautiful figures, a typical ♂ and a *lutea* ♀.

Tutt took the very variable ground colour "from pale whitish grey and yellowish red, through bright red and purplish red, to deep brown, with no trace of the typical red colour." Apparently this range was in the 400 or more bred specimens, as with cabinet examples I have seen nothing like this range. In fact every specimen seems to have gone to the dull brown colour with markings of the same colour but of a different shade.

Haw. describes a form B. "Alis magis fuscis et absque tincturâ

roseâ ; posticis cinerascentibus lunulâ mediâ, strigâque pone medium fuscis," which probably is the typical form.

The List of names to be considered are as follow.

micacea, Esp. *Schn. Abbl.* IV. 466. pl. 145. f. 6. (1789).

r. *cyprica*, Haw. *Lep. Brit.* 227. (1806-10).

ab. *lutea*, Tutt. *Ent.* XXI. 306. (1888).

ab. *rubida*, Tutt. *l.c.*

ab. *brunnea*, Tutt. *l.c.*

ab. *grisea*, Tutt. *l.c.*

[race *amurensis*, Stdgr. *Rom. Mem.* VI. 465. (1892)] ?

ab. *intacta*, Warr.-Seitz. *Pal. Noct.* III. 226. pl. 46e. (1911).

ab. *plumbosa*, Harrn. *Vasculum.* XV. 39. (1929).

Tutt dealt with (1) the typical form Esper's *micacea* ; (2) the rosy form *cyprica* ; (3) the yellowish-red form *lutea* ; (4) the deep red form *rubida* ; (5) the brown form *brunnea* ; (6) the whitish grey form *grisea*.

Esper, in his text, which Tutt apparently did not consult, says that he had only one example, that it comes near species with a metallic sheen. This is not apparent in the figure and Tutt only describes the figure. Esper also refers to the stigmata and half the forewing as "haben einen dem Schimmerglanz ähnlichen Schiller."

race *amurensis*, Stdgr. *Rom. Mem.* VI. 465 (1892) ?

FIG.—Seitz. *Pal. Noct.* 46d.

ORIG. DESCRIP.—"Three of my Amur examples are each as large as German or English *petasitis*, but they are different from it, especially by the sharply margined, fine outer transverse line of the forewing, which is almost as straight as in *micacea*. The hindwings of these Amur examples are almost equally as dark as in *petasitis* ; but there occur also in Europe *micacea* with darker hindwings.

"I leave it undecided, whether these specimens are not a very large dark Amur form of *micacea*" Amur, E. Siberia.

Stdgr. *Cat.* 186 says, "forewings marked as in *micacea*." It is much larger with grayer and darker hindwings. It may belong to *petasitis*.

Seitz and Hampson treat this as a species. Seitz figure is more like *petasitis* in colour, size and shape of apical portion of the forewing.

ab. *intacta*, Warr.-Seitz. *Pal. Noct.* III. 226. (1911).

FIG.—*l.c.* pl. 46e.

ORIG. DESCRIP.—"Has the forewing wholly suffused with rosy-brown, the median area only a little deeper in colour ; the hindwing pure yellowish ochreous, without marking of any kind ; the underside rufous yellow, deeper rufous along costa and termen of both wings, without trace of cell-spot and outer line, which are both distinct in all the other forms." France ?

ab. *plumbosa*, Harrison. *Vasculum.* XV. p. 39. (1929).

ORIG. DESCRIP.—"A fine melanic variety, at light at Birtley in October. In colour the specimen was dull leaden ; to distinguish this new melanic form the name *plumbosa* will suffice."

Hampson mentions an example from Canada in the B.M. but I find

no mention of *micacea* in either Smith, *Cat.*, Dyar, *Cat.*, nor Holland, *Moth Book*.

Micacea is included in Seitz (*American Noct.* vol. VII.) It differs from *immunis* (see pl. 40) by its smaller size and less strongly spined tarsi. This species occurs in Canada "where it may have been imported" (Draudt Seitz *Am. Noct.* VII. 284.)

Hydroecia, Gn. (1852) [Tutt, Hamps., Barr., Warr.-Seitz : *Gortyna*, Ochs. (1816-25) Curt., Bdv. : *Caradrina*, Och. (1816-25) Meyr.] *petasitis*, Dbldy. (1847).

Tutt *Brit. Noct.* I. 66 (1891) : Barr. *Lep. Br. Is.* V. 71, pl. 191 (1899) : Stdgr. *Cat.* IIIed. 186 (1901) : Splr. *Schm. Eur.* I. 215, pl. 42 (1906) : South *Moths Br. Is.* I. 295, pl. 143 (1907) : Hamp. *Lep. Phal.* IX. 41 (1910) : Warr.-Seitz *Pal. Noct.* III. 226, pl. 46 d (1911) : Culot *N. & G.* I(1). 206, pl. 38 (1909-13).

Herrich-S., *l.c.*, has two very good figures, 521-2, of the well-marked continental ♂ and ♀. Freyer's figures, *l.c.*, 531, 562 are also very passable. Seitz, fig. 46 d. is more like our duller British form. Culot, *l.c.*, pl. 38, has an excellent figure of the continental form.

Of the variation Barrett says.—"Extremely constant in colour and markings, but liable to pale in time towards lighter brown."

The names to be dealt with are :—

• *petasitis*, Dbldy. *Zool.* 1915 (1847).

r. vindelicia, Frr. *N. Beitr.* VI. 82, pls. 531, 562 (1849).

[*r. amurensis*, Stdgr. *Rom. Mem.* VI. 465 (1892)].

Tutt dealt with all three.

I note that Freyer described *vindelicia* in 1849. Herrich-Sch. refers to *vindelicia* in his second volume at p. 220, hence this was published after Freyer's work. In corrections and additions to vol. II. H.-S. says that *vindelicia* has been known in England for a long time as *petasites* "which name therefore has priority." [The spelling is in error.]

The apex of forewing of *amurensis* is produced like that of *petasitis*; the transverse lines are more like those of *micacea*, whereas in size it resembles the former and is in colour intermediate. We find that Warr.-Seitz treats it as a species and places it between *petasitis* and *micacea*. Hampson did the same.

Helotropha, Led. (1857) Culot, Holl., Draudt. [*Hadena*, Shrnk. (1802) Meyr. : *Polia*, Ochs. (1806-25) Hamp. : *Apamea*, Ochs. (1816-25), Gn. Steph. : *Gortyna*, Ochs. (1816-25) Tr., Draudt.] *leucostigma*, Hb. (1808).

Tutt *Ent.* XXIII. 13 (1890) : *Brit. Noct.* I. 67 (1891) : Barr. *Lep. Brit. Is.* V. 59, pl. 191 (1899) : Stdgr. *Cat.* IIIed. 186 (1901) : Splr. *Schm. Eur.* I. 213, pl. 42 (1906) : South *Moths Br. Is.* I. 293, pl.

143 (1907) : Hamp. *Lep. Phal.* IX. 24, fig. (1910) : Warr.-Seitz *Pal. Noct.* III. 223, pl. 46a (1911) : Culot *N. et G.* I(1). 204, pl. 37 (1909-13).

H.-S. Addenda to p. 220 of vol. II. says this species belongs to the genus *Hydroecia* with *nictitans*.

Treit., *Schn.* VI(1). 333, says that he considers it very close to *nictitans*, and its true life-history much resembles that of *micacea*.

Draudt, *Am. Noct.* Seitz says the genus should be *Helotropha*, but yet he uses *Gortyna*.

Ernst. and Engr. figure, vol. VI. 369, the two main forms of this species, that of the *leucostigma* form is lighter, shows a considerable amount of marking and might more correctly be called *lunina*, the other is a *fibrosa* form but not the very red one of Hübner. No name and no reference is given by Ernst. and Engr.

Holland, *Moth Book.* 173. pl. XX. figs. 23, 24, figures the two forms *reniformis* and *atra* corresponding to our *fibrosa* and *leucostigma* respectively, and remarkably like them.

Splr's. fig. *l.c.* pl. 42, is more of an intermediate form, the markings are too apparent for *leucostigma* form, but the submarginal band is not that of *fibrosa*.

Hampson figures the form *fibrosa* under the name *leucostigma*; the description is of the latter.

Warr.-Seitz, *l.c.* p. 223, puts *khasiana* as a synonym of *leucostigma*.

Culot gives a fig. pl. 37, of a very plain example of *leucostigma*, typical.

Seitz figures *lunina* (*intermedia*), *albipuncta* and *laevis*.

Draudt-Seitz *Am. Noct.* VII. 282, pl. 40d, figures *reniformis* and *atra*, the former not nearly so *lunina*-like as the figure in Holland.

Barrett says—"Variation mainly limited to the presence or absence of the broad pale stripe outside the second line; but in those specimens in which this is most strikingly visible there is often a marbling of paler colour before the first line and along the costal margin, the orbicular stigma is edged with paler, and the nervures are white-lined near the reniform: on the other hand, these usually have the latter stigma darkened, those in which it is whitest or most distinctly yellow being the most uniform in general colour. Almost every intermediate shade of variation occurs, from unicolorous dark and bright browns to a rich glossy red-brown with a darker central band. In Ireland there is an unusually dark shade of the unicolorous form. An extremely small variety occurs in the neighbourhood of Edinburgh about bog-myrtle."

He records an example from Salop, "in which the straight stripe is pale pinkish buff, the dorsal margin is distinctly of the same colour, the basal region clouded with fulvous, and the stigmata and white lines on the nervures all well-marked."

He also records, "a specimen of a rich dark red, the reniform stigma and second line completely outlined in white and the orbicular stigma more obliquely so."

The forms and names to be considered are.—

leucostigma, Hb. *Eur. Sam.* 375 (1808).

ab. *fibrosa*, Hb. *l.c.* 385 (1808).

f. *lunina*, Haw. *Lep. Brit.* 209 (1806-10).

subsp. *reniformis*, Grote. *Bull. Buff. Soc.* 18 (1874). and *Can. Ent.* VI. 14 (1874).

f. *atra*, Grote. *Proc. Ac. Nat. S. Philadel.* 200 (1875).

subsp. *khasiana*, Moore. *Proc. Zool. S.* 342. pl. 37 (1881).

race *laevis*, Btlr. *Trans. Ent. S. L.* 181 (1881).

ab. *albipuncta*, Tutt. *Ent.* XXIII. 13 (1890).

ab. *intermedia-albo*, Tutt. *l.c.*

ab. *intermedia-flavo*, Tutt. *l.c.*

ab. *albo-lunina*, Tutt. *Brit. Noct.* I. 67 (1891).

ab. *flavo-lunina*, Tutt. *l.c.*

subsp. *insignita*, Hamp. (Strand). *Lep. Ph.* IX. 24 (1910) [*Arch. Naturg.* LXXXI. Abt. A. Heft 11, p. 163 (1915).]

Of these forms Tutt dealt with (1) typical *leucostigma*; (2) the very red ab. *fibrosa*; (3) *lunina*, the light outer margined form; (4) the white reniform *albipuncta*; (5) *intermedia-albo* which he subsequently corrected to *albo-lunina*; (6) the *intermedia-flavo* which he corrected to *flavo-lunina*; (7) in the Appendix to vol. IV., p. 105 the large Japanese form *laevis*; (8) the American *reniformis* similar to *lunina*, and (9) the dark American form *atra*. The last three in vol. IV. p. 105 (1892).

Tutt did not give the orig. descrip. of *reniformis* and of *laevis*. These I have added for reference.

subsp. *reniformis*, Grote, *Can. Ent.*, 14 (1874).

FIGS.—Holl. *Moth Book*, pl. XX.; Seitz, *Am. Noct.*, pl. 40d.

ORIG. DESCRIP.—“Reniform annulate with white scales which usually extend along veins 3 and 4 at base as in *haworthii*. Beneath, the thoracic squamation is somewhat woolly. Blackish brown; subterminal space usually contrasting by its pale ochreous colour. Median space wide. Orbicular an oblique finely and faintly pale ringed annulet, concolorous with the wing. Claviform indistinct, black. Reniform very narrow, its base visible between veins 3 and 4, neatly ringed with pure white, preceded by a pale vertical streak, which appears to cover the closure of the cell, but which is part of the true outer annulus of the spot. Median shade black, irregular, faint. T.p. line accentuated on the nervules, even, pale between double lines, not retreated on cell 2, followed by black nervular dots on the subterminal space. Subterminal line preceded by a dark brown shade which shows some more determinate shade marks, produced opposite the median nervure. Terminal space black, narrow. Inter spacial terminal black dots. The narrow brown fringes cut with pale at the extremity of the veins. Hindwing pale fuscous with soiled veins beneath with distinct dot and faint transverse line. Varies by the darkening of the subterminal space, and obsolescence of the pale scales on the median nervules.” Canada.

race *khasiana*, Moore. *P.Z.S.* 342. (1881).

FIG.—*l.c.* pl. 37. f. 5.

ORIG. DESCRIP.—“Fore-wing dull reddish brown, washed with

purple grey, with a brighter brown, pale bordered, subbasal, sinuous line, a large orbicular and reniform spot, and discal sinuous line; outer border also brighter and transversed by a pale waved line; median and submedian veins dusky brown; hind-wing cinereous white, with pale brown veins and indistinct marginal fascia. Thorax, head, palpi and legs reddish brown, grey speckled; abdomen paler. Underside much paler." Khasia Hills. Near *H. petasites*.

I fail to follow out the description with the figure. Probably the figure is a very poor one.

race *laevis*, Butlr. *Trans. Ent. Soc.* 181 (1881).

FIG.—Warr.-Seitz. *Pal. Noct.* III. pl. 46 (1911).

ORIG. DESCRIP.—“Primaries above dark silky chocolate brown, varied by velvety brown lines and spots, the whole of the dentate-sinuate lines across these wings arranged as in *erythrocephala* of Europe, those which bound the central area on each side being formed of rather more widely separated parallel double lines; external border shining dark ash-grey almost to apex, and with a pale internal limiting line; its apical portion testaceous: costal border crossed by numerous parallel oblique velvety-brown dashes; marked beyond the middle by four equidistant white dots; orbicular spot outlined in brown, below it and touching the median vein and the inner limit of the central area is a rather large velvety-brown spot; reniform spot duplicated, the inner spot being merely outlined in brown, the outer one almost lunate in form, and straw yellow; nervures on the disc dotted with black; fringe greyish, with central and basal undulated brownish paler lines; secondaries whitish brown, sericeous, greyish in certain lights; costal border whitish, silvery at base; a diffused greyish external border; fringe traversed by two grey lines, and tipped with silvery white; thorax chocolate-brown; abdomen whitish brown; wings below pale, shining, pinky brown, crossed by an irregular grey discal line and irrorated with grey towards the costal margins.”

Hamp. *Cat. Lep. Ph.* IX. 25 (1910). Larger.—Tokei, Japan.

race *insignita*, Hamp. [Strand.] *Lep. Phal.* IX. 24 (1910) [*Arch. Naturg.* LXXXI. Abt. A. Heft. 11, p. 163 (1915)].

ORIG. DESCRIP.—“Brighter in colour; metathoracic crest greyish; forewing with the medial area suffused with black, the postmedial area whitish; median nervure and bases of veins 3, 4 streaked with white.” Canada.

This is a form of the American *reniformis*.

Arylia, Hb. (1825), Gn., Barr., Newm. [*Rhyacia*, Hb. (1822), Warr.-Seitz: *Agrotis*, Ochs. (1816-25), Hamps.: *Graphiphora*, Ochs. (1816-25), Meyr.: *Nylina*, Ochs. (1816-25), Tr., Steph.] *putris*, L. (1761).

Tutt did not quote the orig. descrip. which was in the *Fn. Suecica*, but took his description from the XIIed. *Sys. Nat.* 1767. which consisted of only a portion of the original description. The full description was *Fn. Suec.* 315 (1761) “*Spirilinguis cristata, alis deflexis obsoletis subpunctatis, margine exterioriore fusco adjecta macula subocellari,*” as quoted. In addition, “*Similis Ph. verbasci, sed brevior.*”

Scutelli loco puncta duo, linearia fusca. Alae superiores lividae, vix manifeste lineolis fuscis undatae et punctatae: margo exterior ferrugineus, cui in medio adjacet macula ferruginea cum puncto violaceo."

Tutt *Brit. Noct.* I. 68 (1891): Barr. *Lep. Br. Is.* IV. 3, pl. 137 (1897): Stdg. *Cat.* IIIed. 148 (1901): Hamp. *Lep. Phal.* IV. 452 (1903): Splr. *Schm. Eur.* I. 158, pl. 34 (1905): South *Moths Br. Is.* I. 229, pl. 132 (1907): Warr.-Seitz *Pal. Noct.* III. 49, pl. 10k (1909): Culot *Noct. & G.* I(1), 68, pl. 11 (1909-13).

Treit., *l.c.* V(3). 30, says that one sees *rurea* labelled *putris* in the Schiff. collection at Vienna. Werneberg, *l.c.* I. 513, suggests that the collection, when Hübner came to know it, was no longer in its original condition. He also points out that just before Fabricius completed his *Mantissa*, 1787 he was in Vienna where he consulted the collection, and that there he would certainly have cited *putris*, Schiff. to his *rurea*, if it had been so labelled. Illig. *Verz.* II. Ausg., 1800, gives *putris* as of Linn., Esp., Bork., and Fab. *Ent. Sys.*

In the *Verz.* of Schiff. *putris* is placed between *petrificata* and *conspicillaris* both of which it resembles in having comparatively long and narrow wings, so that it would appear not to be *rurea* as has been supposed.

Esper, *Abbild.* IV., pl. 138, has very fair figs. Werneberg points out a non agreement with this text, which says that the lower wings of the ♂ are coloured like the underside of the forewings, whereas in the figure the lower-wing is ashy-grey.

Ernst. and Engr., *Pap. d'Eur.* VI., 154, figs. 376., give very fair figures of ♂ and ♀. ♂ h.w. light in colour; ♀ h.w. ashy-grey.

Hübner's *putris*, f. 241, is *rurea*, his *lignosa* 245 is *putris*.

Hübner's fig. 245 has wings too broad.

Newman's fig. p. 282 is very dark and probably represents a *lignosa*, Hb. form.

Freyer, *l.c.* pl. 557, has another very dark marked figure.

Dup., *l.c.*, VII(1). 168, pl. III., gives a figure of an example with very sparse amount of marking, which is restricted to a narrow line along the costa, the two stigmata and a streak from the base of the reniform to the hind-margin where it expands. There is also a very slight cloud at the anal angle. The hindwings are those of the female, ashy-grey.

Splr., *Schm. Eur.* I., pl. 34, has a very good figure.

Seitz fig. 10k of *putris* is ashy grey with darker shades of the same and is a badly coloured figure altogether.

Barrett says of the Variation "Hardly ever variable." He records a specimen "in which the whole forewings are suffused with dark umbreous."

The forms and names to be considered are:—

putris, L. *Fn. Suec.* 315 (1761).

subcorticalis, Hufn., *Berl. Mag.* III. 308 (1767).

subsp. *lignosa*, Hb., *Saml. Noct.* 245 (1802?).

subsp. *sicca*, Gn., *Noct.* V. 134 (1852).

subsp. *renal**is*, Moore, *P.Z.S.* 341 (1881).

? subsp. *triseriata*, Moore, *P.Z.S.* 409 (1888).

? subsp. *dispalata*, Swinh., *Trans. Ent. S. Lond.* 145 (1891).

Hamps. *Lep. Ph.* IV. 451, treats *sicca*, Gn. as a species and *renal**is*, Moore, as a synonym of it. In his *Moths of India* he omitted *sicca* altogether.

Warr.-Seitz *l.c.* 49, treats both *subcorticalis* and *lignosa* as synonyms of *putris*.

Warren-Seitz in *Indo-Malay Noct.* XI. 60, treats *renal**is*, Moore (which he spells *renal**is*), *triseriata*, Moore and *dispalata*, Swinh., as independent species, with the remark that *sicca*, Gn. may be the same species as *renal**is* = *renal**is*, all in the genus *Rhyacia**.

Tutt discusses (1) *putris* the typical form, (2) *lignosa*, the darker form of the continent, and (3) *sicca*, a smaller form with white hindwings.

subcorticalis, Hufn. *Berl. Mag.* III.—Rott. *Naturf.* IX., 128 (1776).

ORIG. DESCIP.—“The ground-colour of the forewings is really dusky-white darkened with brown streaks and dots, the upper costal margin is specially almost wholly brown. In the middle of the forewing there stands a reniform spot, which is grey-black in the centre, light brown on the margin, and enclosed by a brown line. Before this spot stands a dot of the same grey colour. To this dot runs a double row of small brown dots, which forms a transverse line across the upper wing. The outer margin is similarly lined by a row of such dots. The lower wings are brown-grey with a whitish area. Head and neck is yellow, the thorax grey-black in the middle and yellow at the sides, but the abdomen has the colour of the hindwings. The forewings are somewhat narrow.”

subsp. (?) *renal**is*, Moore, *Desc. Lep. Ath. Coll.* 103 (1882) [*P.Z.S.* 341 (1881)].

FIGS.—Hamp. *Lep. Ph.* IV., pl. LXXI., 30 (as *sicca*); Seitz, *Ind.-May. Noct.* XI., pl. 8a.

ORIG. DESCIP.—“Forewing pale reddish ochreous, with the costal border iron-grey; orbicular and reniform spots very prominent, black-lined and centred with iron-grey; veins speckled with grey and black; a black fascia extending through the cell to outer margin; a black sub-basal transverse sinuous double line, some discal spots, and a marginal row of dentate spots; hindwing pale brownish white, darker along costal border. Thorax black above, ochreous laterally and in front; abdomen pale brown; palpi black, tipped with ochreous; legs black, fore and middle tibia ochreous.” Sind valley, Kashmir, Punjab.

I see no essential difference from *putris*.

Hamps. says, *Moths of Ind.* 187, that *renal**is* differs from *putris* only in the stigmata being smaller, a blackish fascia from the orbicular to the outer margin below apex, and cilia chequered brown and pale.

Elwes' note says that *renal**is* in coll. Atkinson = *putris*. Locality, Sind.

* In the same large genus *Rhyacia*, Warren-Seitz has another species *renal**is*, Moore, p. 56, so that it may be that the names have been transposed.

subsp. *triseriata*, Moore, *P.Z.S.* p.409 (1888).

FIG.—Seitz *l.c.* pl. 8a.

ORIG. DESCRIP.—“Forewings greyer in tint of colour than in *putris*; the costal border and markings darker, the transverse subbasal zigzag lines less acutely angled, the two transverse discal rows of dots situated nearer towards the outer margin; between the inner rows of dots and the reniform mark is a distinct third row of very similar dots, the marginal row of denate points are also less distinct. Hindwings pale purplish cinereous brown.” Exp. $1\frac{4}{10}$ in. Kangra.

Warr.-Seitz treats *triseriata* as a subsp. of *putris* in *Pal. Noct.* but a true species in *Ind.-M. Noct.* under the name *venalis*.

In Elwes' annotated copy of Cotes and Swinhoe's *Cat.*, which I possess, a note says that *triseriata* = *putris*. Locality Sikkim.

Hamps. *Cat. Lep. Ph.* IV. 452 (1903) “Rather darker.”—Japan and N. India.

subsp.(?) *dispalata*, Swin. *Trans. Ent. S. L.* 145 (1891).

FIG.—Hamp. *Lep. Phal.* IV. pl. LXXI. 29 (1903): Seitz *l.c.* pl. 8a.

ORIG. DESCRIP.—“♂ Antennae, palpi, and head brown, thorax, abdomen and forewings reddish grey; thorax and forewing suffused with brown. Forewings with the orbicular and reniform prominent, the former round and small, the latter much larger and more or less ear-shaped, generally pale, sometimes brown, the whole wing more or less dotted and streaked with black brown, forming a fascia extending through the cell, and from the reniform, in a line to the outer margin, most of the space above is dark brown, and in some specimens there are two transverse fasciae before and beyond the middle; a duplex transverse row of black points on the costa on the apical half, marginal black points and on the cilia marked with brown. Hindwing nearly pure white, unmarked.”

♀ like male but paler and markings thinner. Poona.

Hamps. says *l.c.* that *dispalata* differs from *renalis* in the dark fascia of the forewing being interrupted at the middle, and the hindwings pure white. It is much smaller,

This statement agrees with the figure, but hardly with the above description, which seems loose. This would appear to be the form of the hot plains of India, more intense in colour and dwarfed.

Xylomiges, Gn. (1852). *Stdgr.* [*Melanchra*, Hb. (1822). *Meyr.*: *Xylina*, Ochs. (1816-25) *H.-S.*, *Steph.*: *Xylomania*, Hamps. (1905), Warr.-Seitz.] *conspicillaris*, L. (1758).

There has been some doubt as to whether the description of Linn. *Sys. Nat.* Xed., should be accepted as the original, since is not sufficiently full. Esper points out, *l.c.* IV(2), 420, that Borkhausen is in error in ascribing the *oculea* of Fb. to *conspicillaris*. The Fabrician *oculea* has a slight reniform stigma and Esper places it as a form of *nictitans*. Laspeyres, *Verz. Neu. Ausg.* (1801) I. 223. also doubts the sufficiency of the Linn. description. He says that Borkhausen considers that the Fabr. *oculea*, *Ent. Sys.* III(2). 116, belongs here, and that he cites the Linn. description to his *didyma* = *oculea*, *Eur. Schm.* IV. 465.

The stigma (reniform) of *oculea*, Fb. is whitish or pale and cannot agree with *conspicillaris*, but may agree with *didyma*.

It was called *lithoxylea* by Fab. *Ent. Sys. emend.* III(2). 123 (1793) and *perspicillaris* by Ernst. and Engram. *Pap. d' Eur.* VI. 160 fig. 382, 383, (1788).

Tutt *Brit. Noct.* I., 69 (1891): Barrett *Lep. Br. Is.* IV., 141, pl. 152 (1897): Stögr. *Cat.* III ed., 212 (1901): Hamp. *Lep. Ph.* V., 398 (1905): Spr. *Schm. Eur.* I., 262, pl. 47 (1907): South *Moths Br. Is.* I., 258, pl. 128 (1907): Warr.-Seitz *Pal. Gr. S. Noct.* III., 88, pl. 21gh (1910): Culot *N. et. G.* I(2), 96, pl. 57 (1913).

Meyrick classifies *conspicillaris* with *brassicæ*, *cordigera*, *myrtilli*, *oleracea*, *pisi*, *chrysozona*, etc., etc., on account of its rough-scaled head, its hairy eyes, its more or less crested thorax and abdomen, and other more or less imaginal characters only.

Ernst. and Eng. give several very fair figs., *Pap. d' Eur.* VI., 382, a,b,c,d, lighter *conspicillaris*, 383, a,b,c,d, darker as *perspicillaris* including *melaleuca* forms.

Esper, IV., pl. 134, gives two fair figs. of the *melaleuca* form 4 and 6, and the *intermedia* form fig. 5, under the name *conspicillaris*, and on pl. 147, fig. 5 a fig. of *musicalis*, which has been considered as *conspicillaris* but which is more or less unrecognisable to me. Werneburg *Beitr.* II., 45, considers H.-S. correct in calling it a *conspicillaris* form more particularly as he has seen a specimen in the Keferstein Coll. exactly like the figure *musicalis*. Treit. put *musicalis* as a form of *lithoxylea* as did Esper's text. Esp. *l.c.* pl. 135, 1, is a poor small *conspicillaris*.

Guen. *Noct.* V., 150, says, "This is not, as all authors have said, the *conspicillaris* of Linn. Besides the fact that the descriptions do not at all agree with it, one finds in the Linn. cabinet, a *Caradrina morpheus*, with this ticket "*Conspicillaris alter sexus*." But the descriptions of Linn. do not agree any more with that of *morpheus*." Guen. then ascribes the name to Schiff, 1775.

Barrett refers to the three forms as "seem to be constant—there is less disposition to intermediate variation than in almost any other variable species."

Newman, who figures the three forms to which Barrett refers, says, "it seems desirable to say that the distribution of colour in the forewings is excessively variable."

Borkhausen, 1792, refers to the great variability. Of the forms, he records five of the more noteworthy.

Duponchel gives three figures, *Hist. Nat.* VII. pl. 110, 3-4, *conspicillaris* and var. ditto pl. 112, fig. 6, *melaleuca*. The var. is that to which Tutt gave the name *intermedia*. Culot, *l.c.* I(2). on pl. 57, figs. 5-7, gives 3 good figures of the three constant forms.

Seitz three figures are by no means good.

The forms to be considered are:—

conspicillaris, L., *Sys. Nat.* Xed. 515 (1758). Hb. 237.

musicalis, Esp., *Schm. Abbild.* IV(2a). 478, pl. 147, 5 (1777?).

- f. *melaleuca*, View., *Tab. Verz.* II. 68, pl. 1, 5 (1790). Hb. 236.
 ab. *inusta*, Brahm., *Ins. Kal.* II. 60 (1791).
 ab. *praeusta*, Brahm., *l.c.* 55 (1791).
leuconota, Don., *Br. Ins.* XIII. 453 (1804).
 f. *intermedia*, Tutt, *Brit. Noct.* I. (1894).
 ab. *medio-linea*, Tutt, *l.c.*
 ab. *grisea*, Trautn. (Gauckl.), [*Ent. Jahrb. Kranch.* 113 (1908)].
 r. *volandi*, Phillip's, *Ent. Zt.* XXXIII. 103, figs. (1920).

Tutt dealt with (1) the typical form; (2) *melaleuca*, with the pale inner margin; (3) *intermedia*, a grade between (1) and (2); (4) *medio-linea*, with line from costa to inner margin between the stigmata.

ab. *musicalis*, Esp., *l.c.* IV(2a). 479 (1793?).

FIG.—Esp. *l.c.* pl. 147, 5 (1777).

ORIG. DESCRIP.—The figure is very crude. The main features are.—General surface ashy-grey mixed with blackish or brownish. A line of dark and light chequers lies just below the costa of the forewing. There is a band of colour across the wing from costa to inner margin between where the stigmata are represented by mere traces. The text says this band is often broken or reduced even to a single blotch. Succeeding this band is a double row of black dots on the veins extending from the inner margin two thirds across the wing. The outer margin is blackish or brownish in a narrow band which runs inwards in longish streaks to the black dots. The fringes are strongly chequered. The hindwings are of a light whitish grey.

Most authors are content to say that this figure represents typical *conspicillaris*, (e.g. Hampson, Warr.-Seitz., etc.). It is here called an aberration as the markings, colour, etc., are there but are grossly exaggerated or suppressed as well as being badly portrayed to illustrate the typical form.

ab. *inusta*, Brahm., *Ins. Kal.* II., 61 (1791).

FIG.—Esp. *Abbild.* 134, f. 5 (1777).

ORIG. DESCRIP.—“The forewings are slightly curved outward, pale ashy-grey, and here and there suffused with brownish scaling, especially around the usual stigmata here almost obsolete. In a few examples, and also in Esper's figure occurs a similar and particularly darker shading at the outer margin of the reniform. On the lower margin itself one notices a dark band, but which does not extend to the apex of the wing; it has on the inside three very pointed teeth, which under certain conditions are either conspicuous or very indistinct, the wing nervures show by blackish dots which often run together, and form a fine line. The usual stigmata are emphasised by a dark line, and below these one notices the so-called claviform stigma. The border is ashy-grey, and brown spotted. On the underside the wings are a grey colour, the inner margin shiny white. The hindwings are dusky-white with brown veins, and on the outer margin brownish suffusion. They are of a similar colour below, a brown spot in the middle and an indistinct band of similarly coloured spots towards the hind margin. Thorax and breast hoary with an obsolescent reddish suffusion. Legs grey, and brown ringed.”

ab. *præusta*, Brahm. *Ins. Kal.* II., 56 (1791).

FIG.—Esp. *Abbild.* 134, f. 6 (1777).

ORIG. DESCRIP.—“The ground colour of the forewings is a whitish grey, but of this colour there is very little to be seen, since a black brown powdering from the outer margin up to beyond the half of the wing renders it cloudy, which gives it the appearance either of burnt wood or of wood eaten into by rottenness. In this shading the two ordinary stigmata stand margined by a darker line, but are scarcely distinguishable. From the extreme apex the ground colour shows in a narrow toothed band down the outer margin. The inner margin is white-grey and brown spotted. On the underside the upper wings are grey, with the inner margin whitish and shiny. The hindwings are dusky white, shiny with brown veins, and on the outer margin brownish suffused. Below they have the same colour as above, only one finds the margin towards the upper wings strewn with brown atoms; in the middle there stands a brown dot, and towards the outer margin an obsolescent and similarly coloured band of dots running together. The thorax is whitish, the legs are spined, brown and white ringed.”

Brahm. *Ins.-Kal.* II. 55 (1791), redescribed the *melaleuca*, View., under the name *præusta*, as figured by Esp. *plt.* 134, 6.

Praenusta is described as differing from *melaleuca*.

Individual specimens sometimes produce a slight aberration, which consists in the lesser or greater shading on the fore-wings; but the insect of Esper, as the look of the insect shows us, is somewhat different; the chief characteristic is in the amount of the brownish shading on the outer margin of the lower wings, and the black brown band of the tuft on the back.

leuconota, Don., *N. H. Brit. Ins.* XIII. 453 (1804).

FIG.—*l.c.*

ORIG. DESCRIP.—“Fuscous: thorax, back part of the anterior wings, and transverse band white: abdomen and posterior wings whitish.” The figure is a very fair one of the usual form.

ab. *grisea*, Trautm. (Gauckler), *Ent. Zeit.* XVI. 78 (1903).

This aberration was described but not named by H. Gauckler in *Insekten Börse*, XIII. 298 (1896) as follows.

ORIG. DESCRIP.—“Upper wing pale grey yellow, the reniform is only visible on the middle vein at its lower part. The orbicular is obsolescent; so is the pale longish oval spot near the apex of the wing. The disc of the upper wing becomes somewhat darker scaled. The forewings are strewn with darker dots. In the basal area there is a much darker scaling. The thorax and patagia are pale grey yellow as the forewings.” Karlsruhe.

It was redescribed and named by Trautm. as follows:—

“Pale yellowish fore-wings and similarly coloured thorax. The marking is that of the typical form.” Jena.

ab. *volandi*, Philips, *Ent. Zeit.* XXXIII. 103 (1920).

FIGS.—*l.c.*

ORIG. DESCRIP.—“The upperwings are uniformly pale grey, without white and black marking, but on the pale white hindwings the nervures

stand out sharply black and the discal spot is more strongly emphasised than in the typical form." Bred at Berlin.

Xylophasia, Steph. (1829) [*Sidemia*, Stdgr. (1892) Hamp.] *zollikoferi*, Fr. (1836).

There are so few examples of this species, very rare even on the continent, recorded as occurring in the British Isles, that details of its history can be omitted.

Tutt noted that the two examples taken before 1891 were both paler than the typical ones figured by Herrich-Schaeffer and he named these British specimens as *ab. pallida*, *Brit. Noct.* I. 71 (1891).

Freyer, *Neu. Beitr.* II. 145, pl. 184, 1-2 (1836).

Her.-Sch. *Bearb. Schm. Eur.* II. 287, f. 103-4 (1845).

Dbl. *Ent.* V. 29 (1870).

F. B. White, *Scott. Nat.* I. 267 (1871).

South. *Moths Br. Is.* I. 279 pl. 153, 6 (1907).

Culot, *N. et G.* I(1). 145, pl. XXVI. 10 (1909-13).

Seitz, *Pal. Noct.* III. 178. 41h (1911).

Dup. *Nat. Lep. Fr. Supp.* IV. 209. pl. LXVIII. 1 (1842).

Barr. *Lep. Br. Is.* IV. p. 367 (1897).

Hamp. *Lep. Phal.* VII. 448 (1908).

Two further descriptions are to hand which appear to refer to the same form.

1908. Hamp. *Lep. Phal.*, VII., 448 described a form which he did not name. "Forewings with fuscous suffusion in, below, and beyond cell, and in interspaces of terminal area except at apex and tornus." Urals.

ab. uralensis. Strand in (1915) *Arch. Naturg.* LXXXI., 155, A.11, gave this name to Hampson description.

ab. internigrata, Warr.-Seitz *Pal. Noct.*, III., 178, (1911)=? *ab. 1*, Hamps. *Lep. Ph.*

FIG.—*l.c.* 41h.

ORIG.-DESCRIP.—"Shows the lines and markings clearly, being suffused with blackish between the subcostal vein and submedian fold to outer line and more densely before and beyond submarginal line, the veins all being of the ground colour; the wedge-shaped marks before submarginal line except between veins 6 and 7, black, stigmata paler and plainer; a slight trace of a dark-edged claviform; hindwing whiter, with dark fuscous terminal border and black terminal line." Urals.

Xylophasia, Steph. (1829) Gn., Barr., Tutt [*Hadena*, Schrank (1801) Stdgr., Hoffm., Spr., Culot; *Parastichtis*, Hb. (1822) Seitz. Hamp.] *monoglypha*, Hufn. (1767) = *polyodon*, L (1761).

The name *polyodon* was first used for a Noctua by Clerck, *Icones* (1759). Linn. used it in 1761, *F.n. S.*, for the Noctua we now know as *monoglypha*. Clerck's insect was subsequently named *perspicillaris* by Linn., *F.n. S.*, (1761). Thus by priority *polyodon* must be used for

perspicillaris, L. and Hufnagel's name *monoglypha*, *Berl. Mag.* (1766) must be used for *polyodon*, L.

Bork. vol. IV., p. 256, says that he does not understand what *Noctua* is meant by both Linn. XIIed. and Schiff. under the name *polyodon*, for the Linn. description is so general as to apply to many *Noctuae*. He points out that Fabricius and Brahm from their larval description referred to *nebulosa* and *thapsi* respectively under the name *polyodon*; and that Schiff's *polyodon* was *xanthocerus* = *flavicornis*. In vol. IV. on p. 570 Bork. deals with *radicea*, Hb. and there describes our species with the whitish patch on the forewing, identifying it with *monoglypha*, Hüfn. The description in the *F.S.* of Linn. should have cleared up this tangle, but the older authors did not refer beyond the *Sys. Nat.* XIIed. (1767) in spite of the indication "*F.S.*" in that issue. Thus the name *polyodon*, as used by Bork. does not refer to *monoglypha*, Hüfn. but probably to *perspicillaris*, L.

Laspeyres also discusses these errors at length, *Ill. Mag.* II. 87 (1803), particularly those relating to the larva, not only *monoglypha* and *radicea* are concerned but also *leucophaea*, *thapsi*, *advena*, *nebulosa* and *plebeia* are other species in this complex.

Treit. also discusses the errors concerning both imago and larva made by early authors, *l.c.* V(2). 49 (1825) and V(3). 42 (1826).

Tutt *Ent.* XXII. 42 (1889): *Brit. Noct.* I. 72 (1891): Barr. *Lep. Br. Is.* IV. 365 (1897): *Stdgr. Cat.* IIIed. 173 (1901): *Splr. Schm. Eur.* I. 192 (1905): *South Moths Br. Is.* I. 280 (1907): *Hamp. Lep. Phal.* VII. 90 (1908): *Warr.-Seitz. Lep. Noct. Phal.* III. 165 (1911): *Culot. N. et G.* I(1). 157 (1909-13).

Esper's figs. on plate 132 are marked *oculta*, but the text calls them *monoglypha*. The figures are not typical but depict a deep brown form with fairly distinct markings, and without the typical light patch or any indication of it. Possible this figures ab. *brunnea*, Tutt.

Ernst. and Engram. *Pap. d' Eur.* VI., 156, figs. 380, give five quite good figures. ♂ and ♀ of type with pale whitish blotch, an *obscura* form and form *infuscata*.

Spuler has a good figure as regards markings but there is a generally suffused peculiar brown tinge due probably to the reproductive process in the plate (plt. XL., f. 15).

Turati, *Nat. Sicil.*, XXI. (1909) (Nuo. Forme Lep. III. 88-9, plt. VI. 1-8) gives excellent figures of the typical form with lighter blotch; *sicula*, the lighter grey suffused race, *sardoa* the banded race, and *corsica* the smaller and darker grey race representing the island races or subspecies.

Culot, *N. et G.* I(1). 157, plt. 28, 13-17 (1909 to 1913) gives very good figures of 5 forms, but his figure purporting to be the typical form is without the light patch and dark brown and represents *obscura*. The 3 local island races described by Turati, *Nat. Sicil.* are here well figured.

Warr.-Seitz gives seven figures by no means good. *Monoglypha* is more or less typical. *Pallida* is a pale form. *Intacta* and *obscura* should in my opinion have the names reversed, the former being a suffused brown figure with marking partially lost in the suffusion, the latter being more or less suffused with grey softening both the light

markings and the ground colour. *Infuscata* is an unsatisfactory representation with some marking suffused or confused with black while light patches remain. *Brunnea* is a brown black form. While *aethiops* does not represent a black form with markings obsolescent as it should do, but is a dark brown form with considerable markings in black.

Of the Variation Barrett says—"Always and everywhere variable in the shade of ground colour and depth of markings, especially of the central cloudy band; in southern districts often blotched with white before the apex and hind margin, or having a large flat white triangle close to the anal angle, which more rarely extends itself into a white stripe along the dorsal margin. Northward and westward an opposite tendency shows itself, the colour becoming more uniformly umbreous, sometimes absorbing the central dark shade, in others giving it a blacker tint; and the general colour becomes intensified in various degrees until a deep rich black is attained, which, in some individuals occupies the entire surface of the forewings; in others is blotched with brown, or assumes various shades of rich black-brown; in the majority the pale edges of the transverse lines are visible, and in a still larger number the W in the subterminal line—indeed this is sometimes traceable when the rest of that line has disappeared—but, as already remarked, there are specimens smoothly black without any relief. These black varieties in various degrees seem to commence to appear in the northern Midlands, and are common in South Yorkshire, while in the Scottish mountain districts they become predominant though the brown forms are never absent. Some of the most beautiful of the aberrations are found in Sutherlandshire—velvety-black-brown, or with the central band and marginal cloud black, and white transverse lines in a rough umbreous surface; purplish brown with pale lines. In the north of Ireland specimens of dark red-brown and chocolate colour are found with those of uniform umbreous; in the west of that country the vast majority are dark brown shading to black, but everywhere accompanied by the more normal forms."

Barrett records a specimen of Scottish origin, a rich brown race with "a tinge of grey in the brown."

He also records an example "of the uniform dull umbreous variety with conspicuous whitish-brown blotches before the apex and anal angle."

The following is a list of the names of forms to be considered.

polyodon, L. *Fn. Suec.* 322 (1761).

monoglypha, Hfn. *Berl. Mag.* III., 308 (1767).

radicea, Schiff. (Hb.) *Verz.*, 81 (1775).

ab. *infuscata*, B. White, *Fn. Perth*, I., 14 (1871) [*Scott. Nat.*].

ab. *uniformata*, Weym., *Jhrbh. N.V. Elberfeld*, 18 (1878).

ab. *obscura*, Th. Mieg. (Tutt) *La Nat.*, 236 (1886). [Tutt *Ent.*, 42 (1889)].

ab. *brunnea*, Tutt, *Ent.*, 42 (1889).

ab. *aethiops*, Tutt (Stdgr.?) *Brit. Noct.*, I., 73 (1891).

ab. *pallida*, Fuchs. (Bodrt.) *Jahrb. Nass.*, 94 (1892) [*Rev. Mens.*, 48 (1906)].

subsp. *polygrapha*, Stdgr., *Iris* IV., 286 (1891).

ab. *intacta*, Petersen, *Lep. Kunde. Ent. etc.*, 84 (1903) [*Beitrag etc.*].

- ab. *dissoluta*, Krul., *Rev. Russe.*, VII., 10 (1907).
 subsp. *corsica*, Trti. *Nat. Sic.*, XXI., 89 (1909).
 subsp. *sardoa*, Trti. *L.c.*, (1909).
 subsp. *sicula* Trti. *Nat. Sic.* XXI. 89, pl. VI. 3-4 (1909).
 ab. *rosea*, Schönf. *Int. Ent. Zt.* XI. 167 (1917).
 ab. *inversa*, Derenne. *Lamb.* XXXIX. 74 (1929).

Tutt dealt with (1) the type (*radicea* of Hb.) (2) The deep brown form with scarcely traceable markings, *brunnea*. (3) A black form with moderately distinct markings, *infuscata*. (4) An intensely black form, markings almost obliterated, *aethiops*. (5) The suffused brown form with distinct but obscured markings *obscura*.

Rott., *Naturf.* IX. 128 gives an excellent description of the *monoglypha* of Hufn. *Tabell.*; he notes the "grosser weisser Fleck" on the inner margin of the typical form.

Fb. *polyodon*, *E. S. auct.*, III(2). 114 is not *monoglypha*, Hufn.

Haw. *Lep. Brit.* calls it *polyodon* and identifies it with Hüb. fig. 82, and with Linn. *Fn. S.*

Tutt *l.c.* 74 ascribed *aethiops* to Stdgr. (1891) but Stdgr. *Cat.* IIIed (1901) ascribed it to Tutt. Probably Tutt took a manuscript or suggested name of Stdgr's for his newly described form.

Tutt gave the Linn. description from *Sys. Nat.* ed. XII. (1767) which was not the original one. This is found in the *Fn. S.* p. 322 (1761), is more complete and runs as follows:—

ORIG. DESCIP.—"Noctua spirilinguis cristata cinereo-nebulosa margine postico multidentato." "Alae superiores cinerascetes, nebulosae: striga flexuosa ante maculas ordinarias: pone easdem striga una alterave undulator pallidior: margo posticis octo circiter dentibus terminatus. Subtus punctum fuscum et arcus obsoletus."

The accepted typical form is the pale variegated one with the whitish blotch on the inner margin near the anal angle, well figured by Hübner, 82, under the name *radicea* and well described by Rott. *Naturf.* IX. 128 (1776).

ab. *uniformata*, Weym. *Jhrb. N. Ver. Elberfeld*, 18 (1878).

ORIG. DESCIP.—"Forewing unicolorous dark brown with distinct stigmata and transverse lines."

"Many examples of a variety with unicolorous dark brown forewings were found at Elberfeld with the typical form. The stigmata and crosslines are clearly marked, but all the paler characters of the typical form are filled up with dark-brown. It stands to the type as var. *alopecurus* to *rurea*, only is not so common as that."

Warr.-Seitz identifies this as *infuscata* which is figured *l.c.*, III., 39g.

Tutt, *Ent.*, 42 (1889) described the "suffused brown or greyish brown form, with the markings distinctly traceable, though obscured" as var. *obscura* in ignorance that this particular form had previously been described and named (curiously) *obscura*, by Thy. Meig. *La Nat.* 230 (1886).

ORIG. DESCIP.—"This aberration is distinguished from the type by the forewings being of a much darker colour and the ordinary lines

less apparent. The general facies is of a dark brown tending to black." This agrees very well with Tutt's description. Hence *obscura*, Th. Mg. must be put in place of *obscura*, Tutt.

ab. *pallida*, Fuchs. *Jahr. Nass.* 94 (1892).

FIG.—Warr.-Seitz, *l.c.*, III., 39g.

ORIG. DESCRIP.—“Forewing unicolorous yellow grey, without brownish infusion, with distinct markings. A tolerably uniformly coloured pale form, which wants the brown infusion which in ordinary *monoglypha* is particularly strong outside the transverse line, as well as at the base and in the disc, besides in the marginal area on both sides of the waved line to the lower part of the light apex. The forewings are yellow grey only slightly darkened in the disc between the thickened upper half of the black transverse line and the costa, but not very striking and far from being as in the typical form.” Nassau.

In ignorance of the above Bodart redescribed this pale form in *Rev. Mens.* 48 (1906), as follows:—

“Fore-wings having all the generally pale spots and lines of a pure white. Below all four wings of a greyish rosy-white much paler than in the type.” Dinant.

sub-sp. *polygrapha*, Stdgr. *Iris.* IV. 286 (1891).

ORIG. DESCRIP.—“A small number caught by Herrn Paulus at Jerusalem differ so from the European *monoglypha* which are of themselves so strongly variable, that one might readily think them to be a different species. In the main these specimens, which I term var. *polygrapha*, are much smaller than *monoglypha* and uniformly coloured grey, almost without brown intermixture. Their average size is 38 to 40mm., while *monoglypha* mostly measure 48-50mm.; my smallest wild German specimen is only 42mm. in expanse. The almost complete absence of the brown colour, which occurs quite obsolescent in the discal area, is very striking, since the forewings thereby show a uniform grey ground; the lighter and darker markings appear for the most part equally sharp. The lighter whitish spots which *monoglypha* so commonly has at the end of the inner margin are all completely wanting in *polygrapha*. The hindwings are lighter, much less darkened before the outer margin, especially on the underside, where the black discoidal and the dark transverse lines stand out sharply. The brownish suffusion is also quite absent on the underside of all the wings; the discal point and the cross lines on the forewings are sharper than in *monoglypha*.”

Hamp. *Cat. Lep. Ph.* VII. 91 (1908), “♂ forewing with the orbicular small and more rounded; ♀ grey and fuscous with hardly any red-brown tints.”—Palestine, W. Turkestan, Mongolia.

Stdgr., *Cat.* IIIed (1901) says “now seems to be a different species.”

ab. *intacta*, Petersen. *Lep. Kunde Est.*, etc. 80 (1902) = *Beitr. Kunde Est.* p. 84.

FIG.—Warr.-Seitz. *l.c.* III. pl. 39g.

ORIG. DESCRIP.—“Alis ant. magis unicoloribus absque macula alba ad angulum posteriorem.” “It is characterised by its less variegated marking of forewings and the complete lack of the almost always

distinct white marking at the inner angle of the forewing. The ground colour of this ab. *intacta* is either grey-brown or red-brown and thus is excluded from an identity with ab. *infuscata*, Buch. Wht."

ab. *dissoluta*, Krul. *Rev. Russe*, VII. 10 (1907).

ORIG. DESCRIP.—“Very similar to *monoglypha* in size and appearance being perhaps an aberration. The forewings (at least the left one, the right wing being torn lengthwise and badly stuck together) are shorter and wider. The ground colour is yellowish-white with a dark brown design. The costal margin up to the whitish edge is covered with brownish-grey scaling. The dark, almost black line of the hind margin of the wing is shorter and thicker than that of *monoglypha*; the line emerging from the middle (centre) of the base of the wing is similar to that of *monoglypha*. The clearly double first transverse band forms in the cell between the veins *a* and IV_2 a very faint curve, to which a small black wedge-shaped spot is adjoining, and runs further with a similar faint curve toward the hind margin (with *monoglypha* the two teeth of the cross-band are sharp and well projecting forward). The black line between the claviform and the second band is sharply defined and thick. The orbicular and reniform stigmata are of the colour of the ground. The first is outlined with a dark line in the lower part only, while the upper part is lost in the dusting of the costal margin; the second has no definite contour but a few small dark spots. The second band is also double, which in the upper part runs as that of *monoglypha*, whereas after the vein IV_1 it runs straight to the back corner almost at a right angle, not forming any teeth. The wavelike line is as in *monoglypha*, but beyond the vein IV_1 it runs almost straight to the anal angle. Between the veins III_2 - IV_1 from the inside it is adjoined by triangular dark spots, and further, up to the hind margin of the wing, it is only shaded with black. The costal portion of the wing to the vein II_5 is whitish, and the space beneath, between the outer margin of the wing and the wavy line, is blackish-brown. The fringe is the same as that of *monoglypha*. The hindwings are white with a brown outer margin and a whitish fringe. The design on the lower surface of the wings is the same as of *monoglypha*, but the colour of the ground is lighter, and the discal spots and transverse lines are hardly traced. The collar and shoulder covers are unicolorous, brownish-grey. The abdomen is whitish.” Male.

subsp. *sardoa*, Trti. *Nat. Sic.* XXI. 88 (1909).

FIG.—*l.c.*, pl. VI. 4-6 (1909).

ORIG. DESCRIP.—“Obscurior, lineis ondulatis conspicuis late signatis, fascia media brunnea intensissima.”

“A female, somewhat small, taken at the end of June in Sardinia, with the trapezoidal band finishing more narrow on the inner margin, and others taken at the beginning of June of the same year have the characteristic of the variation extremely well marked and of the same colour; near Mt. Limbaro in the province of Sassari.”

“A very small example of the continental form having a brown colour much brighter than Hufnagel's type; the band conspicuous and of obscure trapezoidal shape, and bounded on both sides by a wavy line much clearer and much wider than in the typical form.” Sardinia.

subsp. *sicula*, Trti. *Nat. Sic.* XXI. 89 (1909).

FIG.—*l.c.* pl. VI. f. 2-3 (1909).

ORIG. DESCRIP.—"Dilator, maculis et signaturis obsoletis."

"*Sicula* compared with typical *monoglypha* has the reniform stigma almost obliterated, the orbicular small and narrow; scarcely any trace of the obscure trapezoidal fascia; the waved line almost obsolete and lost in the pale brown colour of the ground. Somewhat curious from the resemblance it bears to *lithoxylea*."

"It has not the more obscure, nor the little basal brown line to the inner margin, and the almost complete absence of the reniform makes it a transitional form to that species." The Island of Tirheno.

subsp. *corsica*, Trti. *Nat. Sic.* XXI. 88 (1909).

FIG.—*l.c.* pl. VI. 7-8 (1909).

ORIG. DESCRIP.—"Minor glaucescente, signaturis dilutioribus."

"In Corsica *monoglypha* shows another modification. By comparison it seem worthy of being considered a local race; it is distinguished by the intensity of its coloration, yet in the tone of the ground colour and in its glaucescence it is not so striking. The waved lines are narrower, more dilute (less expressed) and the spots less apparent than in *sarda*. The lower wings are obscurely grey, smoky and not clear brownish."

ab. *rosea*, Schönf. *Int. Ent. Zt.* XI. 167 (1917).

ORIG. DESCRIP.—"Ground colour suffused with clear rose-red," Mahlsdorf, Germany.

ab. *inversa*, Derenne *Lamb.* XXIX. 74 (1929).

ORIG. DESCRIP.—"Forewings of a uniform brilliant black up to the elbowed line, and in this area one notes the extra basal line marked in a still deeper black; the subterminal space is white, with black arrow marks; the subterminal line forming very distinct angles thus indicating italic letters, but these angles form an M which shows up here in black on white longitudinal marks. The terminal area is also white arrowed with black, the fringe is toothed and edged with black. The lower wings are of a blackish grey colour externally black with lighter fringes. The reniform is well marked, white crossed by a slight vertical black mark; the orbicular appears as a white remnant. The frontal tuft is of a slightly greyish black, and the body coloured like the hindwings." Spa, Belgium.

Berce, *In. Fr. Lep.* III. 63 (1870) particularly notes that the M mark is figured in white on black. Thus the form described by Derenne is the reverse, *i.e.*, the M mark is black on white.

Xylophasia, Steph. (1829) auct. [*Hadena*, Schrnk. (1802) Meyr.: *Xylina*, Hb. (1806): *Parastichtis*, Hb. (1827). Hamp., Warr.-Seitz.] *lithoxylea*, Fb. (1787) = ?*lithoxylaea*, Schiff (1775)?

If we accept Schiff, for the original designation the spelling must be *lithoxylaea*, but if we refer to Fabricius, *Mant.* it is *lithoxylea*. Schiff. gives the food plant of the larva as *Pyrus communis*, which is incorrect,

as it is now well known to feed [on the roots]* of grasses like its congeners, *polyodon*, *sublustris*, *rurea*, etc. From its associated group in Schiff. it would appear to be this species, but it is certainly imperfectly described and may, of course, possibly include both *sublustris* and *lithoxylea*. Werneburg takes Schiff.'s species but spells it *lithoxylia*. Hamps. accepts Schiff. but does not copy the spelling, Warr.-Seitz accept Fab. as does Meyr.

Hampson was satisfied that the *lithoxylea* of Schiff. *Wien. Verz.* 75 (1775) was the original designation, and to it he puts *musicalis* of Esp., and fig. 2 of Esper's *sublustris*. But Stdgr. does not go further back than Fb. *Mant.*

There was much confusion as to the specific distinction between *lithoxylea* and the next species *sublustris* among the early authors. Some early authors were strongly of opinion that *lithoxylea* was a variety of *polyodon* (*monoglypha*).

Illig. *Wien. Verz. neu Ausg.* I. 222 (1800) confuses the two species *lithoxylea* and *sublustris*, as do Bork., Treit. and H.-S.

Laspèyres *Krit. Verz.* in *Illig. Mag.* II. p. 91 (1803) is of opinion that Esper's *sublustris* is *lithoxylea*, that *musicalis*, Esp. is not this species, nor is *petrificata* as Bork. suggests.

Guenée notes that Borkhausen seems to have described *musicalis*, Esp. as this species, which species, is most unrecognisable and which "no one has seen in nature." He also notes that Treitschke has confounded this species and *sublustris*.

Tutt *Ent.* XXII. 11 (1889). *Brit. Noct.* I. 74 (1891): *Barr. Lep. Br. Is.* IV. 357 (1897): *Stdgr. Cat.* IIIed. 174 (1901): *Splr. Schm. Eur.* I. 193 (1905): *South Moths. Br. Is.* I. 279 (1907): *Hamp. Lep. Ph.* VII. 83 (1908): *Warr.-Seitz Pal. Noct.* III. 163 (1911): *Culot N. et G.* I(1). 160 (1910-13).

Esper *Abbild.* IV(1). 408. pl. 133 figs 1 and 2, gives a ♂ *sublustris* and a ♀ *lithoxylea* under the name *sublustris* and calling the ♀ a var. of *sublustris*. Esper's fig. 2 pl. 133 has, I think, deteriorated in my copy in which the whole area of the wings is devoid of the light fulvous, and much too cinereous.

Ernst and Engr. give 3 good figs. of this species. *Pap. d' Eur.* VI. 115. f. 379. Fig. 378a is probably also this species but 378b is *sublustris*.

Dup. gives a very good figure of a grey form of *lithoxylea*. *Hist. Nat.* VII(1). pl. III. f. 5 (1827).

Werneburg considers Esper's fig. 2 as a ♂ variety of *lithoxylea*. *Beitr.* II. 43.

Culot gives an excellent fig. pl. 29.

Barrett says of the Variation—"Hardly variable except in a small degree in intensity of markings."

* Dr. Cockayne says, "Surely not on roots, and even the others have green grass in the winter time. *Polyodon*, in nature feeds on green grass often if not always." I have had larvae of both *polyodon* and *lithoxylea*, which had been dug up from the roots of grass, etc., in the garden late in the year. These were supplied with similar tufts and roots, among which they made a winter cell, completed their growth and subsequently emerged.—Hy. J. T.

The names to be considered are—

lithoxylaea, Schiff., *Verz.* 74 (1775).

lithoxylea, Fb., *Mant.* II. 182 (1787).

sublustris, Esp., *Abbild.* IV(2). 408, pl. 133, 2 (1788).

musicalis, Esp., *Abbild.* IV(2). pl. 147, 5 (1788).

mergoidea, Schrnk., *Fn. Boica.* II(1). 333 (1802).

ab. *caerulescens*, Reiss., *Zt. Oestr. Ent. Ver.* XI. 13 (1926).

r. *apenninagena*, Dnhl., *Mitt. Münch.* XIX. 109 (1929).

ab. *horrida*, Dnhl., *l.c.*

Tutt dealt only with the typical form.

mergoidea. Schrnk. *Fn. Boica.* II(1). 333 (1802).

ORIG. DESCRIP.—“Of the yellowish colour of solenhofer or so-called native paste slate. All the wings are toothed; the upper wings especially like dry, rotten wood; in all the indentations which lie between the teeth, above and below a black dot; also on the forewings above not far from the hind-margin five small blackish spots in a transverse row.”

“The marlslate yellow.”

This appears to be our *lithoxylea* inadequately described.

ab. *caerulescens*, Reiss., *Zt. Oestr. Ent. Ver.* XI. 13 (1926).

ORIG. DESCRIP.—“The usual form of *lithoxylea* (as is well known) shows a bone to ochre-yellow ground-colour, which, only in quite perfect specimens, has a light grey powdering especially at the base of the forewing and on the outer third of it along the inner margin. In this locality the ground colour of the forewing of the var. *caerulescens* is a particularly light bluish-grey, which, interrupted only by the yellowish area around the marginal spot, extends from the base up to the central shade, goes along the costa up to the apex and also completely fills the broad band-like area, in the marginal region, which contains the doubled black spots on the veins. The red brown costal portion of the central shade in this form appears particularly distinct, since immediately adjacent the grey costa becomes very strongly whitish.

“The hindwings are not yellowish, but grey-white, somewhat resembling *detersa* ♀ in its colour-tone. The dark veins and the blackish marginal band are sharply expressed.” Austria.

ab. *apenninagena*, Dnhl. *Mitt. Münch.* XIX. 109 (1929).

“In the ground colour whitish blue-grey tone prevailing; the yellow grey strongly suppressed. The darker portion, especially the stigmata and outer margin, strongly standing out with deep black brown. But on the hindwings the brownish tone gives way to a more grey appearance.” S. Alps and Italy.

ab. *horrida*, Dnhl. *Mitt. Münch.* XIX. 109 (1929).

“With the fore-going there appear examples at the highest lake in the Gran-Sasso, in which the yellow brown elements become red-yellow, the whole surface of the wing is thickly overspread with black-brown atoms. The spot before the costa is extended deep brown to beyond the median. Hindwing marked with brown, the cell-spot developed into a good middle band.” S. Alps. and Italy.

Xylophasia, Steph. (1829) auct. [*Hadena*, Schrnk. (1802) Meyr.: *Xylina*, Hb. (1806): *Parastichtis*, Hb. (1827) Hamps., Warr.-Seitz.] *sublustris*, Esp.

The confusion of this species with *lithoxyloea* among early authors has been dealt with under that species and need not be repeated.

Tutt *Ent.* XXII. 11 (1889): *Brit. Noct.* I. 75 (1891): Barr. *Lep. Is.* IV. 361 (1897): *Stdgr. Cat.* III ed. 174 (1901): Splr. *Schm. Eur.* I. 193 (1905): *South Moths Br. I.* I. 279 (1907): *Hamps. Lep. Ph.* VII. 84 (1908): *Warr.-Seitz Pal. Noct.* III. 193 (1911): *Culot N. et G.* I(1). 160 (1909-13).

As stated under the last species Esper's fig. 1 on pl. 133 is a dark suffused form of *sublustris*; a bad figure. With this Werneburg, *Beitr.* II., 43 is in agreement but H.-S. takes it for a var. of *lithoxyloea* as Esper states.

Ernst. and Engram. *Pap. d' Eur.* VI. fig. 378b. have a good fig. under the name "La Citrinne." The letterpress is confused.

Hübner's fig. 240 *lithoxyloea* is a large, very red, *sublustris*, and the hindwings have a wide and somewhat darker marginal area.

Dup. *Hist. Nat.* VII(1). pl. CXIII. 1, has figured this species under the name *musicalis*, a well-marked and richly coloured form. He cites Esper, but it does not agree with Esper's fig. of his *musicalis* and hence Dup's name must stand for the form. In his letterpress, Dup. *l.c.* p. 177. calls it a second var. of *polyodon*, and says it is the *lithoxyloea* of Hb. and the "Citrinne" of Engram.

Wood, *Index*, 227. has a good but somewhat dark figure.

Culot. N. et G. has an excellent fig. pl. 29. f. 9.

Of the Variation Barrett says—"Hardly variable, except that the cloudy chocolate markings are sometimes very faint, the forewings consequently almost unicolorous yellow-brown. In north Lancashire specimens are found in which the fulvous tints are replaced by purplish-brown and drab."

The names and forms to be considered are—

sublustris, Esp. *Schm. Abb.* IV(2). 408. pl. 133. I (nec 2). (1788).

ab. *lithoxyloea*, Hb. *Noct.* 240 (1802). nec Fb.

musicalis, Dup. *Hist. Nat.* VII(1). 177. pl. 113. 1 (1827). nec Esp. [ab. *expallescens*, *Stdgr. Stett. ent. Zt.* XLIII. 41 (1882)] = *lateritia*.

ab. *pallida*, Tutt. *Ent.* XXII. 11 (1889).

ab. *intermedia*, Tutt. *l.c.*

Tutt dealt with (1) the dark ochreous slightly red, typical form; (2) the very pale *pallida*; (3) the very red *lithoxyloea*; and (4) the form *intermedia* between type and *lithoxyloea* of Hb. Hubner's spelling is as given here and not *lithoxyloea* as quoted by Tutt and others.

musicalis, Dup. *Hist. Nat.* VII(1). 177, pl. 113, 1 (1827) nec. Esp.

"Forewings above of a pale yellow, with four blotches of a deep brown. Two of these spots, of irregular shape, are at the centre and run one into the other; the other two of almost triangular shape, are at the outer end; they are joined to the terminal margin by their base,

and each of them is cut by two black lines lying on the nervures ; between these four spots one sees a transverse toothed line and scarcely marked in red, with small black points at the end of each tooth. This line does not meet the inner margin and just meets one of the two central spots. The fringe is brown, intersected by red yellow. The lower wings of a reddish white, with a large brownish band in the marginal area." Near Paris.

This is only a typical form of *sublustris*.

The *expallescens* of Stdgr. has been ascribed to *sublustris* but is an Eastern form of *lateritia*.

Xylophasia, Steph. (1829), Gn., Barr., South, Tutt. [*Hadena*, Schrnk. (1802), Stdgr., Hoffm., Splr., Meyr., Culot.: *Parastichtis*, Hb. (1822), Seitz, Hamps.: *Xylina*, Tr. (1816-26), Curtis, H.-S.] *rurea*, Fb. (1775)=? *crenata*, Hufn. (1767).

Werneburg *l.c.* 252 is strongly of opinion that the *crenata* of Hufn. is *rurea*, particularly so on the evidence of Rottemburg *Naturf.* IX. 133, whose description clearly answers to the subsequently named *rurea*. In this case *crenata*, Hufn. (1767) is prior to *rurea*, Fb. (1775).

Tutt *Ent.* XXI. 60 (1889): *Brit. Noct.* I. 76 (1891): Barr. *Lep. Br. Is.* IV. 370, pls. 179-180 (1897): Stdgr. *Cat.* IIIed. 174 (1901): Splr. *Schm. Eur.* I. 193, plt. 40 (1905): South *Moths Br. Is.* I. 278, plt. 135 (1907): Hamps. *Lep. Ph.* VI. 97 (1908): Culot *N. et. G.* I(1). 160, plt. 29 (1909-13): Warr.-Seitz *Pal. Noct.* III. 164, plt. 39 (1911).

Esper's figures plt. 133, figs. 3-4 *luculenta*, are very rough. The markings are too hard and diagrammatic. Plt. 147, f. 3 *alopecurus*, is recognisable; plt. 188, figs. 6-8 *luculenta*, called an aberration in the text (IV(3). 31), that is an ab. of the fig. on plt. 133. It is very rough.

The figs. of Ernst and Eng. *l.c.* VI., 373*a-b* and 374*b-c* are good and much better than those of Esper, but the text reference p. 153 to *lateritia* is not supported by comparison of the figures.

Dup. *Hist. Nat.* VII(2). plt. CXIII., f. 2 is a good one of the usual form. The fig. 6 is a good representation of *combusta*.

Dup. fig. *l.c.*, Sup. III. plt. XXXIX. 5, *aquila* does not agree with the description, which particularly mentions the elongated orbicular and the reniform bordered and pupilled with white. The figure shows neither, nor is there any white whatever in it. My copy is a good one.

H.-S. *l.c.* says that Fr. *Beitr.* plt. IV. 2, is bad; that Hb. 241 is not well coloured, and that Hb. 366 is recognisable, but hindwings too small.

Seitz, *l.c.*, plt. 39 gives ten figures of *rurea* forms:—*rurea*; *ochrea*; *intermedia*; *putris*; *combusta*, with not only the reniform outlined in whitish but numerous other marking similarly produced, as in Hubner's figure 366, whereas Haworth's *combusta* has the reniform alone in whitish; *alopecurus* ♂ and ♀; *nigrorubida*; *extincta*; and *uniformis*. These figures are very good.

Culot, *l.c.* I(1). plt. 29, f. 11-12, has two excellent figures.

Of the Variation Barrett notes the following forms without names except *combusta*.

"The *combusta* form, a recurrent variety everywhere, more frequent in the north, and in Scotland becomes predominant in some districts. Of which (1) the colour may be deeper, (2) the nervures blackened, (3) the edge of the reniform stigma distinctly yellow or even orange."

The south of Scotland form: "ground colour is of a beautifully smooth silvery-white, shaded with ashy-grey, with the purple-brown blotches and clouds intensified, sometimes even blackened, the dots of the transverse line or the first line itself, more distinct, and the reniform stigma yellow."

The Aberdeenshire form: "has the forewings so much suffused with rusty-brown as to render the usual blotches less noticeable; others varying to softer brown; and *combusta* forms tinged with silvery-white."

In Shetland and the Hebrides: "The *combusta* form is intensified and accompanied by all variations to the darkest possible, sometimes nearly black, in others quite of a chestnut colour."

"Indeed, when the comparatively dull appearance of the typical ordinary specimens of this species is taken into consideration, the beauty and silvery glossiness of some of the northern variations is surprising."

Barrett records a specimen "having the red blotch in the middle of the costa extended and intensified into a rich purple-red central band, the transverse lines also being visibly white." He also records "a form found in Cumberland with the lines complete, but upon a pale grey ground." The former is probably *putris*, Hb. and the latter a trans. to *argentea*, Tutt.

The List of Names and Forms to be discussed are:—

- crenata*, Hufn., *Berl. Mag.* III. 402 (1767).
rurea, Fb., *Sys. Ent.* 618 (1775).
luculenta, Esp. *Abbild.* IV(2). 410, pl. 133 (1786).
 ab. *alopecurus*, Esp. *l.c.* 473, pl. 147 (1786).
 ab. *putris*, Hb. *Sam. Eur.* 241 (1802).
hirticornis, Haw. *Trans. Ent. S. Lond.* I. 336 (1812).
hepatica, Haw., *Lep. Br.* 169 (1806-10); Wood *Ind.* 229 (1834).
 ab. *combusta*, Haw., *l.c.*, 170 (1806-10); Wood *l.c.* 230.
 ab. *combusta*, Hb., *Sam. Eur.* 366 (1808).
 (ab. *borealis*, Curt.) *Br. Ent.* 256 (1829) no description.
 race *aquila*, Donz., *Ann. Soc. ent Fr.* 476, pl. XVIII. 6 (1837).
 subsp. *extincta*, Stdgr. *Stett. ent. Zeit.* 43 (1889); Warr.-Seitz *l.c.*,
 pl. 39f.
 ab. *ochrea*, Tutt., *Ent.* 60 (1889); Warr.-Seitz *l.c.*, pl. 39e.
 ab. *intermedia*, Tutt, *l.c.*, Warr.-Seitz *l.c.*
 ab. *flavorufa*, Tutt, *l.c.*
 ab. *nigrorubida*, Tutt, *l.c.*, 62 (1889); Warr.-Seitz *l.c.*, pl. 39f.
 ab. *argentea*, Tutt, *Ent. Rec.* I. 12 (1891).
 ab. *subrurea*, Peters., *Beitr. Kunde. Est., etc.*, 81 (1902).
 ab. *uniformis*, Warr.-Seitz, *Pal. Noct.* III. 165 (1911); *l.c.*, pl. 39f.
 ab. *pallida*, Hein., *Deut. ent. Zeit.* 515 (1916).
 Tutt dealt with (1) *rurea*, Fab., typical form. (2) *alopecurus*, dark reddish-brown with black border to reniform. (3) *combusta*, Hb. (4)

combusta, Haw., dark fuscous, white bordered reniform. (5) *putris*, Hb., pale brown grey, dark central band. (6) *borealis*, Curt. (7) *extincta*, Stdgr., in part. (8) *ochrea*, yellowish ground. (9) *intermedia*, reddish ground. (10) *flavorufa*, unicolorous yellow-red. (11) *nigrorubida*, deep reddish black. (12) *argentea*, white, markings faint.

Treit. *l.c.*, V(3). 36 has made three erroneous citations to this species probably led by Hübner naming his fig. 240, *putris* "whitish, brown margined owl moth." (2) Illiger *Neu. Ausg. Verz.* I. 225 the true *putris* of Linn. *Fn. Suec.* (3) View. *Tab. Verz.* II. 58 is *turca*.

crenata, Hfn., *Berl. Mag.* III. 402 (1767).

ORIG. DESCRIP.—"Reddish-brown with a reniform stigma—the orbicular is in *rurea* mostly obliterated by scales—and a few other spots on the brown ground."

This description of *crenata* by Hufn. is evidently insufficient to determine, but the subsequent notes of Rott. quite definitely make it *rurea*.

Rottemb. *Naturf.* IX. 133 (1776) remarks on Hufn. "The upper wings are dark red-brown. Not far from the outer margin lies a longish curved and a reniform spot, both brown in the centre, but whitish on their margin. On the outer margin lies a pale toothed transverse line and the area between this and the outer margin is black-brown. But all the markings are obsolescent and extremely indistinct. The lower wings are grey brown. It is about the size of *trifolii*." Berlin.

Werneburg, *Beitr.* I. 251, goes very thoroughly into the question and concludes that all the evidence points to *crenata* as the correct and prior name.

luculenta, Esp. IV(2). 410 (1786).

FIGS.—*l.c.* plt. 133. 3-4 : plt. 188. 6-8 (1786).

ORIG. DESCRIP.—Esper notes that "The ground colour is usually ochre-yellow mixed with brown. In the one case it is more inclined to yellow, in the other to ashy-grey."

In the text, *l.c.* IV(2). 31, Esper calls plt. 188. 6-8 an aberration of *luculenta* (plt. 133); it is very dull in coloration and has smoky areas along the inner margin, the anal angle of forewing and submarginal area of the hindwing.

Esper himself says *l.c.* IV(2). 410 that he finds no difference between this species (*luculenta*) and that described by Fabricius under the name *rurea*.

Bork. says *l.c.* IV. 333 that Esper's *luculenta*, plt. 133. figs. 3-4, agrees very closely with the description of *rurea* by Fabricius.

hirticornis, Haw. *Trans. Ent. Soc.* I. 336 (1812).

ORIG. DESCRIP.—"Spirilinguis cristata, alis glaucescentibus : fascia abbreviata terminalique plicata, antennis hirtio-pectinate." Westwood in H. and W's *Brit. Moth.* I. 160 says, "From the latter character one is almost tempted to believe the insects must have been mended with false antennae."

Haw. makes no mention of his *hirticornis* in the *Lep. Brit.* 1806-10, but Stephens includes it in both his *Cat.* and his *Illustrations*; he suspected that it was really a form of *rurea*, but as the specimens

obtained had been destroyed the question of identity must drop. It had been suggested that they were the *borealis* of Curtis. Wood, who relies on Stephens for his species, does not illustrate nor mention it.

The *borealis* of Curtis does not seem to have been described, but seems to have been identified with the *putris*, Hb. fig. 241, both by Curtis and later writers.

hepatica, Haw. *Lep. Brit.* 169 (1806-10).

ORIG. DESCRIP.—“Abdomen with a fuscous dorsal crest. Forewings with very slightly waved outer margin, glaucous or pale liver-colour, with various dots and shades; small fuscous streaks at the base, spiny or wedge-shaped standing towards the inner margin outwards and downwards. The usual stigmata in the middle; after these, twin obsolescent spots of the smallest, dots, and irregular interrupted fascia in the hind margin which extend to wedge shaped spots. Its hind margin spotted with fuscous.” This undoubtedly refers to *rurea*. Haworth himself commented on it thus—“The best lepidopterists in England supposed this species was distinct from *hepatica*, L.” (of which he (H.) copied the initial description from Linn.) but he here decided they were the same.

The *hepatica* of Haw. *l.c.*, p. 169 probably represents the species *rurea*. While *epomidion* is the true *hepatica*, L., Wood's figs. *Ind.* 229 and 231 tend to support this view.

aquila, Donz., *Ann. Soc. ent. Fr.* 476 (1837).

FIG.—*l.c.*, Pl. XVIII. 6.

ORIG. DESCRIP.—“All the wings are slightly dentate. The upper wings are brown tending to reddish, mixed with slight black characters. The two first transverse lines are black, but scarcely indicated near the costa; the third which is nearly parallel to the outer margin, is composed of dots lighter than the ground and but little apparent. The space between this last line and the margin is of a deep brown, the fringe is brown.

“The orbicular forms an elongate oval, placed almost horizontally. The reniform is large, margined and pupilled with white. The costa interrupted with whitish.

“The lower wings are of a smoky grey; the fringe is brownish. On the forewings the nervures approaching the terminal margin are appreciably black. The antennae, head and thorax are brown, the abdomen is crested and of a smoky grey.” Basses Alpes.

The figure is that of a very melanic, deep black brown inclining where lighter to reddish with black markings mostly lost in the ground colour.

Of *aquila*, Donz., Guen. *Hist. Nat.* V. 139 says, “It differs from certain varieties of *rurea* only by a somewhat larger size and a more robust body, the white reniform and the more uniform coloration. As to the difference in length in the third joint of the palpi, noted by H.-S. and which should be more conclusive, it does not appear to me to be appreciable.”

H.-S., II. 272, says the above two characters prevent its union with *rurea* but are characters quite indicative of its being a form of *lateritia*, which he places it close to in his omnibus genus *Polia*.

race *extincta*. Stdgr. *Stett. e. Zeit.* 43. (1889).

FIG.—Warr.-Seitz. *l.c.* pl. 39f.

ORIG. DESCRIPT.—“This is the obsolescent (markingless) grey local form of *rurea*, so similar to the var. *grisescens* of *basilinea*, that Herr Tancreé sent both together as one species. But the absence of the black basal streak of the forewings besides other distinctions separated this form from *basilinea* var. *grisescens*. The specimens are somewhat smaller than typical *rurea*, with light grey, very little brownish tinged, almost markingless forewings. Of the three stigmata, the lower and the first upper (round), oval in this form, are only slightly distinguishable by sharply brownish margins, while the (narrow) reniform appears more clearly with whitish margin and darker centre. In one ♀ the space between the two upper stigmata (and also somewhat below) is darker, brownish suffused; also both the brownish marginal spots of *rurea* (underhalf of the middle also doubled and upperhalf of the anal) stand out clearly, while in the ♀ at the most, just traces of this brownish spot are to be recognised. The two brownish transverse lines are also only quite rudimentary, the black and white dots on the veins in the outer area are in the most marked ♀ clearly present.”—W. and E. Turkestan.

ab. *subrurea*, Petersen, *Lep. Kunde. Ent. etc.* 81. (1902).

ORIG. DESCRIPT.—“Obscurior forma intermedia. I consider this to be a very strongly darkened example mostly coloured in grey brown, with markings very clear, especially the transverse ones and with no appearance of yellowish in the reniform.” Estland.

Warr.-Seitz *l.c.* III. 165, queries the *subrurea*, Petersen, as being the *combusta*, Haw.

ab. *uniformis*, Warr.-Seitz, *Pal. Noct.*, III., 165.

FIG.—*l.c.* pl. 39 f.

ORIG. DESCRIPT.—“Is wholly dull dark liver-colour, with no markings except the pale inner and outer lines and the whitish outer edge of the reniform stigma; the hindwings, as in *extincta* smooth pale grey.”

ab. *pallida*, Heinz. *Deut. Ent. Zt.* 515 (1916).

ORIG. DESCRIPT.—“Of the grey-whitish ground colour of the type, the red-brown element of the forewing marking, the darkening between the stigmata, and also the brown at the anal angle and the basal streak tend to vanish, thus producing almost unicolorous grey-yellow specimens, but not identical with Tutt's *ochrea*, since the ground colour is not ochre yellow, and the brown markings are not red.” Berlin.

Xylophasia, Steph. (1829) Tutt, Gn., South, Barr. [*Xylina*, Tr. (1816-26) = *Xylena*, Hb. (1806): *Parastichtis*, Hb. (1822) Hamp., Warr.-Seitz: *Hadena*, Schrank (1802) Stdgr., Splr., Meyr.] *hepatica*, Linn. (1761).

Xylena was used by Hübner for *lithoxylea* in the *Tent.* 1806. It was also used by Treit. in his preliminary List in *Schm. Eur.* IV. for the same group (1816). But when Treit. described the genus he spelt it *Xylina* (1826).

Tutt did not give the original description but only that portion of it which had been transferred to the *Sys. Nat.* XIIed. (1767). It was originally described in Linn.'s *Fn. Suec.* 320 (1761).

Borkhausen bred a specimen from a pupa found at the foot of a poplar tree in moss and described it in Scriba's *Beitr.* II. 128 under the name *ypsilon*. It was figured on pl. 9, fig. 6 under the name *nunatrum* in error. The figure is not good, the colour and characters are there but not truly placed.

As Tutt says *B.N.* 81, "It must be confessed there is considerable doubt about the types of this species and *rurea*." It appears that Warr.-Seitz, *l.c.* III. 170, figure of *hepatica* agrees best with the Linn. description and may be looked upon as the typical form; Culot's *l.c.* pl. 29, fig. 14, is an excellent portrait of the type. His fig. 13 is an excellent one of the *characterrea* form and Warr.-Seitz' second figure is a good one of the same form, while the third figure, *epomidion* is a very similar figure, but with costal portion of the basal area distinctly lighter than the rest of the wing area.

Fabricius, *Spec. Ins.* II. 237 describes a species as *hepatica* but his description agrees neither with that of Linné nor with that of Borkhausen.

Haworth probably has mixed up *rurea* and *hepatica* in his descriptions.

Tutt. *Brit. Noct.* I. 80 (1891): *Barr. Lep. Br. Is.* IV. 372. pl. 180 (1897): *Stdgr. Cat.* IIIed. 174 (1901): *Splr. Schm. Eur.* I. 194. pl. 40 (1905): *South. Moths. Br. Is.* I. 280. pl. 135 (1907): *Hamp. Lep. Phal.* VII. 95. fig. 16 (1908): *Warr.-Seitz. Pal. Noct.* III. 164. pl. 39d (1911): *Culot. N. et G.* I(1). 161. pl. 29. 13-14 (1909-13).

Ernst. and Engr. *Pap. d'Eur.* fig. 375a picture a small *characterrea* and 375b a large *hepatica*; but both figures are poor.

Hübner *Samll.* 77 was labelled *hepatica* by him, but in his *Text.* p. 190. (1805) ? he corrects this to *tincta*. And on p. 182 of his *Text* he corrects fig. 133 *characterrea* to *hepatica*, L. and in fig. 638 (1918) gives a portrait of *characterrea*.

Hübner's fig. 133 is not that of typical *hepatica*, which has a wide submarginal area of pale liver-colour with more or less suppressed markings (See Warr.-Seitz. *l.c.* III. pl. 39d.) It is labelled *characterrea*, (see Warr.-Seitz. *l.c.*) of which it is a paler example than Hb. fig. 638. Hübner's fig. 393 *temera* is a very red-liver form of *hepatica*; fig. 638 is a form with all markings much emphasised and rich in coloration, fig. 639 *implexa* is another *characterrea* form.

Wood's *hepatica*, *l.c.* fig. 229 is *rurea*. His figure 231, *epomidion* is a very fair figure of typical *hepatica*.

South *l.c.* pl. 235 has two *hepatica* rather well marked tending towards *characterrea*.

Warr.-Seitz gives three figs. *l.c.* III. 39d, *hepatica*, *characterrea*, and *epomidion*. He notes the last as an extreme form of *characterrea* in which the basal area above the black basal streak is very light in contrast.

Culot, *l.c.* pl. 29, 13-14 has two excellent figures of *characterrea* and *hepatica* forms.

Of the Variation Barrett says—"Variation seems to be nearly confined to the two forms occurring always together—that with the larger portion of the forewings pale reddish-brown, and that in which they are mainly suffused or clouded with rich purple-brown. Of these the first is most common in the South, and apparently the second in the North, where also it becomes more blackened. Intermediates occur, but not so frequently. Mr. Kane says that Irish specimens are all of the richer darker race."

Under the name *hepatica*, Dup. has described and figured, *Hist. Nat.* VII(1). 204, pl. 113, a very aberrant form of the type, of a yellowish-grey instead of liver-coloured, and with a minimum of marking, yet sufficient to identify it as that species, the characteristic submarginal waved line being quite well expressed.

List of Named Forms to be discussed.—

hepatica, Linn. *Fn. Suec.* 320 (1761) : *Sys. Nat.* XII ed. 853 (1767).

ab. *charactera*, Hb. *Saml. Noct.* fig. 133 (1802), 638 (1818).

temera, Hb. *l.c.* 393 (1802-08).

ab. *epomidion*, Haw. *Lep. Brit.* (1806-10).

implexa, Hb. *l.c.* 639 (1818).

? ab. *nux*, Freyer. *Neu. Beitr.* IV. 143. pl. 370 (1842).

subsp. *discrepans*, Stdgr. *Mem. Rom.* VI. 440 (1892).

ab. *alopeuroides*, Splr. *Schn. Eur.* I. 194 (1905).

Tutt dealt with (1) *hepatica* the typical *Sys. Nat.* form ; (2) the well marked *charactera* ; and (3) *epomidion* with pale base.

Tutt suggested that *nux*, Freyer. pl. 370, *Neu. Beitr.* might be this species. But a close comparison makes it almost certain that it is a very large example of *scolopacina* just as Freyer himself at first considered it. Reference to the description, in which it states that there are two very distinct white dots below the reniform stigma, is quite conclusive.

The full description, which was not given by Tutt, follows.

hepatica, Linn. *Fn. Suec.* 320 (1761).

ORIG. DESCRIP.—"Spirilinguis cristata, alis glaucescentibus ; fascia ferruginea abbreviata terminalique plicata."

"Alae superiores supra hepatici coloris : fascia ferruginea vix ad latus interius extensa ; fascia dein terminalis angustior, inaequalis, ferruginea ; margo posticus plicato subdentatus. Inferiores alae subfuscentes margine postico flavo. Subtus alae cinereo-rufescentes puncto lunari arcuque nigricantibus. Thoracis latera fuscoferruginea. Dorsum thoracis et abdominis plurimis dentibus cristatum."

ab. *temera*, Hb. *l.c.* 393 (1803 ?) Text. *l.c.* 194 (1805-8 ?)

ORIG. DESCRIP.—"Ruddy brown : the wings darkened in bandlike fashion ; the forewings are marked with spots and streaks of a yellowish colour agreeing tolerably well in their character with those of closely allied species ; the hindwings clear ashy-grey, dark bordered and whitish fringed. The abdomen of a similar colour to the hind-wings."

This figure in the character of marking agrees fairly well with *hepatica*, but the basal colour is quite different from the typical liver-colour. It is, as the original description says, "ruddy-brown," and certainly not the colour of the type nor has it the submarginal area with suppressed markings so extensive.

Warr.-Seitz give this as a synonym of *hepatica* as also does Hampson.

ab. *implexa*, Hb. *l.c.* 639 (1818).

This figure is more of a rich olive brown in colour and not hepatic or liver-coloured. The markings agree generally with those of *hepatica* and may be described as yellowish as in *temera*. Between the two stigmata lies an irregular band of deep black diminishing in width about half way across and with spots of the ground colour in it on the costa. The fringe shows no chequering as in *characterera*.

Warr. Seitz. give this as a synonym of *hepatica* as does Hampson.

race *discrepans*, Stögr., *Rom. Mem.* VI. 440 (1892).

ORIG. DESCIP.—“At first sight the Amur specimens appear to be a different species from *hepatica*, and thus deserving a name as a local form. The forewings are not brown, or light brown grey and dark mixed, but fairly uniformly dark brownish grey. The markings are all arranged as in *hepatica* more or less, but the brownish colour is almost wholly wanting. The reniform is in *discrepans* more or less filled with whitish, light grey, in one specimen almost wholly light grey.” Vladivostock, Askold.

Stögr. *Cat.* IIIed. 174 (1901) says “Much more obscure, forewings coloured almost as in *gemina*.”

Hamp. *Cat. Lep. Ph.* VII. 96 (1908) “Much darker; forewings with blackish markings.”—Ussari.

ab. *alopeuroides*, Spl. *Schm. Eur.* I. 194 (1905).

ORIG. DESCIP.—“Like *alopæurus* of *rurea*, i.e. “Dark red or black-brown, darker on the inner margin, usually with light margined orbicular and yellow or red-yellow looking reniform.” Bukowina.

Warr.-Seitz puts *nux*, Fr. as a synonym of *hepatica*. (See *scolopacina*.)

Tutt put it with *scolopacina* tentatively, with a suggestion that it might turn out to be *hepatica*.

Xylophasia, Steph. (1829) Gn. Tutt. *Sth. Barr.* [*Hadena*, Schrnk. (1902) Stögr.: *Xylena*, Hb. (1805): *Xylina*, Tr. (1816-26) nec Hb. Fr.: *Oligia*, Hb. (1822) Hamp.] *scolopacina*, Esp. 1786.

Tutt. *B.N.* 81 (1891): *Barr. Lep. Br. Is.* IV. 376 (1897): Stögr. *Cat.* IIIed. 174 (1901): Splr. *Schm. Eur.* I. 194. (1905): *South. Moths. Br. Is.* I. 281 (1907): *Hamp. Lep. Phal.* VII. 379 (1908): Warr.-Seitz. *Pal. Noct.* III. 170 (1911): *Culot. N. et. G.* I(1). 161 (1909-13).

Esper's fig. *l.c.* IV. pl. 130 is bad. Hübner's fig. 460 is a good figure of a small dark male. Freyer's *l.c.* pl. 64. vol. I. figs. are good of the usual British form. Humphrey's fig. *Br. M.* pl. 32, is the lighter British form but markings are too formal. Wood's fig. 232 is a good one of the very lightly marked form *abbreviata*, Haw. Ernst. and Engr. give *l.c.* fig. 377 two very good figs. Duponchel's figure has the minimum of marking only the larger features are present and those far too rigid. The colour has none of the typical richness—the contrast of ground-colour and markings is not strong enough. A poor

representation. Seitz give 4 figures. Those of the typical form and of *abbreviata* are much too pale, there is none of the rich coloration. Spuler's fig. pl. 40 is much too deep in colour; in the previous edition, Hoffmann's, the colouring was more correct. Culot has two very good figures, one typical, the other with general intensified colouring, pl. 29. South has two capital figures on pl. 135.

Of the variation Barrett says—"Not very variable, though specimens taken in the South of England are usually more warmly coloured and strongly marked than those from further north. Occasionally specimens have the forewings suffused with chocolate-red in a very soft smooth manner, the only distinct marking in them being the whiter reniform stigma."

Barrett records "Surrey examples of a very warm rich tint."

He also records a specimen "of which the ground colour is yellowish-white, and the only markings a central costal spot and the clouding of the hind margin."

The List of names and forms to be discussed are:—

scolopacina, Esp. *Schm. Abbild.* IV(2). 394, pl. 130, 1 (1786).

ab. *abbreviata*, Haw. *Lep. Brit.* 170 (1806-10); Wood. *Ind.* 232 (1834) as *scolopacina*.

ab. *nux*, Freyer *Neu. Beitr.* IV. 143, pl. 370 (1842).

ab. *hammoniensis*, Saub. *Verh. Ver. Nat. Hamb.* X. 69 (1899): Warr.-Seitz *l.c.* pl. 40f. (1911).

ab. *subbrunnea*, Warr.-Seitz *Pal. Noct.* III. 170, pl. 40f (1911).

ab. *unicolor-nigra*, Wagn. *Mitt. Munch.* XII. 39 (1922).

ab. *unicolor-brunnea*, Wagn. *l.c.*

Tutt deals with (1) the typical form; (2) the pale *abbreviata*; (3) the ab. *nux* in part.

ab. *nux*, Freyer *Neu Beitr.* IV. 143. (1842).

FIG.—*l.c.* pl. 370.

ORIG. DESCRIP.—"I considered this as a large specimen of *scolopacina*. But the more than double size, as well as the dark brown thorax, distinctly points to the status of a true species. Of the size of the well-known *rurea*. Its forewings have the colour as well as the marking of the rough and irregular shell of a walnut. They are ochreous brown. In the middle of the base there is a dark brown streak which extends out into two teeth. The orbicular and reniform as well as half the claviform stigmata are very distinct and of a dark brown colour. The reniform is only slightly emphasised on the outside and has below it two very distinct white dots. Inside the fringes there lies a very distinct curved band lined on the outside blackish, on the inside brown, the whole breadth of the wing. The fringes are brown with paler veins, giving a chequered appearance. On each of the veins of the forewings between the reniform and the outer margin a little black streak edged paler on the outer side. The hindwings are grey-brown with ochre-yellow fringes. The abdomen is similar. The thorax is dark brown, as in *rurea*, with pale edged patagia and collar. The underside is shining yellow-grey varying on the costa to reddish with dark discal spot and a similar band. The veins are darker and quite distinct." Warasdin.

ab. *hammoniensis*, Sauben, *Verhand. Ver. Nat. Hamb.* X. 69 (1899).

FIG.—Warr.-Seitz *l.c.* III. pl. 40f. (1911).

ORIG. DESCRIP.—“A clear black-brown colour from the base of the forewings to beyond the middle almost to two-thirds, one portion of the white outline of the reniform is quite outside this darkened portion and is pure white, the other portion is darkened so that only a dusky white intimation of it is visible; the outer third of the forewing is an impression of the typical form slightly darkened, but still of a clear yellow brown colour. Head, thorax, and abdomen normal.” Near Hamburg.

The fig. of Seitz does not agree with the above description, nearly half the basal portion of the inner marginal area being of a grey ground with the dark streak of the typical form well emphasised in it. The general colour of the figure is too pale and not the rich tint of the type.

Hamps. *Cat. Lep. Ph.* VII. 379 (1908). Suffused with fuscous.

ab. *subbrunnea*, Warr.-Seitz *l.c.*, III. 170 (1911).

FIG.—Seitz *l.c.*, 40f.

ORIG. DESCRIP.—“The whole wing is washed with pale brown; the oblique bar near base of inner margin is either brown or obsolete; the dark blotches on costa and the brown terminal area are pale brown; all the lines are obscured, the only clear marking being the whitish reniform; the hindwing pale grey or brownish grey with dark cell spot and outer line.” Japan.

ab. *unicolor-nigra*, Wagn. *Mitt. Münch. ent. Ges.* XII. 39 (1922).

ORIG. DESCRIP.—“Almost black, only in the marginal area is it indistinctly paler.” Salzburg.

This aberration appears to be extremely like *hammoniensis* from the description. It is apparently a more emphasised melanic form than that is.

ab. *unicolor-brunnea*, Wagn. *Mitt. Münch. ent. Ges.* XII. 39 (1922).

ORIG. DESCRIP.—“Almost without marking, reddish nut-brown, only the costa and a central cloud are a shade darker; the characteristic colour of *scolopacina* pale fawn yellow as well as the usual white markings of the reniform are completely absent.” Near Salzburg.

Dipterygia, Steph. (1829) Hamp., Warr.-Seitz, Barr., Tutt [*Hadena*, Schrnk (1802) Meyr.: *Calliergis*, Hb. (1822-25): *Xylina*, Tr. (1816-26) Bdv.: *Perigea*, Gn. (1852)] *scabriuscula*, L. (1758).

Tutt noted that in the original description the forewings were described as fuscous (not black and that in the 12th edition *pinastri* (1758) was described in exactly the same words except that the forewings were described as fuscous. He omitted to refer to the *Fn. Suec.* (1761) where Linn. first described *pinastri* with black forewings and in more detail.

“Alae superiores nigrae characteribus atris, ad marginem posticum striae atrae; margo inferior postice punctis aliquot albis, margo tenuior pallidus linea atra repanda distinctus. Thorax fascicularis pallidus.” Linn. says it is the *scabriuscula* of the S.N.

Fab. *Sys. Ent.* III(2). 101 (1794) says "Alae anticae nigrae maculis ordinariis, obsoletis margine tenuiore anguloque ani late cinereis," which is somewhat more correct.

Thus as Tutt says, *scabriuscula* is the fuscous and *pinastri* the black form.

Tutt *B.N.* I. 82 (1891): Smith *Cat. Noct. N. Am.* 155 (1892): Barr. *Lep. Br. Is.* V. 30 (1899): Stdgr. *Cat.* IIIed. 182 (1901): Holl. *Moth Bk.* 172 (1903): Splr. *Schn. Eur.* I. 207 (1905): South *Moths B. Is.* I. 281 (1907): Hamps. *Cat. Phal.* VII. 66 (1908): Warr-Seitz *Pal. Noct.* III. 163 (1911): Culot *N. et G.* I(1). 196 (1909-13).

Ernst. and Engram. *Pap. d' Eur.* f. 458, a. b., has two very fair figures a lighter and a darker one with marginal streaks too numerous and too emphasised.

Donovan *N. H. Br. Ins.*, plt. 347, gives a very fair representation but the "bird's wing" is incorrect in shape and shading.

Hüb. fig. 246 is very good except that there is a slight pearly look to the hindwings and the black has too much of a brown suggestion.

Dup. *Hist. Nat.* VII. plt. 110, 5, gives a good figure, the lighter markings white instead of ochreous.

Wood's figure is poor, practically only the two strong colours blocked in, all the delicate markings are suppressed. *Ind.* fig. 217 (1834).

Splr. plt. 41. 11 has the "bird wing" mark much too dark.

Culot, *l.c.*, plt. 36. 8 has an excellent figure.

Barrett says of the Variation—"Usually very constant in colour and markings."

He records a specimen "which has the fore-wings extraordinarily broad and the 'birds-wing' mark much more of a red brown than usual."

There is but little variation in this species. The only markings which vary and that so slightly as to be but little noticeable, are (1) depth of colour of the black, (2) the number and size of the pale streaks near the hind margin, and (3) the light colour of the inner margin and anal angle area.

The Forms and Names to be discussed are
scabriuscula, L. *Sys. Nat.* Xed. 516 (1758).

f. *pinastri*, L. *Fn. Suec.* 315 (1761).

dipterygia, Hüfn. *Berl. Mag.* 300 (1766).

tripterygia, Esp. *Schn. Abb.* IV(1). 177. plt. 107 (1786).

Amer. race *pinastri*, Grote. *Proc. Ent. S. Phil.* I. 218 (1863): Holl. *Moth Bk.* plt. 20 (1903).

Tutt dealt with *scabriuscula* the fuscous fore-wing, and *pinastri* the black fore-wing.

dipterygia, Hüfn. *Berl. Mag.* III. 300 (1766).

ORIG. DESCRIP.—"Coal-black, with a grey figure on each upper wing, which is just like the wing of a bird." Of this Rottensburg says *Naturf.* IX. 120 (1776). "The best mark of distinction is that of Hüfnagel, on the lower margin of the upper wing in the anal angle is a grey wing-form figure."

Esper, *Schm. Abb.* IV. pl. 107, 4, figures it under the name *tripterygia*. This he corrects in the text p. 177, where he also says it is the *scabriuscula*, Linn. *Sys. Nat.* (1758).

pinastri, Grote. *Proc. Ent. S. Phil.* I. 218 (1863).

ORIG. DESCRIP.—“Anterior wings brownish-black with two irregular black transverse lines near the base. Beyond the outer line are two spherical spaces with black borders, and at the lower corner of the outer margin is a greyish patch continued on the hind margin and bordered on the inside by an irregular black line which runs up to the upper margin of the wing. Posterior wings dark grey with a darker wavy line and discal spot more apparent on the under surface. Head and tegulae brown black; thorax light and body dark grey, latter with a row of brownish tufts on the upper surface.” Nr. New York.

The author compared them with European examples and was satisfied with their identity.

Apamea, Tr. (1816-25) Tutt, Spey., Barr. [*Hadena*, Schrnk (1802). Stögr., Splr., Meyr., Dyar, Culot: *Trachea*, Tr. (1816-25) Hamps.: South, *Parastichtis*, Hb. (1827) Warr.-Seitz.: *Hama*, Steph. (1829): *Xylophasia*, Steph. (1829) Smith.] *basilinea*, Schiff. (1775)=? *sordens*, Hüfn. (1766).

Tutt gave Fab. *Mant.* II. 183 (1787), as the author, whereas all the early writers refer the name to Schiff. *Verz.* p. 78 (1775). The original description is extremely short and imperfect but still indicates this species. Fab. III(2) refers to Schiff. *Verz.* 78.

ORIG. DESCRIP.—“The black-marked Noctuid. The fawn-coloured, straight-lined Noctuid.” Evidently the indication was sufficient for the early authors.

Schrank, *Fuess. N. Mag.* II. 215 (1785) gave a more complete description of *basilinea* from Schiff.'s own collection. Thus if Schiff. be not accepted as the original describer Schrank comes next and not Fab.

ORIG. DESCRIP. (Schrank's)—“Brownish-grey; on the upper wings lengthways there lies a very short, very black line, and on the thorax, not quite on the wing surface, a similarly coloured dot; the reniform stigma has a yellow outline and a yellow centre, and towards the inner-margin there is a pale brown-shaded clouding. The hindwings are very pale brownish shaded with a dull golden gloss. The underside of all the wings is pale brownish shaded and glossy; the hind-wing has a blackish ground in the middle, and on the upperwing the reniform stigma shows through blackish.”

Werneburg, *Beitr.* I. 417 (1863) says that the *sordens* of Hüfn. *Berl. Mag.* III. 306 (1766) is *basilinea*. Rottenberg's enlarged description of *sordens*, however, does not justify this assumption. Neither description mentions the dominant character of *basilinea*, the black basal line.

Tutt *Ent.* XXII. 254 (1889): *B.N.* I. 84 (1891): Smith *Cat. Noct. N. Am.* 134 (1893): Barr. *Lep. Br. Is.* IV. 380 (1897): Stögr. *Cat.* III ed. 174 (1901): Splr. *Schm. Eur.* 194 (1905): South *Moths Br. Is.* I. 272 (1907): Hamps. *Lep. Phal.* VII. 183 (1908): Warr.-Seitz. *Pal. Noct.* III. 169 (1911): Culot *N. and G.* I(1). 162 (1909-13).

Ernst. and Engr. figure a grey and a reddish tinged form, fig. 486 *l.c.* VIII.

Esper's fig. I. pl. 166 is a very poor one, the basal streak is almost the only recognisable character.

Hübner's fig. 427 is red approaching *rurea*, not like the ordinary British *basilinea*, and has the marking all too emphasised and contrasted. Freyer says it is a very good figure.

Duponchel's fig. on pl. 101 is much better although the ground of British *basilinea* is hardly produced.

Freyer's fig. *Beitr.* pl. 29 errs the other way for there is no red or brown coloration but shades of grey only. I have never seen a *basilinea* like either Hübner's figure or Freyer's.

Splr.'s figure on pl. 40. is rather highly coloured.

Warr.-Seitz figures *basistrija*, *cinerascens* and *unicolor*. This last he calls melanic.

Culot, *l.c.* pl. 29, has two excellent figures, 17 typical and 18 a fine melanic form probably referable to an extreme of Tutt's *unicolor*.

The Variation according to Barrett.—“Very slight, but occasional specimens have the ground colour whitish-brown, in others there is a tinge of grey-brown. Scotch and Irish specimens are often rather more strongly clouded with either grey-brown or red-brown.”

Barrett records a specimen “of a dark slate brown.”

He also records an example “in which the dark central clouding is grey-brown, and forms a well-marked band.”

List of Forms and Names to be discussed.—

basilinea, Schiff. *Verz.* 78 (1775); Schrnk. *Fuessl N. Mag.* II. 215 (1785).

ab. *nebulosa*, View. *Tabell. Verz.* II. 55, pl. 1 (1789).

subsp. *finitima*, Gn. *Hist. Nat. Noct.* V. 206 (1852).

subsp. *cinefacta*, Graes. *Berl. ent. Zt.* 334 (1888).

subsp. *grisescens*, Stdgr., *Stett. ent. Zt.* 42 (1889).

ab. *pallida*, Tutt, *Ent.* 254 (1889); *B.N.* 85 (1891).

ab. *unicolor*, Tutt, *l.c.* Warr.-Seitz, *l.c.* pl. 40e.

ab. *cinerascens*, Tutt, *Ent.* 255 (1889); Warr.-Seitz, *l.c.* pl. 40e.

Subsp. *basistrija*, Stdgr., *Mem. Rom.* VI. 439 (1892) Warr.-Seitz, *l.c.* pl. 40e.

subsp. *dubiosa*, Bng. *Hs., Iris.* XXV. 149 (1912).

Of these Tutt dealt with (1) *basilinea*; (2) ab. *pallida*, pale ochreous grey; (3) ab. *unicolor*, dark reddish brown; (4) ab. *nebulosa*, pale ochreous grey with reddish costa from base to reniform; (5) ab. *cinerascens*, dull ashy grey with no trace of ferruginous; (6) *finitima*, the American subsp.; (7) subsp. *grisescens*, from Alai and Issykul.

Speyer, *Stett. ent. Zt.* 150 (1875) says the only difference between the American *finitima* and *basilinea* is a colour distinction, the former having a light grey forewing with a violet tinge and not a yellowish or brown-ochre colour as in *basilinea*.

Stdgr. *Cat.* II^{ed.} gives on p. 174 v. *finitima*, Gn. This should be *finitima*.

Of the var. *grisescens*, Stdgr., Tutt says *B.N.* IV. 196 “This would

appear to be almost identical (with) my *pallida*, except that the latter appears to be ochreous grey rather than ashy grey." *Grisescens* has no basal line.

subsp. *cinefacta*, Graes., *Berl. ent. Zt.* 334 (1888) nec Grote.

ORIG. DESCRIP.—“It looks like *basilinea*, but in any case stands nearer *illyria*, Fr. ; it is somewhat larger than that, its forewings are not brownish, but pale ashy-grey coloured, all the wings also have a more wavy margin (border). The two distinct transverse lines lie exactly as in *illyria* ; they consist of a narrow, pale, ashy-grey streak enclosed on both sides by a fine darker line. In the pale grey basal area, at the base, stands a short blacker streak. The discal area is darker grey than the basal and marginal areas, but not darkened so blackish as in *illyria*. The claviform stigma is not seen in the ♂ but in the female lying before me is distinctly black surrounded and below the central area up to the inner margin is darkened blackish. The orbicular is longish and stands somewhat obliquely as in *illyria*, it is grey-brown, not eyed and blackish margined. The reniform stigma has the same coloration and margining, but is slightly dark centred and between veins 3 and 5 is tinged whitish. On the middle arc the costa carries a few pale grey spots; a narrower darker shade runs obliquely between both stigmata towards the outer transverse line. Wavy line brown, dentate ; the marginal area is outwards to the margin ashy-grey, basalwards it is brown grey as that area ; at the apex stands a large brownish spot and in this close to the costa, three small white dots ; on the margin between the veins are small black triangles ; fringes dark brown-grey with no visible basal line.

“Hindwings yellow-grey, with broader smoky-grey marginal band and blacker marginal-line ; fringes yellow-grey with darker basal-line.

“Underside of forewings smoky-grey, on the costa and outer margin ashy-grey ; the vein on the marginal area paler coloured than the ground. The discal spot not apparent. The hindwings pale yellowish-grey, powdered with dark scales, which are thickest on the costa ; discal spot black and very distinct.”

Warr.-Seitz treats *cinefacta* as synonymous with *grisescens*.

Both Stdgr. *Cat.* and Warr.-Seitz *l.c.* spell it *cinifacta* in error.

subsp. *basistriga*, Stdgr., *Rom. Mem.* VI. 439 (1892).

ORIG. DESCRIP.—“The forewings have a bluish grey ground colour, the middle area is almost wholly covered, dark brownish grey, forming a sharp contrast, and the short black basal streak stands out far sharper and blacker. Specimens from Dovrefeld, Lepsa, Altai and Amur are equally strongly marked and coloured without the basal streak.” Amur.

This form without the basal streak might be designated by the name **alinea**.

Hamp. *Cat. Lep. Ph.* VII. 184 (1908) Forewing suffused with blue-grey, except medial area.—Norway, W. Turkestan, E. Siberia, Japan, W. China.

subsp. *dubiosa*, Bng.-Hs., *Iris.* XXV. 149 (1912).

Originally described as a form of *P. lama* from Yarkend, was

British Dipterological Literature.

An annotated List of systematic monographs and books, published in English,
dealing with British Diptera.

By H. W. ANDREWS, F.E.S.

From time to time I am asked by young students or would-be students, if and what books of reference there are in English on our British species of Diptera, and am inclined to answer, "Yes, there are books, but you can't get them," the truth being that the majority of the few books on this Order are out of print and difficult to obtain second-hand, and such monographs on families and genera as do exist are widely scattered among Transactions and Magazines. With a view to helping such beginners I have compiled the following list, which I trust may prove useful as indicating what families have been dealt with in books or monographs, and in the latter case, where such monographs have appeared. The list deals with the systematic side of the subject only, and does not claim to be exhaustive, although I believe I have included most of the recent publications. I have to thank Mr. J. E. Collin for kindly looking through my MS.

In the first place I would refer those who desire a fuller guide to Mr. Percy H. Grimshaw's *Guide to the Literature of British Diptera*, being his Vice-Presidential address to the Royal Physical Society of Edinburgh, and published in their *Proceedings*, Vol. XX., Pt. 2, 1917. This *Guide* consists of a complete enumeration of publications large and small, on British Diptera from 1782 to 1916, and embraces all aspects of the subject; systematic, biological and economic.

Of general works G. H. Verrall's *List of British Diptera* [published by the Cambridge University Press; 2nd edition, 1901] is the sole attempt, to my knowledge, to give a complete list of our British species. Though now out-of-date, owing to the large number of new species added since the 2nd edition appeared, this "List" still forms the basis of all subsequent works on British families. It is a list of names only. The Rev. W. J. Wingate's *Preliminary List of Durham Diptera* [Published in Vol. II. (new series) of the *Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne*, 1906] is the only other general work of which I am aware. Its title of "Durham" diptera is misleading, as the author takes Verrall's *List* and gives analytical tables—taken mainly from Continental sources—for some 2500 odd species, of which only 626 are noted as found in the Durham district. This work is very useful up to a point, especially in those families where no other English work is available.

The publications following are tabulated under families following the arrangement of Verrall's "List."

ORTHORRHAPHA. (NEMATOCERA.)

- Cecidomyiidae.**—J. E. Collin: A LIST OF THE BRITISH CECIDOMYIIDAE ARRANGED ACCORDING TO THE VIEWS OF RECENT AUTHORS. [Published in *The Entomologist's Monthly Magazine*, April, 1904.] This is a list of names only, bringing Verrall's "List" (2nd edition) up to date.
- do—R. S. Bagnall and J. W. Heslop Harrison: A PRELIMINARY CATALOGUE OF BRITISH CECIDOMYIIDAE (DIPTERA) WITH SPECIAL REFERENCE TO THE GALL MIDGES OF THE NORTH OF ENGLAND. [Published in *The Transactions of The Entomological Society of London*, Part II-IV, 1917.] A classified list of species: index to host plants and bibliography. No systematic descriptions.
- do—H. F. Barnes: BRITISH GALL MIDGES. [Published in the *Entomologist's Monthly Magazine*, 1927 and 1928] Part I. July and September, 1927. Descriptions of certain species and text figures. Part II. March and June, 1928. The genus *Lestodiplosis*, Kieffer. Descriptions of new species, list, analytical table and text figures.
- do—F. W. Edwards: THE BRITISH SPECIES OF LESTREMIA AND ALLIED GENERA (DIPTERA CECIDOMYIIDAE.) Published in the *Entomologist's Monthly Magazine*, January 1929.] Analytical table of genera and notes on species.
- Mycetophilidae.**—F. W. Edwards: BRITISH FUNGUS-GNATS (DIPTERA MYCETOPHILIDAE) WITH A REVISED GENERIC CLASSIFICATION OF THE FAMILY. [Published in the *Transactions of the Entomological Society of London*, Part. III-IV, 1924.] Analytical tables with notes on the species. 12 Plates of genitalia and wings, Bibliography and text figures.
- Bibionidae.**—F. W. Edwards: A SYNOPSIS OF BRITISH BIBIONIDAE AND SCATOPSIDAE. [Published in the *Annals of Applied Biology*, Vol. XII, No. 2, May, 1925.] Analytical Tables with brief notes on distribution of the species.
- Simuliidae.**—F. W. Edwards: THE BRITISH SPECIES OF SIMULIUM (DIPTERA). [Published in *The Entomologist's Monthly Magazine*, November, 1915.] This is a summary of a more detailed paper published in the *Bulletin of Entomological Research*, June, 1915. Analytical tables, with summary of distribution of the species described.
- Chironomidae.**—F. W. Edwards: BRITISH NON-BITING MIDGES (DIPTERA, CHIRONOMIDAE). [Published in the *Transactions of the Entomological Society of London*, Pt. II., 1929.] Analytical tables and notes on species, bibliography, text figures, genitalia, etc., and 3 plates of wings.
- do—W. D. Hindes; NOTES ON THE GENUS POLYPEDILUM, KIEFFER (DIPTERA, CHIRONOMIDAE). [Published in the *Entomologist's Monthly Magazine*, August, 1929.] Analytical table and note on distribution.
- do—J. R. Dibb: NOTES ON THE FAMILY CHIRONOMIDAE, SUB-FAMILY TANYPINAE (DIPTERA). [Published in the *Entomologist's Monthly Magazine*, September, 1929.] Analytical tables of genera and species.

- Ceratopogonidae.**—(in Verrall's "list" as a genus under Chironomidae). F. W. Edwards: ON THE BRITISH BITING MIDGES (DIPTERA CERATOPOGONIDAE). [Published in the *Transactions of the Entomological Society of London*, Pt. II., 1926.] Analytical tables with notes on species, bibliography: 2 plates of wings, 3 text figures.
- Psychodidae.**—A. E. Eaton: A SYNOPSIS OF BRITISH PSYCHODIDAE. [Published in the *Entomologist's Monthly Magazine*, 1893 and 1894: followed by a Supplement appearing in the same magazine at intervals 1895-6-7 and 8.] Analytical tables and general notes.
- Culicidae.**—W. D. Lang: A HANDBOOK OF BRITISH MOSQUITOES. [Published at the British Museum, 1920.] A new edition of this book is now in preparation.
- do———F. W. Edwards: THE BRITISH CHAOBORINAE AND DIXINAE (DIPTERA CULICIDAE). [Published in the *Entomologist's Monthly Magazine*, December, 1920.] Analytical tables and notes of species.
- do———F. W. Edwards: THE BRITISH SPECIES OF CHAOBORUS AND MOCHLONYX. [Published in the *Entomologist's Monthly Magazine*, July 1930,] supplementary to the previous paper.
- Limnobiidae.**—F. W. Edwards: BRITISH LIMNOBIIDAE, SOME RECORDS AND CORRECTIONS. [Published in the *Transactions of the Entomological Society of London*. Pt. I-II. 1921.] Analytical tables and notes on species, 2 Plates, genitalia etc. Supplementary to certain genera included in Verrall's work below bringing them up to date.
- Tipulidae.**—G. H. Verrall: LIST OF BRITISH TIPULIDAE, ETC. (DADDY-LONGLEGS) WITH NOTES. [Published in *The Entomologist's Monthly Magazine*, 1886-7-8.] Analytical tables and notes on species.
- do———F. W. Edwards: NOTES ON SOME BRITISH SPECIES OF TIPULA. [Published in the *Entomologist's Monthly Magazine*, April 1924.] Notes and descriptions of species of *Tipula* added to our lists subsequent to Verrall's paper above.
- do———F. W. Edwards: ADDITIONS TO THE LIST OF BRITISH CRANE-FLIES. [Published in the *Entomologist's Monthly Magazine*. February 1926.] Descriptions of 15 species of Tipulids new to our lists.
- Rhyphidae.**—*Anisopus* (*Rhyphus* of Verrall's List).—F. W. Edwards: A MELANIC VARIETY OF A COMMON FLY (ANISOPUS CINCFUS, F.) [Published in *The Entomologist's Monthly Magazine*, May 1926.] In addition to the title matter has an analytical table of the European species of *Anisopus*.

ORTHORRHAPHA. (BRACHYCERA.)

- Stratiomyiidae.**—G. H. Verrall: *British Flies*. Vol. V. STRATIOMYIIDAE ETC. [Published, 1909, Gurney and Jackson, Paternoster Row, and still obtainable from Oliver and Boyd, Tweeddale Court, Edinburgh, price 31/6.]

This work with Vol. VIII. (*Syrphidae*, etc.), is one of the only two published of a projected series of 14 volumes covering the whole of the British Diptera. It deals in the fullest detail with all the then known British species of the following families in his "List":—Stratiomyiidae; Tabanidae; Leptidae; Bombyliidae; Therevidae; and Cyrtidae; and is the standard British work in these families.

- Empididae.**—J. E. Collin: NOTES ON THE EMPIDIDAE (DIPTERA) WITH ADDITIONS AND CORRECTIONS TO THE BRITISH LIST [Published in *The Entomologist's Monthly Magazine*, 1926-7.] This consists of descriptions of many new species, and corrections of nomenclature, etc., but as the title states, the additions and corrections are to a "List" only, and not to a complete monograph, which is still lacking for our British Empid fauna.
- Dolichopodidae.**—G. H. Verrall: LIST OF BRITISH DOLICHOPODIDAE WITH TABLES AND NOTES. [Published in *The Entomologist's Monthly Magazine*, 1904-5.] Analytical tables, with brief notes on species and distribution.

CYCLORRHAPHA (PROBOSCIDEA).

- Platypezidae.**—G. H. Verrall: BRITISH FLIES VOL. VIII. (For details see under *Syrphidae*.)
- do———Dr. J. H. Wood: AGATHOMYIA ELEGANTULA, FALL., A CORRECTION; AND A. ZETTERSTEDTI, ZETT., A SPECIES NEW TO BRITAIN. [Published in *The Entomologist's Monthly Magazine*, February, 1910.] In addition to the title matter this paper gives an analytical table of the British species revising that in *British Flies*, Vol. VIII.
- Pipunculidae.**—G. H. Verrall: BRITISH FLIES VOL. VIII. (For details see under *Syrphidae*.)
- do———J. E. Collin: THE BRITISH SPECIES OF THE SYLVATICUS GROUP OF PIPUNCULUS (DIPTERA). [Published in *The Entomologist's Monthly Magazine*, December 1920.] A revision, with additions, of the table in *British Flies*, Vol. VIII.
- Syrphidae.**—G. H. Verrall: *British Flies*, Vol. VIII. [Published by Gurney and Jackson, Paternoster Row, London, 1901, now out of print.] This was the first published of the two volumes mentioned under *Stratiomyiidae*, and deals in like manner with the families *Platypezidae*, *Pipunculidae*, and *Syrphidae*; it is the standard British work on these families.
- do———(*Eumerus*).—J. Collin: EUMERUS STRIGATUS, FALLEN AND E. TUBERCULATUS, RONDANI (DIPTERA, SYRPHIDAE). [Published in the *Entomologist's Monthly Magazine*, May, 1920.] Description of *E. tuberculatus* and its differentiation from *E. strigatus*, with plate.
- Muscidae.**—O. W. Richards: NOTES ON THE BRITISH SPECIES OF LUCILIA (DIPTERA). [Published in the *Transactions of the Entomological Society of London*, Pt. II., 1926.]

Analytical tables and notes on species. 3 plates of genitalia. (This genus is also included in Wainwright's *Tachinidae*.)

Tachinidae.—C. J. Wainwright: THE BRITISH TACHINIDÆ (DIPTERA). [Published in the *Transactions of the Entomological Society of London*, Pt. I., 1928.] A valuable monograph on a difficult family; consisting of a most useful introductory chapter: Analytical tables of genera, and species; brief notes on the latter with localities. Text-figures of chaetotaxy, etc., in the introduction and two plates of profile heads. This work covers the *Tachinidae* and about half the genera under *Muscidae* in Verrall's *List*.

Anthomyiidae (*Limnophora*).—J. E. Collin: THE BRITISH SPECIES OF THE ANTHOMYID GENUS LIMNOPHORA, DESV. (DIPTERA). [Published in *The Entomologist's Monthly Magazine*, 1921.] Analytical tables, descriptions of species, and localities. This monograph includes the genera *Limnophora* and *Melanochila* of the *List* with some species from *Spilogaster*.

—do— (*Hydrotaea*).—P. H. Grimshaw: ON THE BRITISH SPECIES OF HYDROTAEA, DESV. [Published in *The Entomologist's Monthly Magazine*, 1905-6.] Analytical tables, descriptions of species and distribution.

—do— (*Hammomyia* and *Hylephila*).—J. E. Collin: A CONTRIBUTION TOWARDS THE KNOWLEDGE OF THE ANTHOMYID GENERA HAMMOMYIA AND HYLEPHILA OF RONDANI (DIPTERA). Published in the *Transactions of the Entomological Society of London*, Pt. III-V, 1920.] Analytical tables and descriptions of species with localities, 4 plates of genitalia. The British species in this monograph are taken from the genera *Hylemyia* and *Chortophila* of the *List*.

—do— (*Hylemyia-Chortophila*).—J. E. Collin: ON SOME CHARACTERS OF POSSIBLE GENERIC IMPORTANCE IN THE HYLEMYIA-CHORTOPHILA GROUP OF THE ANTHOMYIDÆ (DIPTERA) [Published in the *Entomologist's Monthly Magazine*, June 1927.] This paper is explained by its title and is very useful to workers on this group.

—do— (*Fannia*).—J. R. Malloch: THE BRITISH SPECIES OF THE DIPTEROUS GENUS FANNIA, ROB. DSV. [Published in the *Scottish Naturalist* 1912.] Analytical tables and descriptions of species. The genus *Fannia* = *Homalomyia*, Bouché of the *List*.

Acalyptrate Muscidae.—J. E. Collin: ADDITIONS AND CORRECTIONS TO THE BRITISH LIST OF MUSCIDÆ ACALYPTRATÆ. [Published in *The Entomologist's Monthly Magazine*, 1910-11.] This is on the same lines as the author's paper on *Empididae* above. There is no work on the British Acalyptrate Muscidae as a whole.

Cordyluridae (*Norellia*).—Col. J. W. Yerbury: SOME NOTES ON THE BRITISH SPECIES OF THE GENUS NORELLIA. [Published in *The Entomologist's Monthly Magazine*, September 1900.] Table of species and critical remarks.

- Helomyzidae.**—J. E. Collin: THE GENUS *HETEROMYZA*, FALLEN: (*HELOMYZIDAE*) ALSO FURTHER NOTES ON THE GENUS *HETEROMYZA*, FALLEN. [Published in *The Entomologist's Monthly Magazine*, April and December, 1901.] Critical remarks on the genus, analytical tables, descriptions of species, and localities.
- Heteroneuridae.**—J. E. Collin:—THREE NEW SPECIES OF THE "ALBIMANUS" GROUP OF THE GENUS *HETERONEURA* (DIPTERA). [Published in *The Entomologist's Monthly Magazine*, May, 1912]. Descriptions of species and localities.
- Psilidae.**—E. E. Austen: ON THE BRITISH SPECIES OF THE DIPTEROUS GENUS *LOXOCERA* (FAM. *PSILIDAE*) WITH THE DESCRIPTION OF A NEW VARIETY. [Published in *The Entomologist's Monthly Magazine*, March 1899.] Analytical table, notes on species and localities.
- Trypetidae.**—A. H. Hamm: *TRYPETIDAE* FROM THE OXFORD DISTRICT WITH NOTES ON THEIR TIME OF APPEARANCE AND FOOD PLANTS. [Published in *The Entomologist's Monthly Magazine*, April, 1918.] This is not a systematic paper but gives valuable information as to the food plants of the various species.
- Ephydriidae** (*Scatella*).—J. E. Collin: SOME NEW SPECIES OF THE DIPTEROUS GENUS *SCATELLA*, DSV., AND THE DIFFERENTIATION OF *STICTOSCATELLA*, GEN. NOV. (*EPHYDRIDAE*) WITH FIGURES. [Published in *The Entomologist's Monthly Magazine*, June, 1930.] Analytical tables of genera and species, and localities.
- Agromyzidae** (*Meoneura*).—J. E. Collin: SOME SPECIES OF THE GENUS *MEONEURA* (DIPTERA). [Published in *The Entomologist's Monthly Magazine*, April, 1930.] Analytical tables, descriptions of species, and localities. 1 plate, genitalia. (included under *Agromyza* in the List).
- Sphaeroceridae** (*Borboridae*).—O. W. Richards: THE BRITISH SPECIES OF *SPHAEROCERIDAE* (*BORBORIDAE*, DIPTERA). [Published in the *Proceedings of the Zoological Society of London*, 1930.] Analytical tables of genera and species, notes on species, distribution and general biology of the group. Bibliography, text figures and one plate puparia. (Under *Borboridae* in the List.)
- Phoridae.**—Dr. J. H. Wood: ON THE BRITISH SPECIES OF *PHORA* WITH SUPPLEMENTS. [Published in *The Entomologist's Monthly Magazine* at intervals 1906-1914]. Analytical tables, and descriptions of species. A few figures and one plate, genitalia.

In addition to the foregoing I would mention two Continental works whose inclusion is justified by their being written in English, and covering many British species.

Douglas Melin.—A CONTRIBUTION TO THE KNOWLEDGE OF THE BIOLOGY, METAMORPHOSIS AND DISTRIBUTION OF THE SWEDISH ASILIDS. [Published in the Swedish magazine *Zoologiska Bidrag*: Uppsala. Band VIII, 1923.] This paper is fully illustrated and in my opinion a model of what a comprehensive monograph should be.

William Lundbeck.—DIPTERA DANICA. Genera and species of flies hitherto found in Denmark. [Published by G. and E. Gad, Copenhagen (London, Wm. Wesley and Son).] Seven parts of this work have appeared so far, as under:—

Part I. (1907). *Stratiomyiidae*; *Xylophagidae*; *Coenomyiidae*; *Tabanidae*; *Leptidae*, and *Acroceridae*.

Part II. (1908). *Asilidae*; *Bombyliidae*; *Therevidae*, and *Scenopinidae*.

Part III. (1910). *Empididae*.

Part IV. (1912). *Dolichopodidae*.

Part V. (1916). *Lonchopteridae* and *Syrphidae*.

Part VI. (1922). *Pipunculidae* and *Phoridae*.

Part VII. (1927). *Platypezidae* and *Tachinidae*.

The families are comprehensively dealt with in a clear manner and there are numerous text figures. These parts can still be obtained from Messrs. Gad.

It will be seen by the foregoing that in Orthorrhapha the Nematocera are comparatively well covered by systematic monographs, and the Brachycera almost entirely with the exception of *Empididae* (none) and *Dolichopodidae* (one, somewhat brief). Both these families however are covered by Lundbeck's *Diptera Danica*. In the Cyclorrhapha the Proboscidea are fully covered as regards *Syrphidae* and the allied families, and of the two major divisions of the Calyptrate Muscidae the *Tachinidae* are covered and a certain proportion of the *Anthomyiidae*: *Conopidae* and *Oestridae* still lack systematic works in English. The Acalyptrate Muscidae are badly off with very few monographs and there are none, to my knowledge, on the Cyclorrhapha-pupipara.

It will also be noticed that in this list I have omitted the works of the older authors such as Francis Walker, Dr. Meade, etc. Without in anyway wishing to disparage the valuable pioneer work they did; they had not the advantages of such modern methods of classification as chaetotaxy and the study of genitalia, and they can hardly be recommended as useful guides now-a-days. Besides, in many instances, their works have been superseded by modern papers on the same groups. I would refer those who may wish to consult them to Dr. Grimshaw's *Guide* mentioned at the beginning of this paper. I have tried to keep strictly to papers useful for identification purposes, omitting locality records only, and records of single new species. To have included papers other than those dealing with the systematic side of Dipterology would have needed a volume rather than a pamphlet, and been beyond my powers.

Contributions to the Lepidopterology of the Argentine. I.

By CAPT. K. J. HAYWARD, F.E.S., F.Z.S., F.R.G.S.

ADDENDA TO PREVIOUSLY PUBLISHED NOTES ON ARGENTINE LEPIDOPTERA.

I. *Ent. Rec.* XLI. p. 91. Larval Descriptions from the Argentine—*Maenas azollae*, Berg. The foodplant of this insect is *Pentamogeton* sp.

II. *Ent. Rec.* XLI. p. 180. Descr. of the larvae and pupa of *Phobetron coras*, Cr.—My note on this insect was written early in January, 1929, and forwarded at that time to the Editor of this Journal. I have since received a copy of the *Revista Yerbatera* issued in April of the same year (I.No. 5) in which Dr. A. Ogloblin gives an account of this same larva which has come to his notice as a pest of the Yerba Maté. As the *Revista* mentioned is probably unknown to, and unobtainable by, most entomologists, it may be interesting to summarise one or two observations made by Dr. Ogloblin additional to the larval description already published in these pages. He states that although the yerbales were from 300 to 600 yards distant from the experimental station, yet males assembled as soon as the females emerged. Copulation took place immediately, and eggs were laid the day following emergence, being ovoid in shape and of a greenish yellow colour. The larvae emerged after ten days and passed through five instars before pupating. Dr. Ogloblin's observations points to there being four generations of this moth annually, and as he has found the females to lay up to 200 eggs, the danger to the yerba can well be imagined.

The article in question is titled, "Temas de vulgarización científica. —[El Limacodido y] *Pengonia lusca-ilus*, Boisd. de la Yerba." (The portion of the title in brackets has been added in ink by the author), and the observations deal with the Province of Misiones.

III. *Ent. Rec.* XLI. p. 138.—*Protoparce sexta* subsp. *paphus*.—This larva is extremely common in the neighbourhood of Patquia (La Rioja—Argentine) on *Nicotiana acutiflora*. Examination of a large number of specimens reveals the fact that the colouring of the larvae varies from near chromium green to apple green, and that the colouring of the spiracles is somewhat variable and the variation not entirely constant inter se.

IV. *Automeris aspersa*, Boisd.—In *Ent. Rec.*, XLI., p. 12 (1929) I noted Aromita or Algarobillo (*Acacia macrantha*) as the foodplant in the Chaco Santafecino. I have since found larvae very commonly on Algarobo negro (*Prosopis nigra*) in the Prov. of La Rioja where I have also beaten the larvae from Quebracho blanco (*Aspidosperma quebracho*) in small numbers and have occasionally encountered it on (cultivated) *Tamariscus* sp.

V. *Protoparce sexta* subsp. *paphus*.—When collecting in the Nevado de Famatina I encountered a single larva of this species at an altitude of slightly above 10,000 ft. feeding on Duraznillo (also known locally as Duraznillo negro and Hediondillo) *Cestrum parqui*, which appears a strange foodplant for this species.

THE COLOURS OF THE LARVA OF DANAIIS ERIPPUS, Cr.

This larva is already well known, but it may be of interest to denote the colouring in accordance with Ridgeway's colour charts. (*Color Standards and Nomenclature*, 1912.)

The ground colour is black. Head, frons and the triangle above primuline yellow (XVI a.). The segments each bear a ring, split by a thin line of the ground colour dorsally, anteriorly, and with an indication of a second similar line posteriorly, the ring having an oblique forward pointing wedge from the margin, the colour of ring and wedge being barium yellow (XVI. d.). A pair of black horns on the first thoracic and the eighth abdominal segments, the anterior pair 9mm., the posterior pair 3.5mm.

A shade of primuline yellow on the anal segment.

Beneath brownish white ventrally.

The foodplant on which I have found this larva at Guayapa (Prov. of La Rioja, Argentina) is *Tweedia brunonis*, Hook et Arn, known vulgarly as "Malme."

DESCRIPTION OF THE LARVA AND PUPA OF DRYOCAMPA LINEATA, Dogn.

Length 45mm.

Ground colour hellebore green (XVII. m.).

Head edged laterally with two white vertical stripes bordered outwardly with black, the latter colour one half the width of the white.

First thoracic segment with a slightly raised and angular forward edge across the dorsum, white, whilst below as a continuation a fairly large white spot from which obliquely downwards backwards several much smaller white points. Still nearer the margin another similar but smaller oblique line of white spotting, parallel to the upper series. In each series the anterior spot is considerably larger than the remainder which are but tiny points.

Second thoracic segment with a slightly raised pinkish white forward edge, carrying at either extremity a pair of upright slightly back-curved horns, one without the other and from separate bases, the bases touching. The inner horn at base an indefinite green, shading above to jouvence blue (XX.k.), from this colour to black, and from black to a lighter tip, watery green above the black and the point wax yellow (XVI.a.) the colour slightly deeper at the tip. The outer horn similar in size and shape, baryta yellow (IV.f.), deeper at the extremity. Laterally a few minute white points, thicker on the margin.

The third thoracic segments similar to the second but the inner horn slightly longer.

The abdominal segments with a double dorsal and a lateral row of thin silvered "leaves," length three and a half times breadth, laid along the body so that they slope backwards and upwards at approximately 45° from a line uniting their bases, the upper half free from the body and running to a point. The "leaf" yellowish white, the

outer side brightly silvered, whilst below on the same centre line the body has a paler colour as though the "leaves" had been pushed under the skin. At one stage shortly before pupation the silvering has a pale pinkish flush over that portion lying against the body, appearing mother of pearl. There is an extra but smaller similar process on the penultimate segment in line with the remainder.

Three or four tiny white spots vertically on the sides of each abdominal segment, a marginal row of vinaceous-rufous (XIV.i.) tubercles shaded anteriorly with a darker green and united to one another by a straight line of very small white spots. The penultimate segment with a horn, pale yellow green (VI.f.) at the base, above a watery pomegranate purple (XII.i.) shading through a watery blue to zinc green (XIX.i.) and at the tip to deep chrome (III.b.). The anal segment pointed, the dorsal portion flattened and somewhat projecting over the under portion, green, edged with a somewhat greenish white and vinaceous-rufous in the order stated, the remainder of this segment watery vinaceous-rufous over green with a few vinaceous-rufous spots.

The alimentary channel shows darker on all segments.

Beneath the ground colour as above, shading lighter to the centre. Thoracic legs green with a line of tiny white spots on the body without their bases, a transverse line of similar white spots across the first and second abdominal segments, abdominal claspers green, the pads black, these claspers partially ringed with a semicircle of white spots without.

A row of black submarginal tubercles on the abdominal segments that do not bear claspers, these tubercles tipped flesh colour on the first and second segments, white on the remainder, largest on the second segment, small on the seventh, thereafter minute.

Pupa obtecta 26mm., in length, dark reddish brown, the surface roughened. First thoracic segment with a raised shiny ridge corresponding to that of the larva, fourth, fifth, and sixth abdominal segments with a sharp posterior ridge at the segmental fold.

Pupal period of November larvae 15 days.

Described from two larvae found at Guayapa near Patquia, Province of La Rioja, Argentina, during the latter days of November 1930. One of these larvae which was successfully reared was found apparently drowned at the bottom of a tank some four feet deep.

Foodplant Algarobo negro (*Prosopis nigra*).

Colours from Ridgeway's *Color Standards and Nomenclature*, 1912.

DESCRIPTION OF THE LARVA OF MEGALOPYGE VULPINA, MAB., F. URUGAYENSIS, BERG.

Length 25mm., the hair tail extending a further 9 to 10 millimetres, but laid back along the dorsum when the insect is at rest. Height 7mm., and breadth $9\frac{1}{2}$ to $10\frac{1}{2}$ mm., at the first abdominal segment.

This is a very beautiful larva covered with silken hairs about 3 to $3\frac{1}{2}$ mm. long laid closely along the upperside, the head and first thoracic segment alone showing bare.

Head brownish, glabrous, the frons lighter, the antennae almost white at the base, brown tipped.

First thoracic segment with a ring of tubercles on the forward edge, each with a cluster of long grey hairs which curve forwards over the

head like a fringe, the posterior portion of the segment approaching dusky neutral grey (LIII.m.) with a diamond-shaped ferruginous (XIV.i.) dorsal patch split by a fine white dorsal stripe.

On the second thoracic segment the silky hair-covering commences, the hairs on this and the following segment being laid forwards and upwards, culminating in a small raised ridge or crest, slightly thinner than on the abdominal segments where the hairs are laid upwards and backwards. These hairs rise from just above the margin on each segment with a slight curl, the base of each curl occupying the anterior two-thirds of the segment but so laid that the whole body is closely covered, the effect being in miniature that of a drowned rodent. From the penultimate abdominal segment there is a long "tail" (9 to 10mm.) which is carried obliquely erect when the larva is in movement. The colour of this clothing of hair commences white on the anterior portion of the second thoracic segment, shading sharply on the third segment to cinnamon buff (XXIV.b.), this colour shading slowly anally to white, the colour lighter just above the margin and dorsally on the latter abdominal segments. The "crest" on the thoracic segments, and the "tail" being very dark grey. On the penultimate abdominal segment below the "tail" are a pair of small tubercles with grey tufts of hair. The hair very sleek and shiny.

The body below the hair (seen by brushing back the latter), pale olive grey (LI.f.)

The margin bare, ferruginous, carrying on each segment a dark olive grey tubercle from which at the base and pressed against the body are short black hairs, and from the raised portion a brush of longer (1 to 1½mm.) white hairs. From these tubercles as also from just above the margin where the hair commences are on each segment several long white hairs, those on the penultimate segment one third longer than the rest.

Beneath, the larva is dark olive grey carrying a sub-marginal row of tubercles with very minute white setae. The claws and termination of the claspers orange-cinnamon. (XXIX.a.)

Described from larvae found at Guayapa (near Patquia) Province of La Rioja, Argentine, in November. Foodplant Quebracho blanco (*Aspidosperma quebracho*).

Duration of the pupal period 24 to 28 days.

Colours from Ridgeway's *Color Standards and Nomenclature*. 1912.

DESCRIPTION OF THE LARVA AND PUPA OF *HEMEROPLANES* *GRISESCENS*, ROTH.

Length 45mm. tapering slightly towards the head and more acutely towards the anal end.

Head lichen green (XXXIII.f.), the frontal plate bordered on either side with a white stripe. Antennae yellowish. Mouth parts black, remainder of face yellowish.

Thoracic and abdominal segments with the alimentary canal showing light niagara green (XXXIII.d.) bordered by an indistinct line of pale lumiere green (XVII.f.). The dorsal area light fluorite green (XXXII.b.) bordered by a line of light green yellow (V.d.) lightly shaded dorsally with a brownish shade. On the first thoracic segment a dash of black within and parallel to the bordering lines. The lateral

area grass green (VI.k.). Spiracles white with a round brownish spot in their centres. The light lines bordering the dorsal area converge slightly from the seventh abdominal segment till they reach the base of a small horn on the penultimate segment along the outer sides of which the light colouring continues, the horn being yellowish green beneath and above deep orient blue (XXXIV.i.). The anal section projects slightly dorsally, the projection being edged yellowish, the claspers prominent and pale glaucous blue (XXXIV.f.) above.

Beneath the same colour as the lateral area, legs and claspers transparent near viridine green (VI.d.).

Pupa obtecta, 26-27mm. in length, deep mahogany brown, the wing cases a deep olive brown, segmental folds brownish yellow, almost ochreous. Anal segment a sharp point, two flanking ridges giving it a flattened appearance. Cremaster not visible except under magnification, the two hooks very short, blunted outcurved. Posterior ridge of the metathorax raised across the saddle in the form of a small rounded ridge, broken centrally at the dorsum. The anterior ridges of each abdominal segmental fold finely punctate.

Beaten from Quebracho blanco (*Aspidosperma quebracho*) at Guayapa near Patquia, Province of La Rioja, Argentina, on November 29th, 1930. One specimen pupated the same night, the other changed into the final instar during the day. A pupa was found the following day beneath an old bone near another tree of the same species.

The November larvae remained in the pupal state 14 days.

Colours from Ridgeway's *Color Standards and Nomenclature*, 1912.

DESCRIPTION OF THE LARVA, PUPA AND OVA OF ARTACE LILLOI, GIAC.

Length 27mm., breadth at the third thoracic segment 9mm., and height at the same point 5mm.

A somewhat flattened larva with a very small head that it withdraws under the first thoracic segment when at rest. The thoracic segments wider than the abdominal and so appearing like a large head to the rest of the body. The larva being designed to imitate the bark of the food tree, like all similar bark-like caterpillars varies very greatly in colouring and in the density or otherwise of its markings.

Head of the general colouring, hairy, the face and appendages greenish white, the antennae tipped brownish.

Ground colour of the thoracic and abdominal segments varying in different specimens from hair brown and drab (XLVI a. and i.) to the lighter neutral greys (LIII. a., b., and d.), closely and irregularly spotted with black, closer speckling forming two squares on the anterior segments, the outer square with sides from the dorsum on the second thoracic and second abdominal segments to the margin on the third thoracic, and inner square parallel, the intervening lighter space approaching 1 mm. in width. The anterior angle of the outer square not formed, the lines forming the sides at this point turning off to run parallel along the dorsum of the first thoracic segment. In the centre of these squares there is a small circle of darker shading with a central dark point.

The margin consists of twelve projections giving the larva the appearance of a small *Scolopendra*, these projections edged with heavier shading which continues forwards and obliquely upwards for a short

distance over the lateral area. The projections are longer on the second and third thoracic segments, those on the first thoracic segment double headed and pointing forwards, on the penultimate segment very small. Bordering this margin a close fringe of hairs, whitish grey, giving the larva the appearance of being covered with mould. There are two forms of these hairs. From the point of each projection a dozen to fifteen black simple hairs, fairly long, whilst below a complete fringe of whitish hairs which near their extremities carry a fanned out plume of tiny branches.

Dorsally on all the segments except the anal, warts, a pair on the first thoracic segment scarcely raised from the dorsum but intensely hairy, a pair of rounded and prominent warts on the second thoracic, a pair of larger rounded warts connected by a slightly raised ridge on the third thoracic, a similar much larger pair on the fifth abdominal segment, the connecting ridge being nearly as high as the warts themselves, on the remainder of the segments a pair of small rounded warts, not connected.

The segmental fold between the last thoracic and first abdominal segment black with four orange buff (III. d.) spots.

Beneath near light bic green (XVII. i.), the thoracic segments darker (more bluish) and the first two abdominal segments a shade between the two. Numerous white very short hairs. Legs and claspers of the same colour as the segments bearing them.

These larvae on the bark of the branches of the food tree are highly procryptic and practically impossible to see. (The bark of the trunk is slightly darker, less greyish.)

Described from a well marked specimen selected from a number beaten from Quebracho blanco (*Aspidosperma quebracho*) on November 29th, 1930, at Guayapa near Patquia, Province of La Rioja, Argentina. Several larvae pupated on December 1st, remaining in the pupal state 10 days.

They pupate on the bark, forming a flattened pale grey silk cocoon that lies closely to the surface of the branch or trunk and is very difficult to distinguish from it. The pupa itself is 13mm. in length somewhat flattened. Head thorax and wing cases a very dark brown, dorsum of the abdomen except on the first segment near auburn (II.m.), first abdominal segment dorsally, final segment, and abdominal segments ventrally, amber brown (III.k.), the anal segment generally somewhat brighter and the ventral portion of the abdomen clearer, more transparent. The same colour beneath the antennae. The colours vary according to the age of the pupa, those mentioned ruling the afternoon before emergence.

My imagines all proved to be females, laying eggs the same night as they emerged, the eggs naturally being sterile.

These eggs were roundish, very slightly longer than wide, the measurements being .75mm. horizontal axis, .8mm. vertical axis. They are very slightly flattened at the base. Colour ivory (a slightly yellowish white), freely spotted with round coffee-brown spots, deeper at their centre, the colour shading outwardly lighter. These spots placed irregularly singly, in pairs, patches or lines, more lightly at the top of the egg. The flattened base with a larger brown central spot, more net (without the shading), a clear ring of the ground colour surrounding this spot. The shell is slightly roughened having the

appearance of a small orange in this respect when magnified, and is covered with shallow and small indentations. The eggs laid in captivity were placed on the underside of the leaf of the foodplant in small masses, eggs being piled on one another without order, glued together with a yellowish liquid that when dry was strongly adhesive, and with many pale grey hairs from the abdomen of the parent.

Colours from Ridgeway's *Color Standards and Nomenclature*, 1912.

DESCRIPTION OF THE LARVA AND PUPA OF HALISIDOTA TEXTA, H.-S.

Length 30mm.

A snow white caterpillar turning very slightly yellowish when about to pupate.

Head old ivory, slightly mottled, face and mouthparts black.

Thoracic segments slightly greenish white at the segmental folds, the abdominal segments bluish white at the folds.

Prothorax with a ring of white tubercles on the anterior portion of the segment carrying several short white hairs pointed forwards over the head and forming a complete fringe.

Mesothorax with a ring of eight white tubercles on the anterior portion of the segment, the four dorsal with white hairs 3mm. long, the lower tubercles with slightly shorter white hairs.

The tubercles on the metathorax similar to those on the preceding segment the tufts of white hairs measuring 9mm. on the dorsal pair, 7mm. on the upper lateral, 3mm. on the lower lateral and a little over 1mm. on the marginal tubercle.

The abdominal segments carry an anterior and posterior trapezoidal tubercle, white, the tops very slightly tinged brownish, carrying short thick tufts of white hairs.

In addition supra- and sub-spiracular tubercles and a lateral tubercle, each white with tufts of white hairs, their position in one vertical line. On the eighth abdominal segment the hairs from the trapezoidal tubercles are 8mm. long pointing backwards over the anal segment, whilst on the 9th abdominal segment the hairs are 7mm. long and on this segment there is only a single pair of dorsal tubercles. On the anal segment there are only two small dorsal tubercles with white hairs pointing backwards.

The alimentary canal shows slightly bluish white.

Beneath white, bluish white at the segmental folds, the claspers and feet ivory.

Foodplant Duraznillo, Duraznillo negro, or Hediondillo. (*Cestrum parqui*.)

The above short description was made in the field from five larvae found feeding in the Nevado de Famatina at an altitude of 10,100 feet. (Prov. of La Rioja, Argentina, about 50km. N.W. of Chilecita).

The larva pupated on January 9th and emerged on Jan. 22nd. The emergence did not take place till after 10 p.m. (sun time.)

The larvae show up strikingly on the dark green lanceolate leaves of the foodplant.

The pupa, incomplete, 14mm. in length, is contained in an oval cocoon spun up from the larval hairs, slightly yellowish, and exceedingly soft, in no manner tough. The pupa is a delicate pale greenish white, greener at the segmental joints and with a broken green line along the

dorsum. The wing cases paler white and the back of the head slightly more yellowish. The compound eyes appear as two large brown, almost black spots. The anal end of the abdomen very rounded so that the pupa has a " grub-like " shape. Cremaster a short horizontal line of brown hooks, the spiracles with a fine brown centre.

DESCRIPTION OF THE LARVA AND PUPA OF *TOLTYPE PAUPERATA*, BURM.

Length from 38 to 42mm. The ventral face completely flat allowing the larva to lie compressed along the stalk of the foodplant where it is highly procrystic.

Head, dorsally of a very faint mauve to purplish tinge with three double lines of brown spotting running back from the frons. Beneath tinged Brazil red (I.c.), the antennae, maxillae, labium, and palpi, Brazil red. The head very hairy, the hairs greyish.

The general colouring of the thoracic and abdominal segments is either light grey or a light brownish on grey, the colouring being composed of a great number of broken, longitudinal, coloured lines, approximating one tenth of a millimetre in thickness, the lines becoming more broken up and the colouring more mottled as the margin is neared. The lines in the case of the light grey larvae are greyish to black brown and dirty white, in the case of the brownish specimens there is an additional yellowish colouring, the major portion of the lighter lining being of this shade with dirty white and the greyish or blackish brown lines.

Prothorax with a dorsal plate varying in colour from creamy white to salmon buff or apricot buff (XIV. b.d.), darkening at the anterior edge, divided dorsally by a fine double black line, not parallel but diverging posteriorly so that the plate is divided into two portions which have the shape of a deep solid U, the open side towards the head. An anterior fringe of longish grey hairs curved over the face, whilst in addition there are eighteen black setae set alternately in three rows on the anterior portion of the dorsal plate. Laterally below the plate the segment of the general colouring and carrying on the forward edge of the segment two raised warts of the same colour with tufts of grey hairs pointing forwards, those of the upper wart about 6mm. in length. A few scattered grey short hairs over the lateral portion of the segment.

Meso- and meta-thorax of the general colour bearing dorsally in the centre of the segments a pair of dorsal tubercles, round, somewhat high in comparison to their diameter, ox-blood red (I.k.), rising from an ill defined lighter ring (whitish to yellowish), bearing about twelve short stiff black setae. A lateral, and a slightly smaller marginal, tubercle bearing the same colouring and marking as the remainder of the segments (but the underlying colour sometimes inclined to pinkish), the numerous hairs blackish brown to grey. Both segments as also all the abdominal segments with very many tiny stiff black hairs irregularly placed. Also on these two thoracic segments a few slightly longer, softer, more slender greyish hairs.

The abdominal segments of the general colour, the first seven carrying a pair of dorsal tubercles placed at the centre of each segment, ox-blood red (or very near this colour), whilst at the base laterally and dorsally (not anteriorly and posteriorly) a half-moon shaped apricot

A Scheme for Recording Immigrant Insects in Great Britain

ABOUT one-sixth of our British Butterflies and nearly one-half of our Hawk-Moths are partially or wholly dependent on immigration for their presence in this country. Many others of our moths and dragonflies are also regular migrants.

It has been shown that the majority of insects which migrate in temperate regions tend to move from the warm temperate or sub-tropical zones towards the cooler districts in the spring and early summer. Thus it follows that few if any spring migrations start in this country, which is more frequently an end-point or a point on route for the migrants. Many, indeed, reach our southern shores with comparative frequency but rarely reach Scotland and may never be recorded in the extreme north of the country.

For these reasons it is seldom possible in Great Britain to take observations on the start of a migratory movement ; but, on the other hand, observations on the arrival of immigrant insects can easily be collected, and indeed in an irregular way many such records have found their way into entomological and natural history journals in the past.

If records were more regularly kept over a large area it might be possible to throw light on such questions as the influence of climatic and weather conditions on the route of the flight, the periodicity of migrations, the sex condition of the migrants, the extent of the movements and indeed on many other problems.

It is now proposed by the Hastings and St Leonards Natural History Society, whose area of special interest is particularly favourably situated for observing the arrival of immigrants on the south-east coast, to start a more regular series of observations on immigrant butterflies.

At their request Dr C. B. Williams of Edinburgh University has drawn up a standard card for the recording of information and, as the investigation is more likely to be interesting if it is extended over a wider area, the scheme was brought before the S. E. Union of Scientific Societies at Winchester in June 1931 and a resolution was passed inviting the co-operation of all the seventy-two affiliated Societies.

To test out the scheme it is proposed to confine attention at first to the commoner and more conspicuous migrants and especially the Painted Lady Butterfly (*V. cardui*), the Clouded Yellow (*C. croceus*, or *cdusa*), the Pale Clouded Yellow (*C. hyale*), the Silver Y Moth (*P. gamma*), and the Diamond-Back Moth (*P. maculipennis* or *cruciferarum*). This short list should not, however, prevent anyone specially interested from recording any immigrants that he may come across.

Any person who knows the commoner butterflies and moths can help by sending in their records, and every additional observer will make the results more likely to be of value.

Cards of the standard arrangement, filled in with the type of information hoped for, are shown opposite. The back of the card can be used for any information for which there is no room on the printed side. Filled in cards will be collected at intervals and sorted and analysed.

In addition to sending in records of their own observations, any naturalists who are specially interested can help in other ways, for example:—

- (1) By sending living or fresh killed specimens of obviously recent immigrants direct to Dr Williams for dissection purposes, so that further evidence on the state of sexual development of migrant insects may be obtained.
- (2) By searching through collections and literature and sorting and tabulating the information about any of our migrant insects, especially those not dealt with in Williams' *Migration of Butterflies* (1930), and publishing the results. (Cf. paper by Dean in *Ent. Mo. Mag.*, 1931, p. 31.)

1930	June 18	Brockenhurst, Hants		
Year	Date	Locality		Flight direction
10-12 a.m.	calm	hundreds	6	recorder
Time of day	Wind force and direction	Number seen	No. captured	In collection
3 ♂ 3 ♀ caught	good	Suddenly appeared flying about. None seen in previous two weeks		
Sex	Condition	Notes (speed, egg laying, duration of flight)		
<i>Last week warmer than usual. 18th fine but cooler</i>				
Meteorological condition present and past. (Temperature, sun, cloud, rain, etc.)				
T. Robertson		Noted in "Entom." July 1930		
Recorder		Reference if published		
Colias edusa		Nat. Hist. Mus. London		
Species and variety		Determined by		
IMMIGRANT INSECT RECORD				
1929	May 28	Hastings		to N.E.
Year	Date	Locality		Flight direction
2-5 p.m.	very light S.	dozens	3	recorder
Time of day	Wind force and direction	Number seen	No. captured	In collection
All males captured	poor	Steady rapid flight		
Sex	Condition	Notes (speed, egg laying, duration of flight)		
<i>Hot day after cold wet spell</i>				
Meteorological conditions present and past. (Temperature, sun, cloud, rain, etc.)				
J. Jones				
Recorder		Reference if published		
V. cardui		recorder		
Species and variety		Determined by		
IMMIGRANT INSECT RECORD				

A dozen or so printed cards will be sent free of charge to anyone who wishes to co-operate if he or she will send his name and address, and 1½d. in stamps to cover postage, to Dr Norman Ticehurst, 24 Pevensey Road, St Leonards, Sussex. Filled in cards should be returned at intervals to the same address when further record cards will be sent if required.

Specimens for dissection should be sent to Dr C. B. Williams, The University, 10 George Square, Edinburgh.

Coloured post-cards of the following butterflies can be obtained from the Natural History Museum at South Kensington for 2d. each: the Painted Lady (Museum reference No. E43), the Clouded Yellow (E42, E281, and E117), and the Pale Clouded Yellow (E117).

SPECIAL INDEX.

By HY. J. TURNER, F.E.S., F.R.H.S.

VOL. XLIII. (new series) (1931.)

The Entomologist's Record & Journal of Variation.

Coleoptera arranged in order of Genera. The other orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

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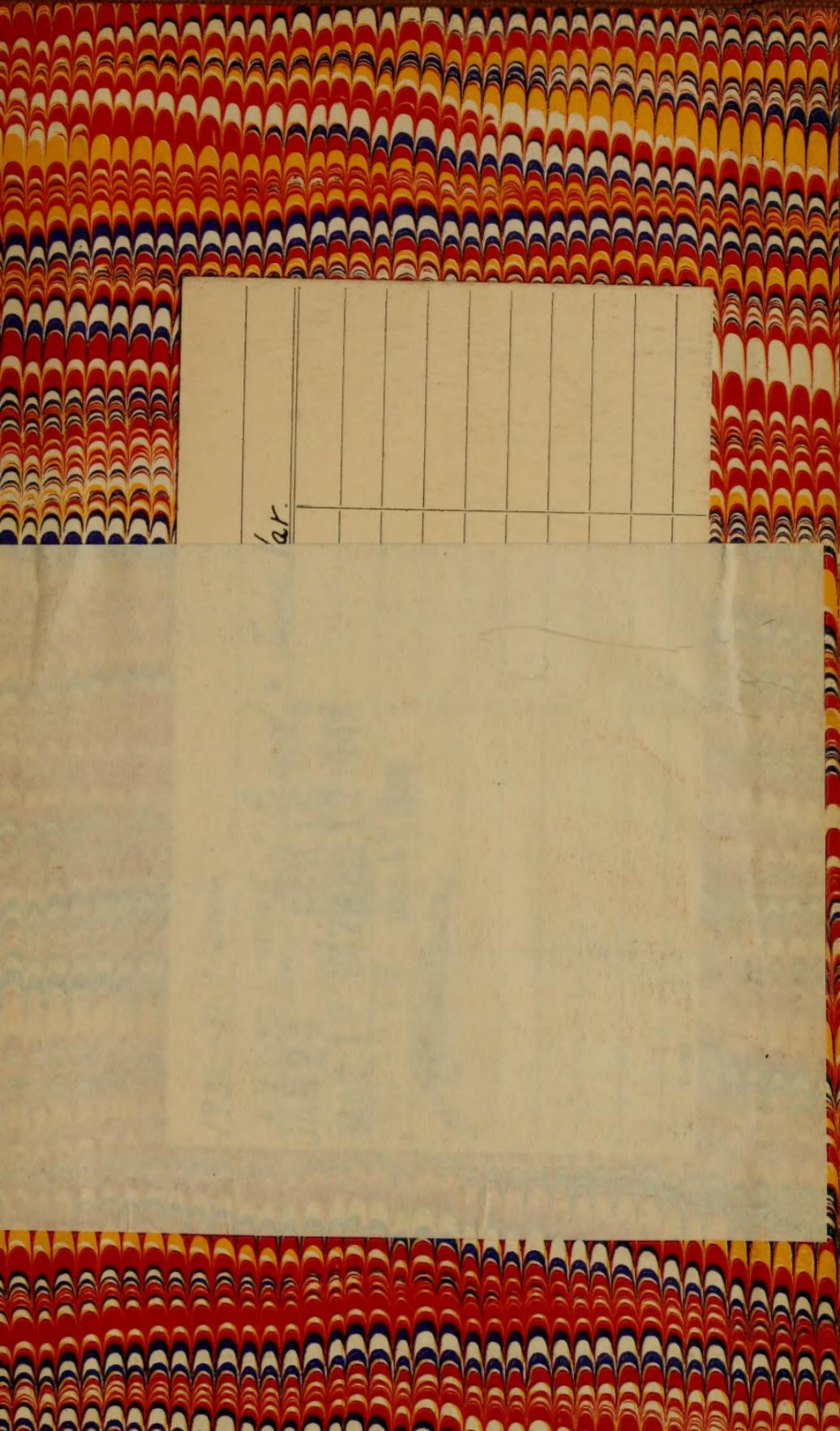
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CORRECTIONS.

p. 52 for *böhmewaldensis* read *isarica*.
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