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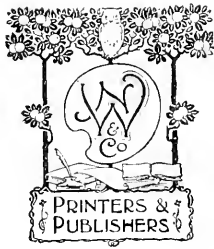
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*Many of the following references to Odonata occur under little-known synonyms,
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ERRATA, &c.

- Page 99, fourth line from bottom, for "50" species read "57."
 ,, 100, delete first line.
 ,, 133, third line from bottom, for "sypical" read "typical."
 ,, 206, third line from bottom, for "an hermaphrodite" read "gynandromorphous."
 ,, 232, footnote, lines 2 and 4, for "Montaudon" read "Montandon."
 ,, 238, line 15 of third paragraph, for "avirous" read "avirons."
 ,, 238, first footnote, line 3, for "devous" read "devons."
 ,, 238, second footnote, line 1, for "pratiquerous" read "pratiquerons."
 ,, 239, line 4 of third paragraph, for "avous" read "avons."
 ,, 239, footnote. N.B.—This refers to the "Iconographie," not to the "Hémiptères."
 ,, 264, footnotes 12, 13, and 14 have been transposed; 12 should be 13, 13 should be 14, and 14 should be 12.

PLATES.

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ON A NEW GENUS OF *LYCÆNIDÆ* HITHERTO CONFOUNDED WITH *CATOCHRYSOPS*.

By A. G. BUTLER, PH.D.

WHILST re-arranging the Museum collection of *Lycænidæ* of the genus *Catochrysops* (type *C. strabo*), my attention was called to the fact that, apart from the tailed or tailless character of the species, which appears in that genus only to have a specific value, many of the forms are separable from the type and its congeners by having smooth eyes, those of typical *Catochrysops* being hairy.

I am well aware that, in his recent 'Catalogue of Rhopalocera of the Ethiopian Region,' my friend Prof. Aurivillius regards *Catochrysops* and many other genera as mere sections or groups of one huge genus—*Cupido*. I fail, however, to see why characters, which in other portions of the Rhopalocera are generally regarded as of generic value—such as the absence of a vein in the primaries, the partial anastomosis of certain veins, or the absence of hair on the eyes—should be ignored in the present family. The question as to whether secondary sexual characters should be used for the separation of genera is one which does not concern the present case; personally, I see no profit in calling groups, based upon well-defined male characters, sections or subgenera; it appears to me to be far better to regard them as genera. But to refuse constant structural characters common to both sexes and accompanied by even slight differences of form or pattern, seems to me to be unscientific and retrograde.

EUCHRYSOPS, gen. nov.

Primaries somewhat less acuminate than in *Catochrysops*; secondaries invariably tailed, with similarly placed ocelloid

spots sprinkled with metallic scales towards anal angle on under surface; eyes quite smooth instead of hairy. Type, *E. cnejus*.

Of the species at present in the Museum collection, the following should be placed in *Euchrysops* :—

E. cnejus = *E. theseus* = *E. hapalina*, *E. contracta*, *E. ella*, *E. pandara* (of which *E. nicola* seems to be an intermediate form), *E. trifracta*, *E. cyclopteris*, *E. naidina*, *E. lochias*, *E. hippocrates*, *E. lois*.

Wallengren's beautiful little species, which I have recently quoted as "*Catochrysops mahallokoæna*," has smooth eyes, but may at once be separated from *Euchrysops* by the close approximation of first subcostal branch and costal nervure (veins 11 and 12), and lack of tails to hind wings; it is nearly related to *Chilades trochilus*. In *Neolycæna*, which has smooth eyes, the third subcostal branch (vein 9) is wholly absent, so that the vein is trifurcate.

THE ORTHOPTEROUS FAUNA OF THE BRITISH ISLES, BELGIUM AND HOLLAND.

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

IN the 'Annales de la Société Entomologique de Belgique,' October, 1899, appears an article by the veteran Belgian entomologist, M. le baron Ed. de Selys-Longchamps, comparing the orthopterous fauna of the British Isles, Belgium, and Holland. A summary of the results arrived at, together with a few notes that seem to be called for in connection with some of the British species, cannot but be of interest to orthopterists in this country also.

Of the **Forficulidæ**, six species—*Labidura riparia*, *Anisolabis maritima*, *A. annulipes*, *Forficula lesnei*, *Apterygida arachidis*, and *Chelisoche morio*—are British, or have occurred in Britain, but do not appear to have been observed in Belgium or Holland. *Labia minor*, *Forficula auricularia*, and *Apterygida albipennis* are common to the three countries; while *Chelidura acanthopygia* occurs in Belgium and Holland, but has not been recorded as British.

Of these nine species set down as British, *L. riparia*, *A. maritima*, and *A. albipennis* have not been taken for some years; *A. annulipes* and *A. arachidis*, although they certainly breed here, do so only under artificial conditions as regards temperature; of *C. morio* but two specimens have occurred—a pair which came to Kew in sugar-cane from Mauritius in August, 1894 (*ante*, vol. xxxi. p. 50).

Six species of **Blattidæ** are found in all three countries. These are *Ectobia lapponica*, *E. livida*, *E. panzeri* (*ericetorum*),

Blatta americana, *B. orientalis*, and *Phyllodromia germanica*. *B. australasiæ* is now well known in Britain; it has been recorded from Belgium, but it does not appear in the Dutch list. In addition to these, *Rhyparobia maderæ*, *Leucopheea surinamensis*, *Blabera gigantea*, and *Nyctibora holosericea* have been accidentally introduced with more or less frequency into Britain, but have not been noticed in Belgium or Holland.



NYCTIBORA HOLOSERICEA.

Eleven species are in this family set down as British, of which the three *Ectobias* only are indigenous. The three *Blattas* and *Phyllodromia germanica* breed here profusely where they are established, but require warmth. It is just possible that *L. surinamensis* breeds, or has bred, in Kew Gardens. The others are merely "casual visitors" due to foreign trade. Of the last, *N. holosericea* has been but once noticed; the single specimen was taken at Covent Garden, and sent to Messrs. Watkins and Doncaster, July 6th, 1897. They sent it alive to Mr. Burr, who wishes me to record it. It is a large insect, measuring 90 mm. in expanse of wings, of a fairly uniform rich dark chestnut colour, except the wings, which are to a great extent transparent; the flat dorsal surface of the abdomen is very dark, with much lighter irregular margins. The pronotum and elytra are covered with a fine yellowish pubescence, which in some positions gives them the appearance of emitting a faint phosphorescent light. [Fig. 1. The tarsi of hind legs, cerci, and antennæ are restored.]

None of the *Mantidæ* are native in either country, though *Mantis religiosa* has occurred accidentally in Belgium.

In all three countries there occur of the **Acridiidae**, *Mecostethus grossus*, *Stenobothrus viridulus*, *S. rufipes*, *S. bicolor*, *S. elegans*, *Gomphocerus maculatus*, *Ædipoda cærulescens* (only as a very casual visitor in Britain), *Tettix bipunctatus*, and *T. subulatus*, while *Pachytylus migratorius* is a casual visitor to each. *Stenobothrus lineatus*, *S. parallelus*, and *Gomphocerus rufus* are common to Britain and Belgium; while *Stenobothrus biguttulus*, *Pachytylus danicus* (*cinerascens*), and *Psophus stridulus* are common to Belgium and Holland. *Gomphocerus sibiricus*, *Acridium ægypticum* (*tartaricum*), and *Schistocerca peregrina* have occurred casually in Britain alone; *Stenobothrus stigmaticus*, *S. hæmorrhoidalis*, *S. vagans*, and *S. dorsatus* are found in Belgium only; Holland possesses none that are peculiar to itself.

One specimen only of *Gomphocerus sibiricus* was captured some years since "on the hills at Netley"; it is difficult to imagine how a single specimen could have got there.

Of the fifteen **Locustidae** enumerated by De Selys-Longchamps, *Leptophyes punctatissima*, *Meconema varium*, *Xiphidium dorsale*, *Locusta viridissima*, *Platyceles grisea*, *P. brachyptera*, and *Decticus verrucivorus* are found in all three countries. *Thamnotrizon cinereus* and *Platyceles ræselii* are found in Britain and Belgium; *Ephippigera vitium* occurs in Belgium and Holland. *Barbitistes serricauda*, *Gampsocleis glabra*, and *Platyceles bicolor* are peculiar to Belgium; while *Phaneroptera falcata* has occurred casually once and *Decticus albifrons* very rarely, in Britain alone.

Four species of the **Gryllidae**—*Nemobius sylvestris*, *Gryllus campestris*, *G. domesticus*, and *Gryllotalpa vulgaris*—occur in all three countries. *Gryllus capensis* is found in Holland only, while *G. bimaculatus*, *G. brunneri*, and *Gryllotalpa didactyla* are casuals in Belgium alone.

To sum up as far as Britain is concerned, there are twenty-nine (or twenty-eight if *Decticus verrucivorus* is omitted) Orthoptera that appear to be natives; * seven (two earwigs, with but a slight foothold, four cockroaches, and the common cricket), which breed here in warm houses; three earwigs that are more or less historic; the rest are casuals. These last might no doubt be added to considerably. Burr states that some species of the *Conocephalides*, especially of the genera *Copiophora* and *Conocephalus*, have been taken in London. A specimen of *Phaneroptera privata* has been found at Merton Hall, in Norfolk. I have in my own possession five Orthoptera from Kew Gardens not included in the list. One of them is probably *Copiophora brevirostris*; the others are not yet identified, but the presence of all is of a most casual nature.

* Burr considers *D. verrucivorus*, *A. albipennis*, and *L. riparia* to be indigenous,

ENTOMOLOGY IN NEW ZEALAND.

BY AMBROSE QUAIL, F.E.S.

I ARRIVED in this colony three years ago from London, and soon found that entomologists were scarce and scattered; in consequence I had to depend on my own resources for prosecuting entomological study, there being little or no literary work—at least get-at-able. When one is thus thrown upon his own knowledge, with an entirely unknown fauna to deal with, it is surprising what little headway can be made.

Again, locality is an important factor. In this respect I have been unfortunate. First, in Auckland the district is volcanic and comparatively sterile, hence a dearth of Insecta; next, I became located in an inland town, wherefrom it is almost impossible to get away for collecting purposes, the district being more or less under cultivation, all bush having been burnt off—the usual plan. Doubtless bush land would be an “El Dorado” to an entomologist.

Recently I discovered that Professor F. W. Hutton is the author of descriptive catalogues of New Zealand Diptera, Hymenoptera, Orthoptera, and Neuroptera; and, of course, the late W. M. Maskell's special work on the Coccidæ (Homoptera) has a world-wide reputation, and is of scientific importance. E. Meyrick seems to have been the most prominent writer on the Lepidoptera, his work being scattered amongst scientific publications; and G. V. Hudson, already the author of an elementary text-book on New Zealand entomology, has, during the last few months, published a work on the “Macro”-Lepidoptera of New Zealand, based upon the scattered work of Meyrick.

Under these circumstances, one can realize what Stainton has done for British lepidopterists. Cavil as we may at Newman, they both popularized the study of Lepidoptera in England, and laid the foundation stones upon which the present generation has raised, at any rate, this branch of entomology to the level of botany, and the rank of a science. From this point of view great credit is due to a “pioneer” author, and G. V. Hudson's work will be a useful volume to local entomologists, though it does not rank with the high-class scientific work of many recent writers—Scudder, Packard, Dyar, Comstock, Chapman, Hampson, Tutt, and others—with which the writer seems to be unacquainted. In the following notes I propose to make comments, which may induce the author to pay more attention to contemporary literature, and place less dependence upon the work of one man, and that man not himself, in any further publication he undertakes.

Among the first Lepidoptera taken by myself was a specimen

of *Sphinx convolvuli* in Auckland, February, 1897. This species is the only representative of the Sphingidæ in New Zealand. Considering that February is summer in this part of the world, and winter in England, the distribution of such a species is an interesting subject. Judging from Hudson's figure (plate xiii.), in respect to markings and colour, one might assume it a local race due to extreme of distribution; my Auckland specimen, however, differs in no respect as to colour and markings from European and Australian *S. convolvuli*, proving this is not so (the species is well figured in Kirby's "European"); and though I am well acquainted with the species, I cannot remember ever having seen any example like that figure of Hudson's, which, if like the insect it represents, is not typical, but a rare variety. I am inclined to doubt the figure. Another interesting species, *Cosmodes elegans*, is obtained in Auckland, which differs in no respect, so far as my memory serves me, from a series of this species which my friend Culpin sent to me some years ago from Queensland, having confluent pale green markings finely edged with silvery, and towards the outer margin of fore wings a broken pinkish brown bar edged both sides with silvery, two white dots on costa towards apex, and ground colour bright brown. On plate vi. Hudson's figure has some circular and elongated dull green spots, with curved lines in place of the bar. Only one species of *Plusia* is stated to occur. I have an Auckland specimen which certainly does not agree with Hudson's figure (plate vi.) of *Plusia chalcites*, which looks like an overgrown *P. gamma*; mine has the metallic spots exactly as those of *P. iota*, but the ground colour of the fore wings is as dark as *P. gamma*, with metallic lines near the base, and the hind wings are very like in colour to *P. chrysitis*. *Agrotis ypsilon* occurs commonly in New Zealand, being amongst the largest of the Noctuæ; the largest species in this group being *Dasypodia selenophora*, nearly the size of *Mania maura*. I felt the excitement of the old *M. maura* days when I saw this insect at my sugars. Hudson's figures of the Caradrinina (Noctuæ) are very poor; the Notodontina (Geometræ) are well figured; and the Papilionina (Rhopalocera) are perhaps the best in the book. Alas! the old landmarks—Noctuæ, Geometræ, Rhopalocera—are no more; and the old familiar genus *Mamestra* becomes *Melanchra* (à la Meyrick). Entomological nomenclature is like the sand at the seaside, shifting at every tide. Referring to sugar, I may mention I had good success last season, until the grass began to flower; then I gave it up, as Lepidoptera were conspicuously absent; also I notice that warm, rainy evenings are good for collecting at light; at such times, mostly small fry; but among them several species of Hepialidæ—and curiously of the latter all females in the genus *Porina*—come in dozens. I have the same report from South Africa in regard to light.

Reverting to my subject. When in Sydney, N.S.W., a species of *Nyctemera* was very plentiful, and, as I received a lengthy series from my friend Culpin, evidently extends through to Queensland. In New Zealand we have a species of *Nyctemera* which, so far as I can see, differs in no respect from the species I took in Sydney, and received from Queensland. There is, of course, a certain amount of variation *inter se*; I therefore believe there is only the one species, but should be glad to co-operate with any Australian entomologist in describing the whole life-history of the Australian and the New Zealand representatives. Curiously Hudson gives the name *N. annulata* (Boisd.), with *N. doubledayi* (Walk.), as a synonym; Kirby gives *N. annulata* (Boisd.) as the name of the Australian species, and mentions that a very similar species, *N. doubledayi*, occurs in New Zealand ('Text Book,' 1885). This supports my belief for sinking the one name as a synonym of the other. Hudson identifies the New Zealand *Nyctemera* with the Australian, though he says, "this moth is confined to New Zealand, but two closely allied species . . . are found in Australia." The insect has black wings with white band, sometimes broken on fore wings, and a white circular spot on hind wings; the thorax marked with yellow and brown; male and female both with pectinated antennæ, male more conspicuously so. Also a comparison of lengthy series of the New Zealand species of the genus *Metacrias*, with certain Australian *Spilosoma*(?), will reveal duplication of species. My study of the neuration always led me to believe Arctiadae to be somewhere about the lower Noctuae in phylogeny, with Bombycid affinities (structural characters); but on what logical grounds Hudson can assign to the Arctid group (*Nyctemera*) the position of specialized Noctuae, I cannot conceive; in placing them as the first genus in the Caradrinina, he gives them the position of the most specialized (recent) of that division.

Anosia erippus and *A. bolina* (both excellently figured by Hudson) are also Queensland species. *Vanessa cardui* I have not yet met with, but the blue-centered black spots of hind wings show kinship with the Australian *V. cardui*, as the European specimens are without the blue centres; this has, I believe, been pointed out by Anderson in his 'Victorian Butterflies.' I soon, however, met with the common and very handsome *V. gonerilla*, which differs from the European *V. atalanta* in the band of the fore wings being smaller, and the band of the hind wings more central and not bordering the fringe as it does in *V. atalanta*; the colour of these bands is also more vivid. I never found the larvæ of *V. gonerilla*, but it is interesting to learn that the habits approximate closely to *V. atalanta*. It feeds on shrub and tree-nettles, concealed under a tent of leaves, and pupates in the tent. I have often collected larvæ of *V. atalanta* in England, and cannot help remarking upon the habits of these

species being so close, though the localities are so far apart. *Chrysophanus salustius* is a common species, about the size of *C. virgauræ*, and not greatly dissimilar; but the male has spots on the upper side; it has the flitting flight so familiar in *C. phloas*.

Here I would enter a protest against commencing a book with specialized groups (most recent), and finishing with the most generalized groups (most ancient). Mathematics advance from simple calculation to complex problems; chemistry from simple principles to analysis: why not zoology from generalized to specialized organisms, the latter admittedly having evolved from organisms similar to the former? The result in Hudson's work is that we turn from the Rhopalocera (Papilionina) to the Micropterygina: from one of the most specialized divisions of the Lepidoptera to the most generalized. We read: "The Micropterygina are the ancestral group of Lepidoptera, from which all others have descended." This is rather rich, considering the present state of our knowledge of the groups of smaller Lepidoptera, and the fact that the Micropterygina (including Hepialidæ!) alone possess the jugum, this statement is without parallel in science. That Frenatæ and Jugatæ were derived from Trichoptera is undoubtedly true, but the one from the other I do not think can even be assumed upon any existing knowledge of structure in the Lepidoptera.

The home of the Hepialidæ is, I think, the Australasian region; my lists show twenty-nine species—possibly thirty-one species—already described in Australia, and nine species described in New Zealand—a total of possibly forty species, against eight species in Europe, of which five are British. The great interest attaching to this group of the Lepidoptera requires very special treatment of the descriptions of all stages; unfortunately, Hudson's figures of the Porinas (plate xiii.), with which I am acquainted, are bad; so much so, that a correspondent wrote, asking me whether the North Island forms differ from the South Island forms of certain species, as he was unable to recognize the species (by the figures) with Southern forms which he collected. I possess good series of four species—*Porina umbraculata*, *signata*, *despecta*, *cervinata*, from North and South, and cannot observe any local variation; they are, in fact, remarkably constant, except *P. cervinata*, which is most variable, and I have one from the South very black in ground colour, offering almost a parallel with the var. *hethlandica* of *Hepialus humuli*. The figures of imagos, male and female, of *Hepialus virescens* (plate xiii.), are excellent; this is one of the handsomest of the Hepialidæ with which I am acquainted, the only species in the genus, and the largest of the group in New Zealand. Hudson figures the adult larva (plate iii.), and places the position of the spiracles correctly, although he does not indicate the position of

the tubercles; this is not easy to do with this species, owing to the tubercles being scarcely distinguishable upon the segments. The position of the tubercles on the abdominal segments is— anterior trapezoidals on large swollen areas of the principal subsegment, dorsal, close together, with one hair each; posterior trapezoidals small and remote on the posterior edge of the next subsegment, with one hair each; spiracle two-thirds down from median line (dorsal) on the intersegmental membrane of anterior edge of principal subsegment; above spiracle, slightly posterior, is a tubercle bearing one long, one short, hairs (supra-spiracular); immediately posterior to the spiracle are two small tubercles, each with one hair; below spiracle is a large tubercle with one anterior hair; prolegs have four hairs at base; and one hair on inner side of prolegs. Hudson gives no hint as to the time occupied in its transformations, but I found half-grown larva at the time this species is in pupa (September), proving at least two years from ovum to imago. *Porina* larvæ which I have examined agree with *Hepialus virescens* in the number of hairs on tubercles and prolegs, but the spiracles are moved to the central area of segments, and consequently the position of the tubercles does not correspond with the latter. I hope to give details of the structural characters of all stages of New Zealand Hepialidæ at a later date. In the letterpress we observe the following:—"The larvæ always consist of thirteen segments, number one being the head." We find this is almost a repetition of Kirby's words ("European"), and is an error which very little use of the microscope would reveal. As a matter of fact, lepidopterous larvæ consist of fourteen segments. Again, "usually segments 7 to 9 and 13, each have—fleshy—prolegs." What about 10 (technically 6th abdominal)?; and 13 should be 14. Moreover, the author is not consistent, for we read—*Hepialus virescens* larva—"The head is large, dark brown, very irregularly striated, and covered with a few short bristles. The first segment is hard and shining," meaning thereby the 1st thoracic, otherwise the prothorax, or, consistently, the second segment. Errors in colour may be the lithographer's, but errors in letterpress must be the author's, and by a man's writings so we must judge his capacity as a student.

Palmerston North, New Zealand.

NOTES AND OBSERVATIONS.

SCOTTISH RHYNCHOTA.—The following captures of Scottish Rhynchota, now—through the kindness of the captors—in my collection, appear worthy of record:—(α) *Acanthosoma dentatum* (De Geer), Saund., *A. interstinctum* (Linn.), Saund., and *Orthotylus marginalis*, Reut., Saund.—all from Ethie Burn, Black Isle, South Sutor of Cromarty, Sept. 20th, 1899, Mr. W. R. Ogilvie-Grant; and (β) *Dolycoris* (*Pentatoma*) *baccarum* (Linn.),* on *Achillea millefolia*, at Kinnoull Hill, Perth, Sept. 21st, 1899, Mr. T. M. McGregor.—G. W. KIRKALDY.

SYNONYMY: RHYNCHOTA.—

1. *Mindura hemerobii* (Walker), Melichar, is a *Sassula*.
2. *Corixa lateralis*, Leach, 1818 = *hieroglyphica*, Dufour, 1833.
3. *Notonecta templetonii*, Kirby, 1891, is an *Enithares*.
4. *Notonecta triangularis*, Guérin, 1830-4, is an *Enithares*, and = *Notonecta simplex*, Kirby, 1891.
5. *Enithares indica* (Fabr.), Stal = *Notonecta abbreviata*, Kirby, 1891.
6. *Enithares brasiliensis*, Spin., 1837 = *Bothronotus grandis*, Fieber, 1851.
7. *Notonecta indica*, Linn., 1771 = *americana*, Fabr., 1775 = *unifasciata*, Guérin, 1858.—G. W. KIRKALDY.

RHYNCHOTA OF PERTHSHIRE.—In the 'Transactions' of the Perthshire Society of Natural Science (vol. iii. pt. i. 1898-1899) there is a list of the Rhynchota known to occur in Perthshire; this has been compiled by Messrs. McGregor and Kirkaldy. Altogether some fifty-two species belonging to the nine families considered are enumerated, and of these six are recorded from Perthshire for the first time, two of the latter being new to Scotland. The authors are of opinion that this total does not adequately represent the Rhynchota fauna of Perthshire, as some of the most promising localities in the county have so far not been explored. The remaining families will be treated in a second paper, which it is proposed to publish at an early date.

ODONESTIS POTATORIA LARVA HYBERNATING THROUGH TWO WINTERS.—In May last I took a number of half-grown larvæ of *O. potatoria* at Chichester, which had already hibernated through one winter. One or two died; the others fed up and duly pupated, and the imagines emerged with the exception of one caterpillar, which fed very slowly, and since Sept. 28th has eaten nothing, and is now hibernating a second time. Is not this unusual?—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E.

PLUSIA FESTUCÆ WITH CONFLUENT SPOTS.—Among twenty to thirty specimens that I bred this season from collected pupæ (second brood), there is one with the gold spots confluent on the right fore wing. On the left fore wing the spots are separated by the thinnest possible line. The pupæ were all taken within a couple of miles from Chester.—J. ARKLE; Chester.

NOTE ON LIGDIA ADUSTATA.—Following up Mr. Carr's interesting note (Entom. xxxii. 308), I may say that *Ligdia adustata* has always

* This species has been taken in the same place previously on *Hesperis* and *Verbascum* (see Trans. Perth. Soc. Nat. Sci. 1899, iii. p. 2).

struck me as being a somewhat erratic species, and one which the collector may reasonably hope to come across at almost any time during the summer months. I can add some later dates than Mr. Carr's for specimens taken at large, namely, Aug. 24th and Sept. 10th, 1891 (in the Isle of Wight), and I believe some others quite at the end of August a year or two previous. On the other hand, I have no earlier date than April 25th, and that was in 1893; but, as I do very little field-work in April, this is not altogether surprising. I have bred the species (without forcing) from March 25th onwards, but certainly had no late autumn emergences.—LOUIS B. PROUT; 246, Richmond Road, N.E., Dec. 7th, 1899.

GREAT DESTRUCTION OF INJURIOUS BEETLES.—While recently on a visit to Alford House, near Springburn Bush, twenty-five miles from Ashburton, I was informed by Mr. Herring of the prodigious destruction of two indigenous species of *Odontria* (*zealandica* and *striatum*), both of which are very injurious to vegetation, especially grasses. The larvæ are both root-feeders, and commit serious havoc in paddocks sown down in English grasses. The perfect beetles appear in the months of November and December, and swarm in myriads on calm sultry evenings; they settle in the grass to deposit their eggs, which hatch in a fortnight, and the larvæ burrow into the ground to commence their depredations. On Dec. 16th, 1897, a north-west gale of wind of exceptional severity blew on the upper parts of the Canterbury Plains near the ranges. Although it was felt at Ashburton, no damage was done to property excepting to cover everything in the houses with very fine dust. Through the day the sun was obscured lower down the Plains by the dense clouds of dust which the strong wind had scoured off the newly-sown paddocks near the ranges. Close to the latter are considerable areas of tussock-grass (*Poa australis*), in which the *Odontria* or cockchafer beetles shelter during the day. On part of Mr. Herring's property, two and a half miles from the base of the ranges, a gorse fence grew at a right angle with the wind. At one end of the fence, where a five-foot gate is placed, the wind during the gale had produced an eddy. Here the soil and the myriads of dead bodies of the brown beetles were deposited in a drift to the depth of two and a half feet. The soil-drift to the same depth was deposited the whole length of the gorse fence, extending about a mile. The fierce low-blowing wind leeching through the tussocks had blown the beetles out, and, carrying their shattered bodies along with the soil scoured off the freshly-sown fields, deposited both together on the low side of the fence. Parallel with the gorse fence, but a chain from it, there is a belt of mixed pines, which also, at the present time, show the effects of the wind-driven soil beating against them two years ago.—W. W. SMITH; Ashburton, N.Z., Sept. 25th, 1899.

ORTHOPTERA LOCALITIES.—Mr. C. W. Dale, in reference to note in 'Entomologist' (vol. xxxii. 289), tells me that *Ectobia panzeri* occurs on the Chesil Beach, and at Glanvilles Wootton, in Dorset, as well as at Studland. He has also found *Xiphidium dorsale* commonly near Studland, and in the marshes between Freshwater and Yarmouth, in the Isle of Wight; and *Platyceles brachyptera* common at Bourne-mouth, and on the Purbeck heaths. He further states that *Leptophyes*

punctatissima and *Meconema varium* occur at Glanvilles Wootton late in November; the former, indeed, has been noticed as late as Dec. 5th.—W. J. LUCAS.

EMERGENCE OF *CLOSTERA RECLUSA*.—A few larvæ of various sizes of the above were taken from dwarf sallow in Wicken Fen in the third week of June, 1899; also four larvæ from Oxshott, nearly full-grown, on July 20th. The following are the dates of emergence from pupæ kept in a cold north room without a fire:—July 11th, one female; 13th, one female. Sept. 8th, one male; 16th, one male. Nov. 30th, one male. Dec. 7th, one female. With regard to the last three, I am unable to say whether they came from the June or July larvæ; but in any case the last two dates seem very extraordinary even for bred specimens.—F. M. B. CARR; Dec. 12th, 1899.

ABNORMAL EMERGENCE OF *SMERINTHUS POPULI*, &c.—Referring to Mr. Cardinall's note on *S. populi* (*ante*, p. 284): It does not appear unusual for individuals of this species to emerge from the same year's pupæ. I have had similar experience with this, as well as *S. ocellatus*, in past seasons. This year I reared an early brood of the larvæ of the latter species, which had all attained the pupa state by the end of July. One imago emerged on Aug. 19th; the remainder are still in the pupa state.—R. LADDIMAN; 25, Drayton Road, Norwich, Nov. 23rd, 1899.

MOULD IN RELAXING BOXES.—I think relaxing may be at least one cause of mould appearing on insects in the cabinet, since spores may become attached to the insects in a mouldy box, and these spores may lie dormant and only develop into mould a long time afterwards, even though there be no appearance of mould itself on the insect when set and taken off the boards. Boxes may be effectually preserved from becoming mouldy by taking the following precautions:—To half a pint of water boiling in a saucepan add a tablespoonful of Calvert's No. 5 carbolic acid. Let the mixture boil for two or three minutes, and then pour it into the box. Let it stand till cold, then pour off and drain the box thoroughly. Leave it open until surface appears thoroughly dry. It will then be in a sufficiently moist state to keep insects relaxed, and they will keep sweet and fit to set in it for at least two or three weeks.—F. C. WOODFORDE; Market Drayton, Salop.

RELAXING LEPIDOPTERA.—A year or two ago one of my friends told me of a method of relaxing insects by applying rectified spirits of naphtha to the thorax, antennæ, and legs of the specimens, and in a few minutes they were ready for setting. This I tried, but the drawback of the method proved to be that the naphtha had a strong tendency to run up the wings, and in many cases spoil the appearance of the insect; but it suggested another mode of using naphtha that I have since tried with success, and particulars of which I now give for the benefit of Mr. Rydon and other readers. Make an ordinary tin box into a relaxing box by lining with cork, and put two or three narrow strips of cork down the longest length to elevate the insect when pinned in. When about to use pour in hot water to saturate the cork, and, after throwing out the water, put a few drops of carbolic acid on to keep mould down. Now add sufficient naphtha to run over the cork without waste, pin in the insects, and the most perfect relaxing

box will be the result. Geometers are ready for setting next morning if put in the night before; Noctuæ not more than twenty-four hours. Repeat the process every time of using.—J. BEAULAND. [See Entom. xxviii. 56.—ED.]

CAPTURES AND FIELD REPORTS.

VANESSA ATALANTA AND *V. io* ABUNDANT AT SUDBURY, SUFFOLK, IN 1899.—During the past season *V. atalanta* was very abundant here. It was on the wing as late as October 29th. The larvæ of *V. io* were also exceedingly plentiful here in July; in some places the nettles were quite black with them, for they simply swarmed. They pupated about July 21st, and the butterflies emerged about August 3rd. As a rule, *V. io* is not common with us.—EDWARD RANSOM; Sudbury, Suffolk, Nov. 16th, 1899.

ABUNDANCE OF VANESSA ATALANTA IN 1899.—This lovely butterfly has been unusually plentiful here during the past season. I captured a number in my garden during the latter half of August. The flowers of the garden scabious proved the chief attraction, and they were easily netted while engaged in imbibing the nectar from these flowers. All those I saw and captured were rather under the average in size. It would be interesting to know if this fact has been noted elsewhere.—R. LADDIMAN; 25, Drayton Road, Norwich, Nov. 23rd, 1899.

ACHERONTIA ATROPOS IN 1899.—Since my note (xxxii. p. 255) on the appearance of *A. atropos* in Suffolk, three pupæ have been found here and imagines emerged therefrom about the middle of October. I have also seen a pupa which was found at Long Melford, Suffolk.—EDWARD RANSOM; Sudbury, Suffolk, Nov. 16th, 1899.

On Oct. 7th a female specimen of *A. atropos* emerged from pupa, and another example on the 18th of the same month. Both were perfect; they were reared from caterpillars taken at Dover.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E.

On Sept. 22nd a full-fed larva of *A. atropos* was brought to me which was found crawling on a road near this city. This is now in the pupa state.—R. LADDIMAN; 25, Drayton Road, Norwich, Nov. 20th, 1899.

CATOCALA NUPTA IN 1899.—I have found *C. nupta* very plentiful this year, on tree-trunks in the Finchley Road, at Peckham Rye and East Dulwich; and on stone pillars at Broadstairs and at Ryde, in the Isle of Wight, they were particularly common.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E., Nov. 22nd, 1899.

PHIGALIA PEDARIA (PILOSARIA) IN DECEMBER.—I took a fine fresh male from a Chester electric lamp on Dec. 6th. The editorial note upon this eccentric species (xxiii. p. 134) will, I think, bear repeating:—"The usual time for the appearance of this species is perhaps between the middle of March and the middle of April, but it has been observed as early as November and December, and so late as the middle of June. *Vide* Entom. xx. pp. 64, 110; xxi. p. 91; xxii. p. 113."—J. ARKLE; Chester.

PHLOGOPHORA METICULOSA IN DECEMBER.—I captured fine and unusually dark specimens at the Chester electric lamps, on Dec. 4th, 6th, and

7th. The nights were very mild. Winter set in on the 8th, with the Snowdon range covered with snow—snow falling on the adjacent lowlands and sharp frost at Chester. Mr. South writes (xxx. p. 293): "A specimen was taken at Putney on Dec. 26th, 1895 (Entom. xix. 65); and Mr. Armstrong tells me that he saw one on the last day of the year 1872, at Sandown Park." The late moths will hibernate, I suppose, as the species has been taken in February (Entom. xxxiii. p. 73) and March (p. 133). The first general appearance would seem to occur in June (p. 187), the second in August (p. 167), and a third in November (p. 19).—J. ARKLE; Chester.

LEPIDOPTEROUS EGGS ON SALLOW, &c.—The eggs described by Mr. J. Arkle (Entom. xxxii. p. 307), in his notes on "Lepidoptera in the Chester District," are, I should say, those of *Odonestis potatoria*. I have frequently found them on the under sides of the leaves of dwarf willows, and hazel also, laid singly and in small clusters, and once in a compact little ring round a twig. It seems a peculiarity on the part of the female to almost always deposit the ova on anything rather than the natural food-plant, although I did once find a small batch on a stem of grass. Possibly, her weight prevents her getting a firm hold on the latter, and so she chooses something more substantial. I have noticed that there is always longish grass to be found close to the bush selected. The larvæ are very active and strong directly they are hatched, and do not appear to suffer at all by wandering about in search of food for a day or two.—(Miss) A. D. EDWARDS; 55, Gildredge Road, Eastbourne, Dec. 12th, 1899.

STILBIA ANOMALA IN NORTH WALES.—I beg to record the capture, in August last, of a freshly emerged specimen of *S. anomala*, at Morfa Nevin, North Wales, and should be glad to know if any other reader of the 'Entomologist' has taken the species in this locality.—MARK A. ROLLASON; 29, Hickman Road, Sparkbrook, Birmingham, Dec. 7th, 1899.

DIPHTHERA (AGRIOPIS) APRILINA IN MORAY.—I picked up a fine specimen of this moth, which had been stupefied by cold, on Nov. 8th, on the road at Darnaway Wood, Brodie.—HENRY H. BROWN; Rosefield, Elgin.

LEPIDOPTERA, ETC., IN 1899.—The past season, which will long be remembered for its great heat during the summer months and the long spell of dry weather, has been somewhat a varied one entomologically, according to my experience in different parts of the country.

I have generally found the Rhopalocera in good numbers, some especially so, and this remark particularly refers to the "whites." *Lycæna argiolus* was again locally plentiful: in August, *L. icarus* and *Epinephele tithonus* were very abundant in some parts of Somersetshire. Early in May, on hills near Bath, I noticed a few specimens of *Vanessa cardui*; but I only saw one other specimen later in the season, even though I visited several other districts. *Colias edusa* I observed on very few occasions only in South Devon on the borders of Dartmoor, and not a dozen specimens altogether. *V. atalanta* was generally abundant, and *V. io* fairly so, in the same district. *Argynnis paphia* occurred freely in the woods. The last brood of *Polyommatus phlæas* occurred frequently also, in September, in Devonshire.

With regard to the Heterocera, their appearance varied throughout the season, the most noticeable fact being the frequent occurrence of *Macroglossa stellatarum*, both in town and country. I noticed the first specimen in

Breconshire on June 15th, and the last in South Devon in September. I should like to mention an instance of how these moths, like many others, rely on their protective resemblance. On one occasion I watched for some time two specimens flying up and down an old wall on the borders of Dartmoor, the day being bright, with clouds occasionally only passing over. The insects occasionally settled; at last one alighted near me, and appeared inclined to remain at rest. Cautiously approaching, I was able to place my hand completely over the moth, which remained perfectly still until I touched it with my fingers, when of course there was a great buzzing, until I allowed it to escape. In June some Noctuæ came freely to the blossoms of shrubs in Breconshire. Among these were *Hadena dentina*, *H. oleracea*, *Apamea unanimitis*, *A. basilinea*, *Leucania pallens*, *L. comma*, *Cucullia umbratica*, &c.; one specimen of *Aplecta tincta* and *H. pisi* also came; *H. dentina* was extremely abundant. I did not try sugaring throughout the season, but a friend in Somersetshire complained of it not being at all productive. The Geometræ appeared fairly abundant.

Of other insects, wasps, so commonly seen last year, I did not observe a score of individuals, and on no occasion came across a nest; the common house-fly, on the contrary, was quite a plague in many places. Much injury was done in some parts by the larvæ of white butterflies; and I have heard complaints of that of *Carpocapsa pomonella* (the codlin moth).—T. B. JEFFERYS; Bath.

LEPIDOPTERA AT WINCHESTER IN 1899.—Lepidoptera were particularly abundant last season in the Winchester district; at any rate that was my experience, though I have not compared notes with other collectors there. Sugaring at Crabbe Wood, which I found such a failure in 1898, was much more productive this season, the following coming freely:—*Noctua batis*, *N. brunnea*, *N. rhomboidea*, *N. festiva* (including many beautiful varieties), *Aplecta nebulosa*, *Xylophasia hepatica*, *X. polyodon*, *Thyatira derasa*, *Rusina tenebrosa*, *Leucania lithargyria*, *Agrotis exclamationis*, *Hadena thalassina*; and less commonly, *Triphæna fimbria*, *T. subsequa*, *T. orbona*, *T. pronuba*, *Acronycta ligustri*, *Noctua dahlia*, *N. c-nigrum*, *N. triangulum*, *Thyatira batis*, *Cymatophora duplaris*, *Epione omicronaria*, *E. porata*, *Ligdia adustata*, *Platypteryx unguicula*, *Metrocampa margaritata*, *Halias prasinana*. Doubtless, if I had gone oftener, my list would have been considerably swelled; but I only went sugaring some ten or twelve times in all (and it was only thoughts of *Triphæna subsequa* that tempted me to go as often as I did), for I found that my nights were far more profitably spent collecting at the street lamps. Winchester has, within the last three or four years, discarded the oil lamps, with which she formerly used to "make darkness visible" in her streets; and by a great leap has arrived at very decent incandescent gas lamps. There is one lamp in particular which is most favourably situated on the outskirts of the town, and commands the view of a well-wooded valley. To this lamp I would repair every night during June and July (with the exception of the few occasions on which I went sugaring to Crabbe Wood), as soon as it was dark, armed with a chair, net, and killing bottles, besides the usual pocketful of pill boxes; and it was often past 1.30 or 2 a.m. before I could drag myself home to bed, so fascinated was I with my occupation, and so remunerative was the time spent in this manner. During those two months I took no less than two hundred and sixteen species (exclusive of *Micros*) at that one lamp, besides many beautiful and valuable varieties. I have kept a careful record of all

my captures, though I shall not enumerate here all the common species which visited the lamp. By far my best capture was a grand form of *Euchelia jacobææ*, in which the usual crimson was entirely absent, and replaced by a brilliant golden yellow. The specimen, which is a large female, was evidently freshly emerged, and in absolutely perfect condition, the whole colouring being particularly rich; and a merely superficial examination of the insect would suffice to dispel any idea of its having undergone some "fading" process. In 1898 I was fortunate in taking a beautiful variety of this species at the same lamp, and recorded the capture in the 'Entomologist': but this specimen puts it entirely in the shade. Next to this, my best captures were:—*Stauropus fagi* (1), *Notodonta dodonea* (1), *N. dictæoides* (1), *Plusia moneta* (1), *Cucullia lychnitis* (1), *C. chamomilla* (1), *Aventia flexula* (4), and *Triphæna interjecta* (1). I also took in fair numbers:—*Neuria saponaria*, *Agrotis cinerea*, *A. corticæ*, *Hadena genistæ*, *Dysthymia luctuosa*, *Dianthæcia conspersa*, *D. carpophaga* (including one almost pure white), *Xylophasia sublustris*, *Hecatera serena*, *Acidalia imitaria*, *Eupithecia venosata*, *Anticlea rubidata*; and less commonly—*Sphinx ligustri*, *Smerinthus populi*, *Acronycta ligustri*, *A. rumicis*, *A. megacephala*, *A. aceris*, *A. tridens*, *A. psi*, *Demas coryli*, *Agrotis pnta* (very variable), *Noctua triangulum*, *N. c-nigrum*, *N. rubi*, *N. augur*, *Axyliia putris*, *Dianthæcia cucubali*, *D. capsicola*, *Hadena chenopodii*, *Habrostola uticæ*, *Mamestra persicariæ*, *Caradrina blanda*, *C. morpheus*, *C. cubicarica*, *Dipterygia pinastri*, *Cosmia trapezina*, *Heliothis marginatus*, *Hydræcia nictitans*, *Chortodes arcuosa*, *Grammesia trilinea* (with a few of the var. *bilinea*), *Cucullia umbratica*, *C. verbasci*, *Cerigo cytherea*, *Euplexia lucipara*, *Aplecta herbida*, *A. nebulosa*, *Zeuzera æsculi*, *Xylophasia lithoxylea*, *Miana furuncula*, *M. fasciuncula*, *M. strigilis*, *Leucania conigera*, *L. comma*, *Hadena adusta*, *H. gemina*, *Notodonta dictæa*, *N. camelina*, *Ptilodontis palpina*, *Arctia fuliginosa*, *A. caia*, *Liparis chrysorrhæa*, *L. salicis*, *Nolu cuculatella*, *Nudaria mundana*, *N. senex*, *Lasiocampa quercifolia*, *Calligenia miniata*, *Lithosia aureola*, *Platypteryx falcata*, *P. hamula*, *P. unguicula*, *Ennomos illustraria*, *E. tiliaria*, *Eurymene dolobraria*, *Acidalia inornata*, *A. remutata*, *A. immutata*, *Eupithecia coronata*, *E. subfulvata*, *E. abbreviata*, *E. nanata*, *E. exigua*, *E. liniariata*, *E. subumbrata*, *E. iso-grammata*, *E. sobrinata*, *E. subnotata*, *E. assimilata*, *E. plumbeolata*, *E. centaureata*, *E. vulgata* (very common), *E. absinthiata*, *E. indigata*, *E. pulchellata*, *E. dodoneata* (1), *E. pusillata* (1), *E. rectangulata*, *Tephrosia extersaria*, *Macaria liturata*, *Phibalapteryx vitalbata*, *P. tersata*, *Geometra papilionaria*, *Amphidasys betularia*, *Boarmia roboraria*, *Melanthia albicilata*, *Melanippe galiata*, *M. rivata*, *M. unangula*, *M. procellata*, *Cilix spinula*, *Lobophora viretata*, *Anticlea berberata*, *Cidaria corylata*, *Scotosia rhamnata*, *S. vetulata*, *Eubolia mensuraria*, *E. bipunctaria*, *E. palumbaria*, *Urapteryx sambucata*, *Hemithea thymiaria*, *Eupistera heparata*, *Iodis vernaria*, besides very many other commoner species in more or less abundance. The insect which appeared in the greatest abundance was undoubtedly *Agrotis exclamationis*, with *Noctua festiva* and *Arctia menthastri* as good seconds. These three species were perfect nuisances, as also were *Hadena dentina*, *Rusina tenebrosa*, *Leucania lithargyria*, *Orgyia pudibunda*, and *Odontopera bidentata*, all of which absolutely swarmed. On the whole, I consider that the season must have been an exceptionally good one; and I have every reason to be more than satisfied with my list of captures.—H. W. SHEPHEARD-WALWYN; Glensyde, Bidborough, near Tunbridge Wells.

LEPIDOPTERA IN 1899.—In summarising the past season, we are inclined to think, judging from our own experience, that it has been fairly productive as regards Lepidoptera in the perfect state; but the same cannot be said of larvæ, except as regards *Vanessa atalanta*. Sugar was rather uncertain, as throughout July scarcely an insect of note appeared; while June and August were decidedly better. We may remark that *Macroglossa stellatarum* was unusually abundant; we saw as many as five at one time hovering over *Phlox*. The following are the chief insects met with:—*Argynnis paphia* var. *valesina*; *Limenitis sibylla*, plentiful at Holmesley, but soon became worn; *Thecla betulæ*, bred; nice variety of a male *Lycæna corydon*, with the usual black border replaced with white, similar to those described by Mr. Fowler (*vide Entom.* xxxii. 269); *Hesperia actæon*, common at Swanage, in poor condition; aberrations of *Zygæna trifolii* and *Z. filipendulæ*, previously described by our friend Mr. Corbin (*vide Entom.* xxxii. 210); *Lithosia griseola* var. *stramineola*, a few (this species was abundant in 1898); *Emydia cribrum*, took a number at Verwood, also a fine series from the New Forest locality, lately discovered by Mr. Fowler, to whom we are indebted for showing us the exact spot; a specimen of *Cossus ligniperda* was brought to us in a tin, with the inevitable cabbage leaf for its food; three males and a female *Stilbia anomala*; about twenty *Caradrina ambigua*, netted, flying over heather; one *Agrotis agathina*; three *Epunda nigra*, best insect at ivy; *Boarmia cinctaria* and *Cleora lichenaria*, common at rest; *Geometra vernaria*, *Nemoria viridata*, and *Scodionia belgiaria*, rather plentiful; *Eugonia alniaria*, *E. fuscantaria*, and *Himera pennaria*, at gas lamps. Sugar produced:—*Calligenia miniata*, *Dipterygia scabriuscula*, *Caradrina morpheus*, *C. alsines*, *C. taraxaci*, *Leucania turca*, *Rusina tenebrosa*, *Agrotis suffusa*, *Noctua triangulum*, *N. stigmatica*, *N. brunnea*, *N. umbrosa*, *N. castanea*, *Triphæna ianthina*, *T. fimbria* (3), *T. subsequa*, *Hadenia protea*, and *Catocala sponsa*. The latter was not plentiful; a tattered specimen occurred as late as September 9th. Of larvæ we may name:—*Bombyx trifolii*, three, all of which unfortunately died before pupating; a few *Asphalia ridens*, *Thecla betulæ*, and *Dasychira fascelina*; one *Agrotis agathina*, one *Cherocampa elpenor*; and *Nonagria arundinis*, common. Of the latter at least sixty per cent. were destroyed by some aquatic bird, probably moorhens and coots. Two *Acherontia atropos* were taken here during October.—F. & C. BELLAMY: Ringwood, November 7th, 1899.

NOTES FROM NORTH STAFFORDSHIRE.—*Macroglossa stellatarum* appears to have been abundant everywhere this season, and in North Staffordshire there were two broods. The first appeared in June, as on the 3rd of that month I saw at least half a dozen of these moths flying along under the sunny side of a stone wall in the moorlands in the extreme north of the county, and one specimen was netted by my friend Mr. E. D. Bostock. The second brood appeared about the middle of August, and most of my friends reported specimens as seen in their gardens about that time and into September. A specimen found its way into my conservatory in October. *Orgyia antiqua* I have never seen so far north in this county before, several larvæ and one imago having been taken near here, and one imago is reported to me as having been taken near Leek; these larvæ were all taken singly. *Vanessa atalanta* has swarmed this autumn, and I counted no less than thirty-five specimens of this beautiful insect close around me on flowers of scabious (*Scabiosa succisa*) at one time, and with them were five *V. io*, several *V. urticæ*, and innumerable Pierids. A female *Sirex juvencus* was given to me in October, taken at Madeley, in this

county, and this is the first living Staffordshire specimen I have seen. Madeley is a colliery district, and this insect may have been imported with pit props. A male of this species, or of the closely allied *S. melanocerus* (Thoms) was brought to me in July, 1897, taken in a cottage window here.—JOHN R. B. MASEFIELD; Rosehill, Cheadle, Staffordshire, Nov. 7th.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—December 6th, 1899.—Mr. G. H. Verrall, President, in the chair.—Mr. Francis Gayner, of 20, Queen Square, W.C., and Mr. F. B. Jennings, of 152, Silver Street, Upper Edmonton, N., were elected Fellows of the Society. Mr. J. J. Walker exhibited a specimen of *Colias narnoana*, Rogenh., taken, with other examples, by Lieut. Constable, R.N., at Massowah, on the Red Sea. He considered this form to be only a dwarfed race of *C. hyale*, Linn.; and for comparison with it he showed specimens of the var. *nilgherriensis*, Feld., from Central India, and of the var. *simoda*, De l'Orza, from Japan. Dr. Chapman exhibited a series of specimens, selected from various English collections, together with a few foreign examples, in order to illustrate the English forms found within the genus *Fumea*. He also showed specimens of *sepium*, *betulina*, and *salicolella*, and remarked that the first of these species was very properly placed by Mr. Tutt in a new genus (*Bacotia*), since it is a transitional form, having as great affinities with *Solenobia* as with *Fumea*; while the other two species, though perhaps not distantly allied to *Fumea*, did not truly belong to that genus, and were well placed by Tutt in a new genus, *Prorilia*. Dr. Chapman then read some notes relating to the genus *Fumea*, and to characters, chiefly drawn from structure, by which the different species may be distinguished. Mr. Malcolm Burr called attention to Dr. Sharp's paper on "The modification and attitude of *Idolum diabolicum*," recently published in the 'Proceedings of the Cambridge Philosophical Society' (vol. x., part iii.). He exhibited the plate, drawn after nature by Mr. Muir, which illustrates the paper, pointing out that no drawing of this kind, showing a Mantid, in its natural colours simulating the petals of a flower, had hitherto been published. He also exhibited species of Mantodea of various genera, to show the different modifications by means of which insects of this group are made to resemble leaves and flowers. Mr. Kenneth J. Morton communicated a paper entitled "Descriptions of new species of Oriental Rhyacophilæ."—J. J. WALKER and C. J. GAHAN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—November 9th, 1899.—Mr. A. Harrison, F.L.S., F.E.S., President, in the chair. (A Special Pocket-box Exhibition.)—Mr. McArthur exhibited series of *Triphana comes* var. *curtisii*, from Hoy, *Aporophila lutulenta* var. *luneburgensis* and var. *sedi*, from Orkney; an extremely dark *Agrotis cinerea* and *Dianthæcia carpophaga*, with snowy ground tint. Mr. Adkin, a long and extensively varied series of *Boarmia repandata*. Major Ficklin, series of *Dianthæcia luteago* var. *ficklini*, showing a tendency to the tint of var. *lowei*. Mr. Kaye, long and varied series of numerous species of Sphingidæ, collected by himself in Jamaica,

Trinidad, and South America, and representative of the chief sub-families. Mr. H. Moore, specimens of the tropical American bee *Eulema dimidiata*, and read notes on its relation to the fertilisation of the orchid *Catasetum tridentatum*. Mr. Chittenden, a very large number of striking varieties and local species of Lepidoptera taken in the neighbourhood of Ashford, Kent, during the last quarter of a century, including *Aporia crataegi*, *Deilephila livornica*, *Plusia moneta*, and *Pachetra leucophæa*. Mr. Lucas, two scarce species of dragonflies, *Æschna mixta*, from Esher, and *Somatochlora metallica*, taken by Mr. C. A. Briggs in Inverness-shire; also three species of Coleoptera from Tripoli, *Anthia venator*, *A. 6-maculatus*, and *Scarites striatus*, large coast-frequenting Carabidæ. Mr. Colthrup, a very blue female of *Polyommatus icarus*, and a series of very dark *Melanippe fluctuata*. Mr. F. M. B. Carr, bred specimens of *Lithosia grisela* and var. *stramineola*, from Wicken; *Notodonta trepida*, from New Forest; *Drymonia chaonia*, from Bexley; and *Iodis vernaria*, from Shoreham. Dr. Chapman, seventeen species of the genus *Erebia*, taken during some two months spent in Switzerland this year, including *E. epiphron*, *E. mnestra*, *E. flavofasciata*, *E. glacialis*, *E. lappona*, *E. christi*, *E. ligea*, *E. athiops*, and *E. gorge*. Mr. Mitchell, *Locusta viridissima*, from Folkestone Warren; the Coleopteron *Prionis coriarius*, from Richmond; and a smoky suffused example of *Smerinthus ocellatus*. Mr. Buckstone, exceedingly small specimens of *Pieris rapæ*, *P. napi*, *Hipparchia semele*, *Polyommatus (adonis) bellargus*, *Anthrocera filipendulæ*, and *Arctia caia*, the last being one of fifteen similar ones bred from larvæ fed on black currant leaves. He also showed numerous aberrations. Mr. Harrison, varied series of *Aporia crataegi*, *Pieris napi* var. *bryoniæ*, *Euchloë cardamines*, and *Leucophasia sinapis*, all from Meiringen, Switzerland. Mr. F. M. B. Carr, short series of *Agrophila trabealis (sulphuralis)*, from Tuddenham; *Erastria fuscula* and *Bankia argentula*, from Chippenham; *Hydrelia uncula* and *Earias chlorana*, from Wicken; together with various species and varieties.

November 23rd.—The President in the chair.—Mr. Sich exhibited two specimens of *Platyptilia acanthodactyla*, bred from larvæ taken off *Geranium rotundifolium* at Chiswick; *Aglossa cupreatis*, showing extremes in size; and *Cucullia chamomillæ*, Chiswick, 1899. Mr. F. M. B. Carr, *Sirex gigas*, from Boldrewood, where several others had been seen, and numerous species taken at sugar at Wicken in June, and at Hailsham in August, at both of which times Lepidoptera were plentiful. Mr. R. Adkin, on behalf of Mr. Newman, a series of remarkable varieties:—*Argynnis paphia*, suffused with black; *Smerinthus tiliæ*, specimens with the central band reduced to a triangular blotch, and pale ground colour; *S. populi*, pinkish and dark forms; *Saturnia pavonia*, sub-diaphanous, bred, the third year in pupæ; *Pygæa hybrid curtula* × *pigra (reclusa)*, bred (out of one hundred and twenty specimens only three were males); and aberrant forms of *Arctia caia*, *Lasiocampa quercus*, &c. Mr. R. Adkin read a paper entitled "More Lazy Days by the Sea," being stray notes on a short holiday at Eastbourne. He touched upon many subjects that had come under his notice, including the comparative abundance and scarcity respectively of the commoner species of butterflies; the effect of the unusually warm summer on some of the moths; an immigration of *Pieris rapæ*; a collection of land

and freshwater snails that was made; and various other matters of interest. He exhibited series of some of the Lepidoptera and shells taken, in illustration of his remarks. Mr. Carpenter stated that he had examined numerous specimens of *Pyraucis cardui* in the spring, and found they were invariably females. He suggested, since he found no developed ova in them, that they were infertile, and that had they been paired they would not have emigrated.—HY. J. TURNER, *Hon. Report Sec.*

CARLISLE ENTOMOLOGICAL SOCIETY.—December 7th, 1899.—Mr. G. B. Routledge in the chair.—The evening was devoted to the study of the genus *Apion*. Twenty-five species have been taken by the members of this Society round Carlisle. The following species were common:—*affine*, *apricans*, *dichroum*, *ebeninum*, *ervi*, *haematodes*, *humile*, *nigritarse*, *seniculum*, *ulicis*, *violaceum*, *virens*. Locally common:—*athiops*, *carduorum*, *ononis* (at Silloth), *punctigerum*, *striatum*. Scarce:—*gyllenhali*, *loti*, *stolidum*, *vicia*. Also *radiolus*, *spencei*, *marchicum*, and *assimile* have been taken in the neighbourhood. The following have also been recorded:—*Apion cerdo*, banks of Irthing (Bold); *aeuum* (Stephens, Illust.); *onopordi*, lake district (Blackburn); *hydrolapathi* (Stephens, Illust.); but have not yet been taken by members of this Society.—G. B. ROUTLEDGE.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—October 16th, 1899.—Mr. G. T. Bethune-Baker, President, in the chair.—Mr. R. C. Bradley exhibited two specimens of a *Solenobia* which he had previously exhibited as *S. wockii*, to which species they had been assigned by Mr. C. G. Barrett. Recently, however, they had been sent to Mr. J. W. Tutt, who thought they were a variety of *inconspicuella*, and by him had been sent on to Lord Walsingham and Mr. Durrant, who said they were certainly not *wockii*, but they did not quite know what to assign them to. Mr. Bradley also showed a number of Brazilian butterflies. Mr. J. T. Fountain, Lepidoptera obtained in the Valley of the Wye at the beginning of last August. Amongst other species he found *Apatura iris*, not uncommonly; *Thecla w-album*, common, but worn; *Vanessa polychloros*: *Grapta e-album*, common; *Triphena interjecta*; *Tethea retusa*; *Catocala nupta*; &c. Mr. Colbran J. Wainwright, a short series of *Tephrosia extersaria*, from Wyre Forest, where he said the species had been quite abundant this year, although in previous years only odd specimens had been taken by various members; also a specimen of *Vanessa atalanta*, from Cornwall, and one of *Melanippe fluctuata*, from Handsworth, both of which were remarkably small examples of their species. Mr. G. T. Bethune-Baker, a number of *Erebias*, including many examples of *E. blandina*, from Britain and the Continent, and pointed out that the Scotch ones showed more red than the Swiss ones.

In the report of the meeting of August 21st (*Entom.* xxxii. 262), it was stated that *Leucania straminea* had been bred for the first time; this of course is a mistake, as there is a full description of the larva in Buckler's. At p. 288, line 16, the date 1884 should be 1894.

November 20th.—The President in the chair.—Rev. C. F. Thorne-will exhibited specimens of *Lycana betica*, taken by Mr. Lowe, in Guernsey, this year; and said that there had apparently been a long immigration of the species this year, as Mr. Lowe had taken about

eighty, and seen many others; also specimens of *Oporabia dilutata*, from Calverhall, Salop, where he said all the specimens were of the same dark leaden colour, with slight traces of markings, and were much darker than he had been in the habit of getting them at Burton-on-Trent; also a series of *Ctenonympa typhon*, from Calverhall. Mr. R. C. Bradley, a long series of *Bombus hortorum*, taken this year, and showing a wide range of variation; var *harrissellus* in all sexes, from Droitwich; var. *subterraneus*, from his garden at Moseley, and various intermediate forms. Mr. J. T. Fountain, a number of insects taken during the year at Acocks Green, close to the town, including *Lencania comma*, *Agrotis exclamatoris* (a variable series), *Anchocelis pistacina*, *Orthosia lota*, *Grammesia trigrammica*, &c. Mr. P. W. Abbott, a box full of Lepidoptera, including *Agrotis cinerea*, dark forms from Wyre Forest; *Sesia culiciformis*, with one white-banded specimen caught last year, and an orange-banded one caught this year; *Oporina croceago*, including two specimens which were light brown in colour, no trace of the usual orange coloration; one specimen of *Neuria saponaria*, new to the district; bred series of *Asphalia ridens*, including a black one; a series of *Cymatophora fluctuosa*, and a bred series of *Sesia sphegiformis*, all from Wyre Forest. He said that *C. fluctuosa* was comparatively common this year, though he had only taken odd specimens in previous years; also that he had caught one specimen of *C. octogesima* at Wyre Forest this year, thus completing the list of the Cymatophoridae, all of which were to be obtained at this one locality in Wyre Forest. Mr. J. T. Fountain, *Spilosoma menthastri*, bred as recently as Nov. 17th; also *Sirex gigas* (male), from a colliery at Walsall, where it had emerged from some wood about eight hundred yards beneath the surface, at the beginning of October. Mr. G. T. Bethune-Baker, his collection of the genus *Eneis* and part of *Satyrus*; there was a nice series of *Eneis oëlle*, and various good Turkestan species, *Satyrus alcyone*, *S. hermine* and *S. circe*, in nice series, &c. Mr. C. J. Wainwright, a series of the handsome dipteran, *Asilus crabroniformis*, taken in Cornwall this year; a fine series of *Leptogaster cylindrica* from Herefordshire, where he had found it commonly; and various other Asilids.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

KENDAL ENTOMOLOGICAL SOCIETY. — November 13th, 1899. — The President in the chair.—Mr. Littlewood read a very excellent paper on the ever-important subject of "setting." The lecture was thoroughly practical and comprehensive, and showed that no pains had been spared in its preparation. Mr. Littlewood showed an exhibition case of butterflies and moths, set in every conceivable position and carefully ticketed, illustrative of his remarks as to good and bad methods. He also showed a small appliance of tin, to secure uniformity of height in setting. He was heartily thanked for his efforts, and an interesting discussion followed. Mr. Cragg exhibited a specimen of *Melanippe hastata*, caught near 'Derby Arms,' Witherslack. Mr. Holmes, series of bred *Nemeobius lucina* and others, Rev. A. M. Moss, two drawers of Geometræ—the Fidoniidæ, Zerenidæ, Hybernidæ, and Larentiidæ. Mr. Smith, *Heliodes arbuti* and two specimens of *Eubolia cervinaria*, bred from heather. Mr. Wright, *Mamestra furva* and *Cerigo cytherea*, taken at sugar.—A. M. Moss, *Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—November 13th, 1899. The President in the chair. Messrs. Tyerman, Harrison, Ackerby, Tonkin, and Dr. Chaster were elected members. Messrs. C. E. Stott, of Bolton; Chas. Farrar, of Liverpool; and Dr. Dobie, of Chester, were proposed for membership. Mr. C. G. Barrett, F.E.S., of London, gave an address on “The hairy eyes and abdominal tufts of Lepidoptera.” In it he showed that though other characters must be relied upon for families, yet these features might be used to classify genera. In following out this plan he had found it necessary to divide the genera *Cymatophora* and *Mamestra* (amongst others) into hairy-eyed and smooth-eyed groups. He further found that in the latter genus the hairy-eyed species were produced from hairy larvæ, and the smooth-eyed from smooth larvæ. This was afterwards shortly discussed. He then referred to the ornamental and other tufts as being also useful for distinguishing genera, and showed by sketches how the abdominal tufts were in many cases of great use in keeping the spiracles free from dust. Mr. Barrett concluded his interesting address with a reference to Mr. Capper’s magnificent collection of varieties, and the benefit he had derived from the study of them. Mr. John E. Robson, F.E.S., of Hartlepool, then addressed the meeting on the subject of “Arrangement.” He spoke of the value of Stainton’s Manual, and considered that his placing of *Papilio* at the head of the Rhopalocera was justifiable, as the genus possesses a greater degree of all-round perfection than any other. He thought that no system of classification could be perfect which was not based on total characteristics. How unreliable external characters often are he showed by reference to the close mimetic resemblances of many exotic butterflies belonging in reality to widely separated families. Mr. Robson concluded his remarks with a warm testimony to the value of the work of the older entomologists. Mr. Newstead expressed his surprise at the attempt ever having been made to classify Lepidoptera by their wing-markings only, and thought that such an attempt was bound to prove futile. He referred to Mr. John Watson’s Monograph of the Asiatic genus *Calinaga*, which the society had just received, as a step in the right direction. Mr. Newstead then detailed the interesting life-history of *Selandria atra*, the pear-tree sawfly, as observed by himself, and exhibited a case of specimens illustrating it throughout. To destroy them he recommended the use of Paris-green. He also communicated notes on *Piophila casei*, the cheese-hopper, showing how very tenacious of life it was, by the fact of larvæ which had been subjected to water, methylated spirit, glycerine, and absolute alcohol producing perfect insects! The following exhibits were made:—Species of the genus *Oporabia* with genitalia photographs, by Mr. F. N. Pierce; eleven drawers of Lepidoptera taken at the Chester electric lamps, including *Amphidasys betularia* (type, black and intermediate vars.), *Acronycta alni*, *Ephesia splendidella*, &c., by Dr. Dobie; vars. of *Abraaxas ulmata* and *A. grossulariata*, by Mr. B. H. Crabtree; spring captures in the New Forest, by Dr. Cotton; an ingenious device for setting Lepidoptera with greater accuracy, by Mr. Geo. O. Day; a case of Lepidoptera, by Mr. J. Collins; pupæ of *Nemeobius lucina*, by Mr. Prince; a box of insects for distribution, by Mr. John Robson; *Cleora glabraria*, a new record for North Wales, by Mr. F. Birch, Hon. Sec.

RECENT LITERATURE.

Fauna Hawaiianis; or, the Zoology of the Sandwich (Hawaiian) Isles.
 Vol. I. Hymenoptera Aculeata, pp. 1-122; two Plates and Map. By R. C. L. PERKINS and A. FOREL (March 20th, 1899).
 Vol. II. Orthoptera, pp. 1-30, and two Plates (August 19th, 1899); and Neuroptera, pp. 31-89, and three Plates (September 25th, 1899). By R. C. L. PERKINS. Edited by Dr. D. SHARP.

ISOLATED in the midst of the vast North Pacific Ocean, 2350 miles from San Francisco and 3500 miles from Kamtchatka—the nearest continental points east and west—and separated from them by some of the profoundest depths of ocean; a little nearer to, but still far away from, the coral islands and reefs of the South Pacific, connected with them only by scattered islets and atolls—almost or entirely uninhabited,—the Sandwich Islands, or Hawaiian group, undoubtedly form to the student of the geographical distribution of animals the most interesting country in the world.

Chiefly through the collections made by Blackburn, some knowledge has been acquired, during the last quarter of a century, of the salient characteristics of the insect fauna; but, having regard to the increasingly numerous importations into the country, a renewed survey was very desirable before the extinction or further differentiation of the existing fauna took place. This has been effected by the explorations of Mr. Perkins during a period of several years, and his collections are now being systematically worked out by a number of zoologists. One naturally reserves a final summary of the characteristics of the insect fauna till the last entomological contribution has appeared; meanwhile some notices from time to time of the various parts may be interesting.

Of Aculeate Hymenoptera one hundred and ninety-eight species are recorded, though of these twenty-eight are importations, all the main divisions of the group, except the ants, being well represented by endemic forms. The Fossores embrace six genera and thirty-four species, thirty-one of the latter being endemic. The wasps comprehend two genera and eighty-eight species (eighty-six species endemic). The bees comprise three genera and fifty-six species, of which fifty-two species are indigenous. Of ants twenty species (belonging to twelve genera) are recorded, of which only one "has any claim to be considered endemic." "So far as one can judge from a study of the relationship of the endemic species to one another, all the Mimesidæ, Crabronidæ, Eumenidæ, and the bees of the genus *Nesoprosopis* could have been evolved from four species which reached the islands at some very remote period, one of the four species of course representing each group. The total absence of any representative of so many groups of the Aculeata, certainly not less fitted to pass over the great distances between the islands and other lands, and for which the country is admirably adapted, is a point greatly in favour of the view that the numerous species of each of the families represented arose from a single immigrant species, and the examination of the structures of the species themselves greatly supports this view. How rarely an immi-

grant can have arrived from without can be judged from the great number of species which fail to cross the short distances between the islands themselves.*

"An important fact in connection with the Hawaiian species is their variability. This is most noticeable in the bees, Crabronidæ, and Mimesidæ, a great many of the species in these groups being in a very unstable condition. The variation is not confined to differences in size, colour, &c., but affects important structures, in which it is unusual to find any noticeable variability; and to this is due the extreme difficulty of determining and describing the numerous species, the specific characters frequently having to be taken from structures which are obviously variable. In striking contrast with the groups above mentioned are the species of *Odynerus*. Very few of the eighty-six species exhibit any variation of note, and this, when it occurs, is nearly always of an unimportant character (*e.g.*, colour). From this one would infer that the Odyneri have now reached the maximum of species that the islands can support in the present condition of the lepidopterous fauna, on which, as they prey on caterpillars, they are dependent. The bees, on the other hand, are not similarly restricted; for, with flowers abundant at all seasons, the islands, so far as one can see, are capable of supporting much greater numbers of these than of wasps."

The Orthoptera are very remarkable. Seventy-three species are known, of which six belong to the earwigs, cockroaches, Mantids, and short-horned grasshoppers; † the other forty-nine belonging to the long-horned grasshoppers and crickets. Of the former group one species only "has any claim to be considered indigenous"; of the latter, forty-three (nearly eighty-eight per cent.) are endemic. The Phasmatids are entirely unrepresented.

Of the Neuroptera (*sens. lat.*), one hundred and eleven species are present: fifty-four being Hemerobiidæ (lacewings and antlions), of which about fifty are indigenous; twenty-nine dragonflies (about twenty-five endemic) and twenty-five Psocids (nearly all confined to these islands); one Embiid and two Termites complete the list, caddisflies and mayflies being unrepresented.

Exigencies of space will not permit a longer notice; but enough has been written to show that the work is one of exceptional interest and value. As for the paper, printing, and illustrations, it is sufficient to say that the Cambridge University Press is the publisher.

G. W. KIRKALDY.

* Percentage of peculiar species in the different islands:—

	<i>Hymenoptera aculeata</i>	<i>Hemerobiidæ.</i>	<i>Dragonflies.</i>
Kauai	90·9	87·5	77·7
Oahu	66·6	60	40
Molokai	26·3	75	12·5
Maui	34·6	75	10
Lanai	7·6	—	—
Hawaii	81·4	80	11·1

† Seven earwigs are known, all introduced—some probably at an early date, as Bloxham notices, in 1825, a "black earwig" ('Voy. Blonde,' p. 252).

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ON THE NOMENCLATURE OF THE GENERA OF THE RHYNCHOTA, HETEROPTERA AND AUCHENORRHYNCHOUS HOMOPTERA.

By G. W. KIRKALDY, F.E.S.

THE present memoir consists of a chronological catalogue of the works in which new genera have been proposed, or genotypes fixed, or which are connected with the settlement of the generic nomenclature of the Heteroptera and Auchenorrhynchous Homoptera. I have indicated synonymy where the genera are homotypical, and have also adjoined the latest authoritative synonymy, in most instances in footnotes. The memoir will be divided into four parts, *viz.* :—

1. A list of works from 1758–1843 (terminating with AMYOT and AUDINET-SERVILLE's 'Suites à Buffon, Hémiptères,' the foundation of modern Rhynchotal science), with the genera, genotypes, &c., therein contained.

2. 1844–1876, concluding with the fifth volume of STAL's monumental 'Enumeratio Hemipterorum.'

3. 1877–1900, finishing with the last year of the present century.

4. An alphabetical recapitulation of all the genera from 1758–1900, and their types.

This is, as I believe, the first time that these Rhynchota have been taken in hand as a whole in such a manner; and as I cannot hope that I have succeeded to a greater extent than other entomologists who have essayed work on similar lines, in altogether avoiding errors of omission and commission, I beg my colleagues who discover any mistakes to inform me, either personally or through the press, so that they may be amended in a subsequent part of the work. To enable them to check my results as readily as possible, a summary of the "rules" that I held in view while conducting my researches are annexed.

A. STRICT PRIORITY WITHOUT EXCEPTION.

The majority of existing nomenclatorial systems seem to me to fail in their object on account of their complexity. Although most authors now profess to conform to the "rule of priority," they admit so many exceptions, on one plea or another, that the original idea is entirely lost sight of. The chief end of nomenclatorial systems is stability; and though complete stability is neither possible nor desirable, an approximate attainment should be possible, but only—as I believe—by a rigid and scrupulous adherence to the "rule of priority—without exception."

So-called "Classical Emendations" have been entirely disregarded; while tautonyms, names geographically or descriptively misleading or incorrect, and politically or theologically offensive, have been strictly adhered to, the original orthography of the author being in every case retained, unless, of course, pre-occupied.*

B. FORMATION OF GENOTYPES.

I have considered that a species may be fixed as the type of a genus by any of the following methods:—

1. *By being the only species described* (or, in the case of a species previously described, by a reference to the species and its author) *at the foundation of the genus.*

Ex. 1. *Anotia*, W. Kirby, 1819, type *bonnetii*, W. Kirby, 1819.

Ex. 2. *Phymata*, Latreille, 1802, type *crassipes* (Fabr., 1775).

2. *By being indicated as the type by the author of the genus at its foundation.*

Ex. *Gerris*, Fabricius, 1794, type *lacustris* (Linn.), Fabr. 1794. This method was instituted by Fabricius (as far as Rhynchota are concerned) in 1794.

These two principles appear to me indisputable.

3. *By the subsequent removal of one or more species to other genera, thus indirectly fixing the type.* An exception is made of course in the removal of species to genera with the definition of which (as at that time accepted) they did not accord, or by their removal back again into a compound genus.

Ex 1. *Neides* was founded by Latreille in 1802 for two species, viz. *tipularius* and *clavipes*. In 1803 Fabricius erected a genus *Berytus* with type *tipularius*; thus indirectly fixing *clavipes* as the type of *Neides*. In the second volume of Lethierry and Severin's General Catalogue, *clavipes* is placed in *Berytus* and *tipularius* in *Neides*!

Ex. 2. Fabricius used *Tettigonia* (recte *Tetigonia*) for *Cicada*

* Emendations to displace names already in existence—unless emended for the express purpose of replacing a preoccupied name—are not here considered as separate names, e. g. "*Aphana*," Burm. is not considered as a name separate from *Aphana*, Guér.

Linn. Geoffr., and *Cicada* for *Tetigonia*, Geoffr.; this reversement does not affect the type-fixations in either of these, or in any other, genera.

4. By the statement of any subsequent author that "X" is the type of a certain genus, *provided that it be one of the original species of that genus*, and that such fixation be permissible by the previous operations of other authors.

Ex. 1. *Cercopis*, Fabr., 1775, type *spumaria* (Linn., 1758), Latr., 1802.

Ex. 2. The type of *Membracis*, Fabr., 1775, is stated by its author (in 1803) to be *atrata*, but this statement is invalid, as *atrata* was not an original species.

N.B. The description (or mention with sufficient reference) of one species only in a genus, in a general systematic work [such as Amyot and Serville's 'Suites à Buffon, Hémiptères'], is a valid indication of the type; this does not hold however in a faunistic work, nor in works published previous to 1794. When two or more species have been described or indicated in such a work, the type should be subsequently founded on one of those species. Where (as for example in Amyot and Serville) one species, (say) "*striata*," is described, and the authors say "add '*maculata*,' '*venusta*,' '*irrorata*,' &c.," '*striata*' should be the type.

The following considerations also come under this heading:—

α. Many authors consider that a name only (or even a figure!) is sufficient to establish a genus. This does not appear to me to be reasonable. The essential for the establishment of the validity of a genus is surely a description, however short, displaying the salient characteristics whereby it differs from its nearest allies. Now take the case of (say) *Laternaria*, Linn., 1764; a name only, without a line of description. To find out in what way *Laternaria* essentially differs from *Cicada*, 1758, one would then have had to prepare a table of the species of the former and compare it with a similar one of the remaining species of the latter! This, I contend, is not the establishment of a genus. In the second case, a figure in the Atlas of Belanger's Voyage to the East Indies (Insects by Guérin) is the warrant for the genus "*Euryptera*" (dropped in the letterpress by Guérin himself).*

β. Subgenera are here treated for nomenclatorial purposes as genera—that is to say, a subgenus on being raised to full rank dates from its first proposal as a subgenus. The typical subgenus (*i.e.* that which contains the type of the genus) should bear the same name as the genus.

Ex. 1. *Microvelia*, erected by Westwood, 1834, as a subgenus

* I also refuse to acknowledge the validity of a species based upon a figure only, even though detailed.

of *Velia*, has priority AS A GENUS OVER *Hydroëssa*, Burmeister (full genus 1835).*

Ex. 2. *Corixa*, Geoffr., 1762, has type *geoffroyi*, Leach. The typical subgenus is therefore the section containing *geoffroyi*, Leach (i. e. *Macrocorisa*, Thomson, which ought to be known as *Corixa*, Geoffr., in sp.), and not that containing *striata* (Linn.), which is not the type of the genus. I have previously rectified the synonymy of the subgenera of *Corixa* in the Entom., 1898, p. 252.†

γ If a genus, having no type assigned, be divided into two or more subgenera (none of the latter bearing the generic name), the fixation of the genotype (and of the typical subgenus) may be determined subsequently as follows:—

(α) Any subsequent author has the right to fix the type of the genus out of any one of the subgenera, the name of that subgenus then becoming a true synonym of the genus. If all the subgenera be raised to full rank at the same time, the above procedure takes place. N.B. If a genus, having no type assigned, be divided into two or more subgenera, one of which bears the generic name, the type must subsequently be fixed from that subgenus.

(β) If some of the subgenera be raised to generic rank, the remaining one falls as a synonym of the genus if one be left, or α comes into operation if two or more be left.

All these unavoidably complicated methods of type-fixation would have been obviated, had authors always unmistakably indicated (since 1794) the types of their new genera; unfortunately, many modern authors still continue this neglect.

(δ.) Many genera which were undoubtedly strictly co-extensive, each with some other genus or genera, originally —, have been, through the operations of later authors, made heterotypical and used separately, e. g. (1) *Asiraca*, Latr., 1796, and *Delphax*, Fabr., 1798; (2) *Poekilloptera*, Latr., 1796, and *Flata*, Fabr., 1798; (3) *Laternaria*, Linn., 1764, and *Fulgora*, Linn., 1767; (4) *Ploiaria*, Scop., 1786, and *Emesa*, Fabr., 1803; (5) *Neides*, Latr., 1802, and *Berytus*, Fabr., 1803; and many others.

* This is in direct opposition to the opinion given in my "Guide to the Study of British Waterbugs" (Entom. 1898-1900), when treating of the genus.

† I was wrong, however, in proposing "*Basileocorixa*" for the "*striata*" group; amend as follows:—

Subgenus 3. *Arctocorisa*, Wallengr., 1894, type *carinata* (Sahlb.), Kirk, 1900.

= *Corixa* (*Corisa*) [coextensive, but heterotypical] auctt., nec Geoffr. in sp.

= *Glaenocorisa* (p) and *Corisa*, Puton, 1880.

= *Glaenocorisa* and *Corixa*, Saund., 1892.

= *Basileocorixa*, Kirk., 1898.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

BY W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from vol. xxxi. p. 211.)

CRAMBITES.*

SCHÆNOBIUS FORFICELLUS, *Thnb.*—Ballincar, Co. Donegal (*R.*): Mayo and Cork (*S.*); Killarney (*B.*); Kilkerran Bay, Galway (*J. J. W.*). Phoenix Park, Dublin (*K.*).

S. MUCRONELLUS, *Schiff.*—One at Favour Royal, Tyrone (*K.*).

CRAMBUS PRATELLUS, *L.*—Common everywhere. A white female, Clonbrock (*R. E. D.*).

C. DUMETELLUS, *Hb.*—Favour Royal, Tyrone; Markree Castle, Sligo.

C. SYLVELLUS, *Hb.*—Killarney by Bouchard (*B.*).

C. HAMELLUS, *Thnb.*—Killarney by Bouchard (*B.*).

C. PASCUELLUS, *L.*—Common, and widely spread. Mr. Watts reports it scarce, however, in the district about Belfast.

C. MARGARITELLUS, *Hb.*—Dalyston near Loughrea, Co. Galway; Markree Castle, and near Sligo (*K.*).

C. PINELLUS, *L.*—Killarney, Ardtully, and Sneem, Co. Kerry (*K.*); Blarney, Co. Cork (*Mr. Hogan*); Favour Royal, Tyrone (*K.*); Belfast, local (*W.*).

C. PERLELLUS, *Scop.*—Throughout Ireland very abundant, sometimes with the variety *warringtonellus*.

C. SELASELLUS, *Hb.*—Belfast (*Mr. Hogan*); Armagh (*J.*); Favour Royal, Tyrone; Markree Castle, Sligo; Cork (*McArthur*).

C. TRISTELLUS, *Fb.*—Very common.

* The following portion of this Catalogue is virtually a reprint of the list of Irish Micro-lepidoptera furnished to Mr. Birchall, many years ago, by Mr. Charles G. Barrett, who has now carefully revised it, and assisted in adding records of more recent captures, nearly all of which have been submitted to him from time to time for identification. The localities with the initial *R.* appended have been kindly furnished me by Mr. G. Carpenter, of the Science and Art Museum, Dublin, from a collection made by Mr. Russ. It is possible that in some cases, however, the captures were made about Ballincar, Co. Donegal, rather than in the county of Sligo. The localities given without any following initials represent the original records of Mr. Barrett, without whose valued assistance it would have been impossible for me to have compiled a reliable list. Those with the initial *K.* are captures of my own, and have been submitted to Mr. Barrett. I have also to thank the few workers in this group who have collected in Ireland and have assisted me with lists of localities, especially Messrs. Watts, Campbell, and Hart. It is regrettable that we are still in ignorance of the resources of Ireland as regards this large section of our fauna, the present Catalogue being meagre in the extreme in every respect, and should not be taken as other than an instalment, which it is to be hoped the investigations of subsequent entomologists will render more complete and representative of the Irish Micro-lepidopterous fauna.

CRAMBUS INQUINATELLUS, *Schiff.*—Glengarriff (*K.*).

C. GENICULEUS, *Haw.*—Abundant on the Dublin coast: Newcastle, Co. Down (*W.*); Sligo (*McC.*); Donegal (*G. V. H.*); Dursey I., Co. Kerry (*K.*); Roches Pt., Co. Cork (*K.*); Cork (*S.*).

C. CULMELLUS, *L.*—Common everywhere.

C. HORTUELLUS, *Hb.*—Common everywhere.

PHYCIDÆ.

ANERASTIA LOTELLA, *Hb.*—Malahide (Portmarnock), abundant; Co. Dublin (*B.*); Belfast. Crossfarnoge Point, Wexford (*K.*).

ILYTHYIA SEMIRUBELLA, *Scop.*—Dursey I., Kerry (*K.*).

HOMŒOSOMA NIMBELLA, *Zell.*—Malahide and Howth, Co. Dublin, Wicklow coast (*B.*); Sligo (*R.*).

H. SENECONIS, *Vaughan.*—Newcastle, Co. Down, one (*W.*); Magilligan, Co. Derry (*Curzon.*).

EPHESTIA ELUTELLA, *Hb.*—Very common.

PLODIA INTERPUNCTELLA, *Hb.*—Dublin (*S.*).

PHYCIS FUSCA, *Haw.*—Generally distributed, and common.

P. DILUTELLA, *Hüb.*—Galway and Howth, June, July, August (*B.*); Island Magee, Co. Down, one (*W.*).

DIORYCTRIA ABIETELLA, *Zinck.*—Clonbrock, Co. Galway, one (*R. E. D.*); Sligo (*R.*).

NEPHOPTERYX SPISSICELLA, *Fb.*—Ardtully near Kenmare, Co. Kerry (*K.*); Clonbrock, Co. Galway (*R. E. D.*).

PEMPELIA PALUMBELLA, *Schiff.*—Howth, taken by Mr. Sinclair. Specimen confirmed (*C. G. B.*).

RHODOPHÆA CONSOCIELLA, *Hüb.*—Co. Cork (*McArthur.*).

GALLERIA MELLONELLA, *L.*—Common.

APHOMIA SOCIELLA, *L.*—Common.

ACHROIA GRISELLA, *Fb.*—Common.

TORTRICES.

TORTRIX PODANA, *Scop.*—Co. Dublin, common (*B.*); Sligo (*R.*). Favour Royal, Tyrone (*K.*).

T. XYLOSTEANA, *L.*—Cos. Dublin and Wicklow, plentiful (*B.*); one near Belfast (*W.*).

T. ROSANA, *L.*—Cos. Dublin and Wicklow, plentiful; Sligo (*R.*).

T. HEPARANA, *Schiff.*—Cos. Dublin and Wicklow; Derry (*C.*); Sligo (*R.*).

T. RIBEANA, *Hb.*—Generally common.

T. UNIFASCIANA, *Dup.*—Co. Wicklow, common; Belfast, common (*W.*); Coolmore, Co. Donegal, and Armagh (*J.*); Sligo.

T. COSTANA.—Sligo (*R.*).

TORTRIX VIBURNANA, *Fb.*—Killarney (*B.*); Belfast, abundant (*W.*); Markree Castle, and near Sligo.

Var. *donellana*.—*Carpenter*. Tuam, feeding on pine, Ent. xxiv. 253.

T. PALLEANA, *Hb.*—Howth, Co. Dublin (*B.*); common about Belfast district (*W.*); Armagh (*J.*); Sligo (*R.*).

T. VIRIDANA, *L.*—Common about Belfast district (*W.*); Sligo (*R.*).

T. MINISTRANA, *L.*—Limavady, Co. Derry (*B.*); Favour Royal, Tyrone, common; Markree Castle, &c., Sligo (*K.*).

T. FORSTERANA, *Fb.*—Howth (*B.*); Sligo (*R.*).

DICHELIA GROTIANA, *Fb.*—Powerscourt, Co. Wicklow, common (*B.*); Derry (*C.*); Sligo (*R.*).

AMPHYSA GERNINGANA, *Schiff.*—Wicklow Mts. ? (*B.*); Churchill, Co. Armagh (*J.*); Sligo (*R.*).

A. PRODROMANA, *Hb.*—Sligo (*R.*); Enniskillen (*P.*).

LEPTOGRAMMA LITERANA, *L.*—Killarney (*B.*).

PERONEA SPONSANA, *Fb.*—Howth (*B.*); Sligo (*R.*).

P. RUFANA, *W. V.*—Sligo (*R.*).

P. MIXTANA, *Hb.*—Powerscourt, Co. Wicklow (*B.*); Belfast (*W.*); Sligo (*R.*).

P. SCHALLERIANA, *L.*—Wicklow Mts. ? (*B.*); Armagh (*J.*); Island Magee, Co. Down (*W.*); Sligo (*R.*). Enniskillen (*P.*).

P. COMPARANA, *Hb.*—Armagh (*J.*). Enniskillen (*P.*).

P. PERPLEXANA, *Bar.*—Armagh, abundant (*J.*); Sligo (*R.*). Enniskillen (*P.*).

P. COMARIANA, *Zell.*—Limerick (Ent. vol. viii. p. 89); Armagh (*J.*); Mayo (*S.*).

P. PERMUTANA, *Dup.*—Howth, on the cliffs (*B.*).

P. VARIEGANA, *Schiff.*—Howth, on the cliffs; Belfast, abundant (*W.*); Armagh (*J.*); Sligo (*R.*). Enniskillen (*P.*).

P. CRISTANA, *Fab.*—Co. Cork (*McArthur*).

P. HASTIANA, *L.*—Macgilligan, Co. Derry (*R. C.*); Belfast, one (*W.*); Mayo (*S.*); Cromlyn, Co. Westmeath, Clonbrock, Co. Galway (*R. E. D.*); Sligo (*R.*). Armagh (*J.*); Enniskillen (*P.*).

P. MACCANA, *Tr.*—Mayo (*S.*).

P. FERRUGANA, *Tr.*—Wicklow Mts. and Killarney (*B.*); Sligo (*R.*). Enniskillen (*P.*).

P. CALEDONIANA, *St.*—Local in the Belfast district (*W.*).

P. ASPERSANA, *Hb.*—Howth (*B.*); Armagh (*J.*); Sligo (*R.*). Enniskillen (*P.*).

P. SHEPERDANA, *St.*—Sligo (*R.*).

RHACODIA CAUDANA, *Fb.*—Blarney, Co. Cork, Belfast (*B.*); Favour Royal, Tyrone (*K.*); Inishowen, Co. Donegal (*W. E. H.*); Sligo (*R.*); Cappagh, Co. Waterford (*K.*).

TERAS CONTAMINANA, *Hb.*—Belfast (*B. & W.*); Howth (*B.*); Armagh (*J.*); Sligo (*R.*); Cappagh, Co. Waterford (*K.*).

DICTYOPTERYX LOEFLINGIANA, *L.*—Galway (*B.*).

D. HOLMIANA, *L.*—Belfast (*B. & W.*); Sligo (*R.*).

D. BERGMANNIANA, *L.*—Common everywhere.

D. FORSKALEANA, *L.*—Sligo (*R.*).

ARGYROTOZA CONWAYANA, *Fb.*—Abundant in Galway and Wicklow (*B.*); Favour Royal, Tyrone, abundant (*K.*); Belfast, abundant (*W.*); Armagh (*J.*); Sligo (*McC.*); &c.

PTYCHOLOMA LECHEANA, *L.*—Killarney (*B.*).

PENTHINA BETULÆTANA, *Haw.*—Wicklow Mts., Holywood, Co. Down (*B.*); Sligo (*R.*).

P. SORORCULANA, *Zett.*—Killarney (*B.*).

P. PRUNIANA, *Hb.*—Abundant everywhere.

P. OCHROLEUCANA, *Hüb.*—Co. Cork (*McArthur.*).

P. VARIEGANA, *Hb.*—Dublin, and Cork? (*B.*); Armagh (*J.*).

P. DIMIDIANA, *Tr.*—Killarney (*B.*); Enniskillen (*P.*).

P. SAUCIANA, *Hb.*—Killarney (*B.*); Belfast (*W.*).

P. MARGINANA, *Haw.*—Clonbrock, Co. Galway (*R. E. D.*).

ANTITHESIA SALICELLA, *L.*—Sligo (*R.*).

HEDYA OCELLANA, *Fb.*—Sligo (*R.*).

H. ACERIANA, *Dup.*—Sligo (*R.*).

H. DEALBANA, *Fröl.*—Sligo (*R.*).

H. NEGLECTANA, *Dup.*—Sligo (*R.*).

SPILONOTA INCARNATANA, *Hb.*—Howth, abundant, and on the sandhills (*B.*); Derry (*C.*).

S. TRIMACULANA, *Haw.*—Sligo (*R.*); Clonbrock, Co. Galway (*R. E. D.*).

S. ROSÆCOLANA, *Dbl.*—Sligo (*R.*).

S. ROBORANA, *Tr.*—Howth, common (*B.*); Derry (*C.*).

PARDIA TRIPUNCTANA, *Fb.*—Counties of Dublin and Wicklow, common (*B.*); Sligo (*McC.*); Armagh (*J.*).

ASPIS UDMANNIANA, *L.*—Dublin coast, common (*B.*).

(To be continued.)

A LIST OF BUTTERFLIES OBSERVED IN SWITZERLAND
IN JULY, 1899.

By A. F. ROSA.

THE following species of butterflies and varieties were met with between the 1st and 13th July last summer, during a tour in the Valais and adjacent Bernese Alps, the exact districts visited being the Visp Valley, Zermatt and neighbourhood (seven days); between Leuk and Kandersteg, over the Gemmi (three days); and in the vicinity of Aigle (two days).

The weather was very cold and unsettled at the beginning of the month, and afterwards inclined to remain dull for several days. The last few days were, however, bright and warm.

PAPILIONIDÆ.

Papilio machaon.—Occasionally seen in all the districts visited, as Zmutt, St. Niklaus, Leuk, Leukerbad, Kandersteg, Aigle (frequently), and Le Sepey; several fine specimens being secured.

Parnassius apollo.—Very common in the Nicolai Thal and Zmutt Thal; also between Aigle and Le Sepey.

P. delius.—A few taken flying languidly along the sides of the Visp at Zermatt; also a good many found lying on a marshy bank, on the ground among the grass.

PIERIDÆ.

Aporia crataegi.—Very common in the Zmutt and Nicolai Thals; also at Leukerbad, Kandersteg, Aigle, &c.

Pieris brassicae.—Abundant at Leukerbad; seldom seen elsewhere.

P. rapae.—Only one or two seen.

P. napi.—A few at Stalden, and plentiful on the Gemmi in the pine forest above Gastern-Thal. — Var. *bryoniae*. Very fine specimens from the Gemmi; also one or two at Stalden.

P. callidice.—A short series of this fast flier on the Riffelberg and Gorner Grat; also taken on the Gemmi Pass.

Euchloë belia var. *simplonia*.—Turned up occasionally at Täsch, Stalden, Zmutt, and on the Gemmi.

E. cardamines.—Two males and several females taken, and others seen.

Leucophasia sinapis.—Common in the neighbourhood of trees and bushes between Zermatt and Visp; also taken at Aigle, &c.—Ab. *erysimi*. Three specimens of this variety at Randa, Leuk, and Aigle respectively; also a few between this and the type.

Colias phicomone.—Not rare, and in first-class condition at St. Niklaus, Zmutt, and on the Gemmi Pass; the depth of the yellow ground colour varying considerably, one about as deep as *G. rhamni* male, and from this seem to vary to the very palest yellow; none of the males, however, are as white as the female (*phicomone*).

C. hyale.—Pretty common, but seldom in good condition. Zmutt, Leukerbad, and on the Gemmi near Kandersteg; also at Le Sepey.

C. edusa.—One seen flying swiftly up the valley at Stalden, and another seen near Zermatt; neither captured.

Gonopteryx rhamni.—Several of both sexes seen; those captured were worn, evidently hibernated.

LYCÆNIDÆ.

Thecla spini.—Rather common in the same localities, and along with the next species.

T. ilicis.—Common, sporting about the road between Aigle and Le Sepey, and flying round the tops of trees, which at some parts reach conveniently from a lower level within easy striking distance. Like the last species, difficult to get in anything like good condition. Usually minus a tail or rubbed on upper side.

Polyommatus virgaureæ.—This fine copper was common in some fields at St. Niklaus, and in Zmutt Thal, &c. All males.

P. hippothoë.—The crimson copper, scarce at the same places as the last; also one at Stalden; all these being males. One worn female was taken at Le Sepey.

P. alciphron var. *gordius*. Two fresh specimens taken at St. Nicklaus.

P. phlæas.—One seen on the wing at the same place, but not taken.

Lycana agon.—At Täsch, Randa, Visp, &c.

L. argus.—Hanging to grasses and reeds on marshy ground beside the road at Täsch. Seemed to be plentiful.

L. astrarche.—Turned up now and then, never common, and always in indifferent condition.

L. eros.—This pretty little blue occurred in the same localities as *L. corydon*, but not commonly. One specimen captured is not of the usual pale glossy greenish colour, but a decided pale blue.

L. icarus.—Not very many seen, but was occasionally met with in all the three districts visited.

L. eumedon.—Single specimens captured at St. Nicklaus, Täsch, Stalden, and Le Sepey.

L. bellargus. Several, mostly worn males and one female, at Zmutt, St. Nicklaus, &c.

L. corydon.—With the exception of *L. minima*, probably the most common blue, all males, and mostly in grand condition, as at Täsch, Zmutt, and Le Sepey (very abundant).

L. hylas.—In the same localities as *L. bellargus*, but more common. Appeared to be going over also.

L. damon.—Very common on the road to Ormont Dessous. The blue upper contrasts strongly with the brown under side when in flight. Freshly emerged, and all males.

L. minima.—Very abundant, and sometimes at high elevations, as near the summit of the Gemmi Pass, probably 7600 ft. above sea-level.

L. semiargus.—Worn, at St. Niklaus on the 3rd. I was surprised to find many fresh specimens at the same locality on the 7th. Taken elsewhere also, as at Visp, Kandersteg, Aigle.

L. arion.—Only one specimen of the type, taken at St. Niklaus.—Var. *obscura*. Not uncommon on a rocky slope near Täsch. Several in a meadow at St. Niklaus, also at Zmutt; one also taken at Aigle on a path in the valley.

NYMPHALIDÆ.

Limenitis camilla.—On the road at Aigle, just emerging.

L. sibylla.—One very small-sized specimen taken at Aigle.

Vanessa c-album.—Two seen, but neither captured; one on a teasel-head, the other settled on the road, both near the same spot between Aigle and Le Sepey.

V. polychloros.—One very bright individual captured at Visp.

V. urtica.—Not common, but occasionally at highish elevations; some fresh, some almost scaleless.

V. io.—Two very much worn specimens at Stalden.

V. atalanta.—Several hibernated individuals in the Visp Valley.

Melitæa phœbe.—Not uncommon at Zmutt, Stalden, Randa, &c. One with the submarginal row of fulvous spaces, upper side, hind wings centred black; under side normal.

M. didyma.—Common; specimens from Zmutt, St. Niklaus, Randa, Stalden, and Le Sepey.

M. dictynna.—Common from Täsch to Visp; also taken on the Gemmi, and at Leukerbad.

M. athalia.—Pretty common at Randa, Täsch, and Le Sepey.

M. parthenie var. *varia*.—Randa and Visp; three specimens only. One has the ground colour of the central area of the upper side fore wings pale (whitish).

Argynnis euphrosyne.—A few at Täsch, and on the Gemmi Pass above Kandersteg.

A. pales.—A few on the Riffelalp; also in Zmutt Thal, and on the Gemmi Pass.

A. lathonia.—Single specimens taken at St. Niklaus, Zmutt Thal, Stalden, and Leukerbad. Rather common at Zermatt, unfortunately, however, difficult to capture flying with the wind, but quite recognisable. One was netted here, and another found floating alive in a mountain stream.

A. aglaia.—One specimen taken at Stalden, and in the Zmutt Thal quite commonly.

A. niobe.—Common in the Nicolai and Zmutt Thals. Most specimens approach the var. *eris*, of which several were taken.

A. adippe.—Not uncommon in all the districts visited.

A. paphia.—This species was just beginning to make its appearance at Aigle, &c., when I was leaving.

SATYRIDÆ.

Melanargia galatea.—Very abundant, especially in the Visp Valley below St. Niklaus, and at Aigle.

Erebia melampus.—Several taken on the Gemmi; also at Leukerbad and Kandersteg.

E. pharte.—A few on the Gemmi, and at Kandersteg.

E. manto (*pyrrha*).—One at Kandersteg behind the Bear Hotel.

E. ceto.—Common in the Zmutt and Nicolai Thals.

E. œme.—Not uncommon at Kandersteg, and on the Gemmi. Of this variable species I have one without any trace of ocelli or rusty markings on the upper side, and with only one minute pupilled spot on the under side of the hind wings. Another has two ocellated spots at

the apex of the fore wings, upper and under side, and a series of five on the under side of hind wing, represented above by two. Most specimens are intermediate between these two. I also took several which are very strongly marked, so as to be quite distinct from any of the above, and which appear to be identical to the var. *spodea* of the Austrian and Styrian Alps. The best of these has, fore wing above and below, two well-marked apical spots, and another lower down. Hind wing (upper side) has a series of six, and underneath seven well-marked ocelli, all pupilled white.

E. stygne.—Not uncommon; Kandersteg, Gemmi Pass, and Leukerbad.

E. glacialis.—One specimen taken on the Gemmi, and others seen. One seen also near the top of the Gorner Grat, probably 2000 ft. above the snow-line.—Ab. *alecto*. One netted on the Riffelberg.

E. lappona.—Very common on the Riffelberg, and at the summit of the Gemmi.

E. tyndarus.—Single specimens at St. Niklaus and Täsch.

E. gorge.—Riffelalp, Gemmi Pass, and Kandersteg; not uncommon.—Ab. *erynis*. One or two very closely approaching this form.

E. goante.—One at Stalden, and another at St. Niklaus.

E. ligea.—Several of this fine *Erebia* were taken flying about the road at Le Sepey.

E. euryale.—Kandersteg and Zmütt Thal.

Satyrus hermione.—Common about rocky places from Stalden to Visp; also between Leuk and Leukerbad, and at Aigle.

S. alyone.—One or two at Stalden.

S. semele.—Very large specimens, only males, at Visp, Stalden, Aigle, &c.

S. actæa var. *cordula*.—Common in the Rhone Valley, Nicolai Thal, Zmütt Thal, and at Aigle, &c.

Pararge mæra.—Abundant about stones and rocks between Täsch and Stalden; also seen at Aigle on the road.—Ab. *adrasta*. One at St. Niklaus.

P. megera.—One battered specimen at Visp.

P. achine.—Several of this curious butterfly taken at Le Sepey.

Epinephele lycaon.—Single specimens from Inden and Stalden.

E. ianira.—Visp, Aigle, &c.

E. hyperanthus.—Only a few worn specimens seen at Visp, &c.

Cænonympha arcania var. *darwiniana*.—Several taken at St. Niklaus, Zmütt, &c.—Var. *satyrion*. St. Niklaus.

C. pamphilus.—Common at St. Niklaus, &c.

HESPERIIDÆ.

Spilothyrus lavateræ.—One taken and another seen at Stalden; conspicuous among the swarms of *H. thaumas* and *H. lineola*, settling on the ground at the puddles.

Syrichthus carthami.—One or two at St. Niklaus.

S. fritillum var. *alveus*.—Common.—Var. *serratulæ*, Täsch.—Var. *carlinæ*. Leukerbad.

S. andromedæ.—Two fine specimens near the Schwarzbach, on the Gemmi Pass.

S. malva.—Leukerbad.

S. sao.—Le Sepey.

Nisoniades tages.—One worn specimen at Visp.

Hesperia thauwas.—Swarmed about damp ground at the sides of roads and paths.

H. lineola.—More abundant than the preceding.

H. sylvanus.—Also rather common.

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COLLECTING IN THE ISLE OF LEWIS.

BY H. STUART FREMLIN, F.E.S.

I HAD some three weeks' collecting last summer in the Isle of Lewis, being there from the middle of June to the end of the first week in July. Insects were fairly numerous, but the species were limited in number. The weather was fine generally, exceedingly fine even, for the district, although usually overcast until about 1 p.m. The chief part of my collecting was confined to the neighbourhood of Stornoway, although I searched a little in other parts of the island.

To those of my readers who do not know the Lewis, a short description may be of interest. The island consists almost entirely of moorland, mountains, and small lakes; the soil is peaty, and very little cultivation is carried on. The only trees on the island grow on the Matheson estate at Stornoway, where they have been planted. (This wooded part formed my chief collecting centre.) Stornoway itself is the chief town, and lies on the coast; it is mainly interested in herring fisheries, and in the month of June it is extremely difficult to obtain lodgings, on account of influx of people interested in the fishing trade.

I commenced collecting very soon after my arrival. The first species that I took was *Hypsipetes impluviata*, and this occurred commonly in the neighbourhood of trees; I found some at rest on the tree-trunks during the day, and netted others in the evening.

Melanippe montanata soon made its appearance, and was very generally distributed; I continued to take freshly emerged specimens during the remainder of my stay. I took a few *Odontopera bidentata*, which were attracted by my lamp. *Larentia pectinaria* made its appearance about the end of June; it was very common in certain spots; on one evening I saw practically no other species; they appeared to be the only moths about in that particular place, and could be seen crawling up grass-stems and flying about everywhere.

Hepialus vellela was common everywhere, but difficult to catch. *H. hectus* occurred in one or two glades, but I did not

find it at all common. *H. humuli* appeared about the latter end of June, and occurred in every place that I worked at all; it was the only moth that I took on Little Bernera Island.

Campogramma bilineata apparently emerged two or three days before I left, and I did not find it in any numbers until the last few hours of my stay in the Lewis. It appeared to be local, occurring on rocks and in the growth surrounding them, but only in certain places; one might search for an hour in the heather around the base of rocks without seeing a single specimen, then suddenly one would find eight or ten together. Possibly it is more generally distributed later in the season.

Sugaring was a failure; I do not know if it was from the absence of sugar-loving moths, bad nights, or bad sugar. Whoever wishes to sugar in that neighbourhood had better bring his own rum. I thought I could buy any form of alcohol easily there, but rum does not appear to be a very coveted liquor, as it is not retailed out, and I had to buy a bottle. This bottle was sealed and marked "rum," and contained some sort of spirit, but what it really was I do not know, and the moths could not make it out either, I suppose, as they didn't turn up.

I saw very few species of butterflies. *Lycæna (Polyommatus) icarus* occurred sparingly, the males being much the more common.

Cœnonymphe davus was abundant on the moors, and gave me a rare chase over the boggy ground. *Epinephele ianira* was fairly common. The only Vanessid I saw was one *Vanessa atalanta*.

Besides the insects above mentioned I took a few dragonflies, which I gave to Mr. Lucas, who, I believe, finds them of some interest.

Any collector from the South of England coming for the first time to this northern region must, like myself, have noticed many things that were quite new to him. The short night threw me out entirely with regard to time. I would see the sun in the afternoon fairly high in the heavens, and think it must be about 6 o'clock, and then find to my astonishment that it was 8 p.m. Evening commenced at about 9.30, and then *velleda* would fly for an hour or so, after which time it would be dark enough for the small Geometers to show themselves, and I could net these and other moths until 11 p.m. I usually collected until midnight, and on returning home could see the time by my watch, as the whole northern sky had a yellow glow which lit up the surrounding country and made all objects distinctly visible. This twilight was the nearest approach to night, for in an hour the light would shine more strongly in the east, a lark commence to sing, and the morning break. The chief annoyances to collecting were clegs during the day and midges in the evening. Of the two I prefer clegs, as they can easily be seen and only

occur in dozens, but the midges are almost invisible, and occur in clouds over the moor. They bite every part not protected, and I found it quite impossible to stand still for five minutes when they were about; even whilst walking I used my handkerchief continuously to my face, neck, and hands. Happily both of these torments only occurred on the moors, the wood was quite free from them.

I was fairly satisfied with the result of my collecting, and, although I took no rarities, yet most of the insects were variable. The best forms occurred in *C. bilineata* and *O. bidentata*. The *M. montanata* were of the Northern type, but yielded few striking varieties.

NOTES ON SOME TUDDENHAM LEPIDOPTERA.

By E. G. J. SPARKE, B.A., F.E.S.

I HAVE heard it said, and seen it written, that the special Lepidoptera of Tuddenham and the surrounding district are getting scarcer year by year. Having had good opportunities of testing this by two annual visits for some years past to the late venerable rector of Tuddenham, a near relative of mine, I would assert generally that this is not the case.

Take *Agrophila trabealis* (*sulphuralis*), for instance. By making a close search of Tuddenham for one whole day in June, I found certain places where they almost swarmed if looked for at the right time. In 1897 they were especially plentiful, and I had the pleasure of circulating nearly two hundred specimens amongst friends in various parts of the United Kingdom. Last year (leaving them quite alone in 1898) I again had the pleasure of distributing over one hundred good specimens, taken from a small rough patch of ground not larger than the garden of a suburban villa. I could easily have made it five hundred if I had gone into a field of stunted rye-grass of many acres close by, growing or trying to grow against rabbits and drought. It has struck me as very curious that there should be a small grasshopper on these wastes which flies almost exactly like *A. trabealis*—the one seems to imitate the other. *A. trabealis* is also fond of flying on to the bare field, and while sitting on a clod or a stone is only visible to a trained eye; I only once have boxed one on the ground.

Acidalia rubricata certainly seems scarcer than formerly, though still plentiful in other places, and in Norfolk; but still in certain spots I found it still possible to get a fair series in one afternoon. This year the first brood was late—there were sharp frosts at Tuddenham in June; I caught several beautiful ruddy specimens the first week in July. This insect does not fly as a

rule till about 4 p.m. I have never seen it at rest, though I looked very closely for it. Its red colour no doubt protects it, as many of the wastes are distinctly red-coloured from the scanty herbage on them.

With regard to *Lithostege griseata*, I would say that this moth depends more than the others on its restricted food-plant, the flixweed (*Sisymbrium sophia*). I have taken it in ten different places in Tuddenham by observing closely and making note of where the food-plant grew the year previously. I have hardly touched it for two years, as it is a scheduled insect. The larvæ are plentiful, but in confinement many emerge crippled.

I now come to *Dianthæcia irregularis*. The larvæ are still plentiful at the right time, but I consider it useless and destructive to try and breed them unless you are on the spot to get fresh food (*Silene otites*). I take a few of the best specimens by walking the banks where the food grows, using a good lantern, which you can set down on the ground when a capture is made, and a black gauze net, in which you can see to box or bottle a light insect like *D. irregularis* easily.

I found *Heliothis dipsaceus* the year before last quite plentiful on the wing, and later I saw a good many larvæ about on various plants, especially on *Silene inflata*.

I do not collect micros; but in conclusion I would say that I saw *Spilodes sticticalis* in great numbers at light, though a few are put up in the daytime as one walks along the waste places.

Finally, I would add a word of warning to those who wish to collect in this interesting district. Get leave from the head keeper, or someone in authority, as the whole neighbourhood is now swarming with game, and a long journey there may only end, unless one is very fortunate, in being sent back empty-handed and angry.

1, Christchurch Villas, Tooting Bec Road, S.W.

WHAT IS THE PROPER NAME OF *LOPHYRUS*, LATREILLE ?

By T. D. A. COCKERELL, N.M., Agr. Exp. Sta.

THROUGH the kindness of Dr. T. S. Palmer I have been able to see Gistel's 'Naturgeschichte des Thierreichs,' in which *Anachoreta* is proposed as a new name for *Lophyrus*, Latr., 1802, which is preoccupied in Zoology (*Lophyrus*, Poli, 1791). Gistel's new name dates from 1848, and, even if we abandon *Lophyrus*, is not required. *Diprion*, Schrank, 1802, apparently included a species of *Lophyrus*, but the first species is a *Megalodontes*, and the second a *Monoctenus*. *Nycteridium*, Fischer-Waldheim, 1806,

was based exclusively on a *Lophyrus*, and should apparently be adopted. The name *Nycteridium*, Günther, 1864, as applied to a genus of reptiles, will have to be changed.

In this same work of Gistel's we have *Caliendra* proposed for *Chrysantheda*, Perty, *Matella* for the geometrid *Ephyra* (not *Ephyra*, Peron, 1809), *Marmaryga* for *Hypoderma*, Latr., *Gyra* for *Phyeis*, Fab., and a number of other substitutions which should be critically examined by someone who has the leisure and opportunity.

Mesilla Park, New Mexico, U.S.A.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

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

1. Moses Harris's 'Exposition of English Insects,' 1782.

IN this book, which consists of a number of plates, moderately well printed and hand-coloured, together with descriptive letter-press in English and French, seven plates are devoted to dragonflies.

PLATE XII.

Large Brown = *Æschna grandis* (fig. 1, ♂ ; 2, ♀ ; 3, nymph (very poor) ; 4, face).

PLATE XVI.

Large Green = *Æschna cyanea* (fig. 1 ♂ and ♀ ; 2, eggs).

PLATE XXIII.

Forcipata ♀ = *Cordulegaster annulatus* ♀ (fig. 3).

Anguis ♂ = *Æschna cyanea* ♂ (fig. 4).

PLATE XXVII.

Coluberculus = ? (fig. 1). [*Æ. mixta*, *Æ. juncea*, and *Æ. cærulea* have all been suggested as the insect described by Harris under the name of *coluberculus*; but it does not seem possible to decide which he intended, or whether it might not have been *B. pratense*, the female of which is figured on the same plate, and which also would be on the wing in June.]

ænea = *Cordulia ænea* (fig. 2). [There seems no good reason for supposing that this is *S. metallica* as some have suggested.]

aspis = *Brachytron pratense* ♀ (fig. 3). [The thorax is too red.]

PLATE XXIX.

minius = *Pyrrosoma nymphula* (fig. 1, ♀ ; 2, ♂). [The description is better than the figures, the male being especially poorly coloured.]

æreus = *Enallagma cyathigerum* possibly (fig. 3, ♀ ; 4, ♂).

lucifugus = *Agrion puella* possibly (fig. 5, ♂ ; 6, ♀, *b*, nymph). [With about equal probability *æreus* might be *cyathigerum*; and *lucifugus*, *puella*. The red eyes must be a mistake, except for *minius*. The nymph is very poor.]

PLATE XXX.

- splendens** ♀ = *Calopteryx splendens*, ♂ (fig. 1).
 „ ♀ = *C. virgo*, ♂ (var. *anceps*), (fig. 2).
 „ ♂ = *C. splendens*, ♀ (fig. 3).
splendeo ♀ = *C. virgo*, ♂ (var. *anceps*), fig. 4.
 „ ♂ = *C. virgo*, or *splendens*, ♀, fig. 5; nymph of this class, fig. 6. [In fig. 4 the body is that of a female, but the appendages look like those of a male. As the white speck is specially referred to in fig. 5, it can hardly have been overlooked in fig. 4, so the specimen must be looked on as a male. The description of fig. 5 seems to suit a female *C. splendens*, but the colour of the wings is brown, pointing to ♀ *C. virgo*.]

PLATE XLVI.

- Maculata** = *Libellula quadrimaculata*, ♂ (fig. 1).
Fugax = *Libellula fulva* ♂ (fig. 2). [It has dark tips to the wings, however, as is customary in the female.]
Vulgata = *Sympetrum sanguineum*, ♂ (fig. 3). [The shape and description—deep blood-coloured scarlet—of the abdomen are sufficient to point this insect out as *sanguineum* ♂.]
Flaveola = *Sympetrum striolatum*, ♂, immature (fig. 4). [Apart from the fact that the wings are practically without saffron coloration, Harris speaking about the insect as if it were common points it out as *S. striolatum*.]

Kingston-on-Thames.

NOTES AND OBSERVATIONS.

THE RANGE IN BRITAIN OF EPICHRONOPTERYX PULLA, STERROPTERYX HIRSUTELLA, ACANTHOPSYCHE OPACELLA, AND PACHYTHELIA VILLOSELLA.—I find it quite impossible to obtain satisfactory evidence of the range of these species in Britain, more particularly of *E. pulla*. It is recorded from Kent, Somerset and Cambridgeshire, and is exceedingly abundant in some years in Kent and Essex (in one or two localities). Yet there are whole counties—southern, midland and eastern—for which no record exists. It must exist fairly abundantly in Surrey, Sussex, Suffolk, Bucks, Berks, Norfolk, Herts, Middlesex, one would suspect, yet there are either only single records traceable or none at all for these counties. Will those lepidopterists who have captured any of these species, or who possess local lists in which they are mentioned, please be kind enough to send me the records? I shall be extremely grateful. I need hardly add that I want the localities for insertion in the second volume of 'British Lepidoptera' now in press.—J. W. TUTT; Westcombe Hill, S.E., Jan. 15th, 1900.

DISTRICT LISTS OF LEPIDOPTERA.—A useful addition to the local lists of British Lepidoptera is 'The Butterflies and Moths of Malvern,' by Messrs. W. Edwards and R. F. Towndrow. The species included in this list are only those that have been actually found within a six-mile radius of Malvern. Rhopalocera show a total of forty-seven species, among which we note *Aporia cratagi* (1858), *Pieris daplidice*

(inserted doubtfully), *Limenitis sibylla* (1861), *Apatura iris* (1864-66), *Polyommatus (Lycæna) acis* (1885). None of these butterflies have been observed in the district since the years quoted, but Mr. Edwards states that he found a brood of the larvæ of *A. crategi*, feeding upon hawthorn, in 1876. The Sphingina number twenty-four species; Bombycina, about seventy species; Noctuina, upwards of one hundred and eighty species; Geometrina, over one hundred and sixty species; Pyralidina, forty-seven species. The "Micro-Lepidoptera" appear to have received but little attention, as only fifty-one species of Tortricina are mentioned, and the Tineina are omitted altogether.

In the 'Transactions' of the Hull Scientific and Field Naturalists' Club, vol. i. pt. 2, pp. 55-64) is a list, drawn up by Mr. J. W. Boulton, of the Macro-Lepidoptera collected within eight miles of Hull. The compiler has only included species obtained by himself or other members of the Club during the past twenty-five years. Two hundred species are catalogued, and of these twenty-five are butterflies.

RETARDED EMERGENCE OF SPHINX LIGUSTRI.—I took some full-grown larvæ of *S. ligustri*, which soon entered the pupa state, in September, 1898. All these, except one, attained the perfect state in the following June. The imago from the remaining pupa did not emerge until Aug. 22th, 1899. Is not this rather unusual? The conditions in which the pupæ were kept favoured a much earlier appearance of the moths.—(Rev.) W. J. LEIGH PHILLIPS; The Cottage, Parkwood Road, Tavistock, Jan. 11th.

UNUSUAL PAIRING OF SATYRUS SEMELE.—This year I captured a fine female of *S. semele* with two males "in coitu." This struck me as worth recording.—(Rev.) W. J. LEIGH PHILLIPS.

NEW AFRICAN DRAGONFLIES.—Dr. F. Karsch ('Entomologische Nachrichten,' No. 24, December, 1899) gives a lengthy account of a new genus, *Atoconeura*, of African dragonflies, and of eleven new species:—*Trithemis pruinata*, *T. furva*, *Atoconeura biordinata*, *Orthetrum pollinosum*, *Æschna dolobrata*, *Notogomphus stuhlmanni*, *Libellago consueta*, *L. trifaria*, *Pseudagrion gerstæckeri*, *Agriocnemis inversa*, and *Lestes uncifer*.—W. J. LUCAS.

NEW WORK ON BRITISH ODONATA.—The publication of 'British Dragonflies' (L. Upcott Gill) at the commencement of the year affords an opportunity for those who secure a copy to thoroughly digest the contents before the active season begins. The study of our native dragonflies has probably been neglected by collectors because of difficulty in the way of readily determining the species. With the aid, however, of the clear descriptions and admirable figures given in this book by the author and artist (Mr. W. J. Lucas), the correct identification of captures becomes a comparatively easy matter.

SETTING RELAXED INSECTS.—Relative to the above (Entom. xxxii. 307), I mentioned I had been using (unsuccessfully) cement, which I bought of Messrs. Watkins and Doncaster. I think, in justice to that firm, I should state that the cement was not sold to me for the purpose for which I used it, and that in other respects I have found it an excellent cement.—ARTHUR H. RYDON; Awbrook, Lindfield, Sussex, Jan. 3rd, 1900.

CAPTURES AND FIELD REPORTS.

MACRO-LEPIDOPTERA OF THE GALASHIELS DISTRICT IN 1899. — The entomological year of 1899 has now almost drawn to a close, and it has not been without its surprises as well as its disappointments. The chief features of the season in this district may be summed up as follows:—1st, the absolute failure of sallowing in spring; 2nd, the extraordinary abundance of *Macroglossa stellatarum* in June; 3rd, the great attractiveness of sugar to the summer noctuids in June and the first half of July; 4th, the exceeding commonness of *Vanessa atalanta* in August and September; 5th, the unusual paucity of noctuids at sugar from the middle of July up to date.

The first captures of the season were made on Feb. 19th, when I took *Hybernia progemmaria* and *H. leucophaearia* at rest on a paling. On the 22nd, searching a whitethorn hedge in the evening produced a quantity of *H. rupicapraria* males, but no females were found. *Cucullia verbasci* began to emerge in my breeding-cage on Feb. 27th, and continued to do so until March 12th. My breeding-cage was kept in a room in which there was always a fire burning, and the pupæ were damped in open weather only during the winter.

March 12th was a bright sunny day, and I ventured to go in search of the hibernated larvæ of *Bombyx rubi*, which I thought might be enticed from their winter quarters by the warmth of the sun; in this I was not disappointed, and had the satisfaction of picking up eight larvæ, six of which subsequently proved to have been ichneumonated; the other two pupated successfully after having wandered about in my breeding-cage for more than a fortnight. A few cocoons of *Arctia fuliginosa* were picked up from amongst the heather.

On March 13th, searching the undergrowth on the outskirts of a wood with a lantern, about 8 p.m., was productive of *Larentia multistrigaria* males in any quantity; females much scarcer. From March 28th to April 4th *Acronycta menyanthidis* emerged in my breeding-cage, all five perfect specimens.

Sallowing was tried for the first time on March 30th, and several times afterwards up to April 29th, but proved quite a failure. The only species obtained were one each of the following:—*Cidaria miata*, *Calocampa exoleta*, *Teniocampa gothica*, *T. rubricosa*, *T. instabilis*, and *T. cruda*.

On April 1st I obtained the larvæ of *Thera variata* by beating Scotch fir; these did well in confinement, and the imagines emerged about the beginning of June. Towards the end of the month the imagines of *Cidaria suffumata* and var. *piccata*, also *C. silaceata*, were netted at dusk. Larvæ collecting was also indulged in about this time after dark, and the following species were bred from them in June and July:—*Boarmia repandata*, *Noctua triangulum*, *N. brunnea*, *N. baia*, *Triphæna fimbria* (few this year), *T. ianthina*, *T. orbona*. One lovely specimen of *T. subsequa* emerged about the beginning of July, and a correspondent to whom I sent some pupæ of *T. orbona* told me that he had bred a specimen of *subsequa* from amongst them.

On May 13th *Anarta myrtilli*, *Phytometra ænea*, *Eupithecia nanata*, *Fidonia atomaria* were taken. One night during the end of the month I sugared the posts of a wire fence crossing a moor, and captured about sixteen specimens of a moth which I took to be small examples of the grey var. of *gemina*. It was the only visitor to sugar that night. I was rather pleasantly surprised the other day when I was told by an undoubted authority that my *gemina* were *Mamestra furva*.

On May 21st an excursion to the habitat of *Orgyia fascelina* resulted in the finding of only three larvæ, which, along with a cocoon of *Arctia fuliginosa* and a single specimen of *Euclidia mi*, made up the bag for the day.

In June things began to look more lively, and this was certainly my busiest month of the year. I frequently had as many as two hundred specimens on my blocks at one time. About the beginning of the month the imagines of *Thera variata* were very plentiful dancing round the tops of young pines at dusk. I succeeded in getting a very variable series of this species. Other species taken at the same time were *Selenia illunaria*, *Odontopera bidentata*, *Cabera pusaria*, *Fidonia piniaria*, *Larentia pectinataria*, *Eupithecia lariciata*, *Melanthia ocellata*, *Melanippe rivata*, *M. subtristata*, *M. montanata*, *Rumia cratægata*, and *Campptogramma bilineata*; *Hypsipetes impluviata* was obtained from the alders. On June 11th a male *Bombyx rubi* emerged from one of my two pupæ, and on June 19th, to my great joy, a female made her appearance. The following evening my friend Mr. Lait and myself visited the habitat of the species for the purpose of assembling the males with her, and, to make sure that if we failed in one object we might succeed in another, we took our sugaring kit with us. The ground was reached about 7 p.m., and my friend volunteered to sugar the alders while I made a reconnaissance across the heath with madame. Matters looked rather serious; having wandered about in every direction of the compass for an hour and a half without seeing a trace of anything, I suggested to my friend, who had again joined me, that we give it up. The suggestion had hardly been made when a male *B. rubi* came sailing over a clump of whins, and promptly settled down on the box containing the female; this made an easy capture. Then the fun grew fast and furious; there were sometimes four males dashing about at the same moment. It was exactly 8.30 p.m. when the first capture was made, and by 9.15 there were thirty specimens in the cyanide bottles, and every one of them in as good condition as if bred. A soft undulating wind was blowing, and I noticed that each time this wave of air occurred it was invariably followed almost immediately by fresh arrivals, thus proving that the scent must be carried a good distance by the wind. We lit up about 9.45 for the round of the sugared trees, and I confess that I was fairly staggered by the swarms of insects that were attracted by the sweets. On some trees where the treacle had run down to the base as many as one hundred and fifty insects were counted. *Leucania comma* took the lead in point of numbers, *Agrotis exclamationis* making a good second; *Hadena dentina* was third, and *H. oleracea* fourth. The following were also taken commonly where not marked otherwise:—*Noctua plecta*, *Mamestra brassicæ*, *N. c-nigrum* (a few), *Triphæna pronuba*, *Xylophasia rurea* var. *alopecurus*, *X. lithoxylea*, *X. polyodon* var. *infusata*, *Miana strigilis*, *M. fasciuncula*, *M. literosa* (a few), *Rusina tenebrosa*, *Hadena adusta* (a few), *H. thalassina* (a few), *H. pisi* (one), *Apamea basilinea* (a few), *A. gemina* (two; grey var. common), *A. oculæ*, *Euplexia lucipara* (scarce), *L. pallens*, *L. lithargyria* (four), *Acronycta ligustri* (this species was commoner in July), *A. runicis* (a few), *A. psi* (one seen on the sugar, but not secured), *Mania typica* (one), *Dianthaccia cucubali* (one), *Agrotis suffusa* (in ribbons, three), making a grand total of thirty species seen at sugar, and twenty nine taken.

During June *Macroglossa stellatarum* created a flutter among entomologists in the district by its appearance in extraordinary numbers, attracted principally to the blossom of wallflower and lilac. Up to the present season it has occurred here very sparingly—in some years never being

observed at all—and its sudden appearance in such large numbers is quite unaccountable. On June 23rd the larvæ of *Hypsipetes elutata* were found very common, rolled up in the leaves of willow. On the 24th I had a forenoon after that nimble little fellow *Melanippe tristata*, and found him as abundant and as lively as usual. Several *Arctia menthastri* were taken at rest during the month, but all typical; also one *Hecatera serena*.

Sugaring in July was only productive up till the middle of the month, when it suddenly stopped, and did not improve again throughout the season. In addition to most of those before mentioned in June, the following species were taken in July:—*Noctua depuncta* (scarce), *T. subsequa* (one fine specimen), *T. fimbria* (one), *T. orbona*, *N. baia*, *N. brunnea*, *N. xanthographa*, *N. festiva*, *Caradrina cubicularis*, *Charæus graminis*, *Thyatira batis* (one seen, not taken), *Agrotis porphyrea*. The following were also netted at dusk:—*Metrocampa margaritata*, *Ellopiopsis fuscicaria*, *Cidaria immanata*, *C. testata*, *C. fulvata*, *Larentia didymata*, and *L. cæsiata*.

Butterflies observed during July were *Pieris brassica*, *Vanessa urtica*, *Satyrus ianira*, *S. hyperanthus*, *Ctenonympha pamphilus*, *Polyommatus phleas*, *Lycæna alexis*, *L. agestis* var. *artaxerxes*.

In August *Erebia blandina* occurred, and *Vanessa atalanta* was very abundant, being commoner than its congener *V. urtica*.

The only species taken at sugar up till November were *Agriopis aprilina* (few), *Phlogophora meticulosa* (one), *Hadena proteus* (few), *Stilbia anomala* (one), *Anchocelis litura*, *A. lunosa* (one taken from the clutches of a centipede), *Scopelosoma satellitia*, *Cerastis vaccinii*, and *Calocampa exoleta*. On some evenings not a single insect turned up, and whereas last season I took upwards of fifty *Epunda nigra* in September, this year I never even had a sight of the insect. However, all things considered, I have not much reason to grumble, as I have had a very pleasant season's collecting.—
JAMES C. HAGGART; Galashiels, Nov. 14th, 1899.

NOTES ON THE SEASON OF 1899 IN KENT.—Personally, I have little to complain of during the past season, and think that the summer collecting was far better than in the two previous years. From the end of May to the beginning of September wonderful weather prevailed. Spring collecting was somewhat late, and, with the exception of a few very enjoyable days at the New Forest at Easter, willows were not worked (*ante*, p. 133). Treacle and light are not very easily managed, except when one is staying near the field of operations, but a week at the fens in June (*ante*, pp. 196–9) and another at Hailsham in August were very successful, especially with regards to the “sweets.” Most of the collecting referred to in these notes is therefore day-work.

January was mild and wet up to the last week, when it became finer and colder. *Larentia multistrigaria* came out indoors in a warm room.

In February nothing was seen until the 26th, when a single *Hybernia leucophaæaria* was taken at Bexley. A fine female *Dasychira pudibunda* was bred on the 7th, and another *L. multistrigaria* on the 16th. As to weather, there were scarcely two days together alike.

In March weather was mild enough up to the 18th; but there was then a very severe week of cold. A visit to Bexley on the 5th produced a lovely male *Phigalia pedaria*, and three *H. leucophaæaria*; and a second visit on the 12th, a really hot day, produced *P. pedaria*, *Anisopteryx æscularia*, *H. leucophaæaria*, and *Taniocampa stabilis*. Treacle produced twenty-five *Cerastis vaccinii* and nineteen *Scopelosoma satellitia*, some of the latter being very fair specimens. On the 18th I went a third time, but it turned

out horribly cold, and one *Anisopteryx æscularia* was the only insect seen. On the 26th it was again beautifully warm and fine, and a walk to Chislehurst in the afternoon produced nine *A. æscularia* and one *Hybernia progemmaria*. A crippled specimen of *Amphidasys prodromaria* was bred. *Xylocampa lithorhiza* and *Cerastis vaccinii* were the only insects noticed at Bexley on the 29th. *Smerinthus populi*, *Notodonta trepida*, *Halias prasinana*, *Asphalia ridens*, *Amphidasys betularia*, and *Lomaspilis marginata* emerged during the month from pupæ kept in a warm room.

Common larvæ swarmed in the hedges during May. Imagines were, however, scarce till nearly the end of the month. On the 3rd I went down to Orpington for about two hours, walking from there to Chelsfield railway station. Tiny "loops" were abundant, *Uropteryx sambucaria*, *Abraxas grossulariata*, *Cheimatobia brumata*, *Hybernia aurantiaria*, and *Physelia oxyacanthæ* being noticed. On the 7th we took another afternoon walk to Chislehurst and Paul's Cray, obtaining *Drepana falcataria* and larvæ of *Cerastis vaccinii*, *Orthosia lota*, *Xanthia cerago*, and *Hypsipetes elutata*. Larvæ of *Arctia caia* and *Abraxas grossulariata* were now abundant in the garden. On the afternoon of the 24th my sister and I walked to Chislehurst, taking *Tephrosia punctulata* and larvæ of *Orthosia lota*. The 28th I spent at Hayes, Keston, and West Wickham. The weather looked very unpromising when we started, but about 10.30 the sun came out, and it became beautifully warm. Palings yielded *Tephrosia crepuscularia* (? *biundularia*), *T. punctulata*, *Anticlea derivata*, and *Hadena genistæ*, one of the latter having the hot sun full on it. *Fidonia atomaria* was very abundant, especially on West Wickham Common. A very fine male of *F. piniaria* was beaten from pine, and *Cilix spinula* (*glaucata*) from hawthorn. Larvæ were abundant, and included the following: *Oporabia dilutata*, *Himera pennaria*, *Hemitheia thymiararia*, *Rumia luteolata*, *Epunda viminalis*, and many others. We were rather surprised at taking one larva of *Eupithecia sobrinata* on the only juniper seen, a very small bush.

Our old collecting ground at Bexley was visited on June 4th. *Euchloë cardamines* (male), *Argynnis euphrosyne*, *Lycæna argiolus* (worn), *Pieris brassicæ*, *P. rapæ*, and *P. napi* were seen; and about 7 p.m., at a small place which consists of a "pub" and a few cottages, and rejoices in the name of Puddle Dock, two specimens of *Cynthia* (*Vanessa*) *cardui* were careering madly round a haystack, more wily than ever in their old age. Turning to the moths, a specimen of *Spilosoma mendica* was beaten from oak, and a few *Ephyra punctaria* and one *E. porata* from birch. *Tephrosia punctulata* (oak-trunks), *Melanippe montanata*, and *Cidaria corylata* (one) were noticed, whilst *Venilia maculata* was flying freely in the sunshine. *Asthenes candidata* was very abundant on the borders of the wood at dusk. Treacle only produced *Gonoptera libatrix* (three) and one *Dipterygia pinastri*. A most enjoyable week-end at Shoreham (June 10th to 11th) was our next expedition. A male *Euchloë cardamines* was seen immediately on leaving the station. The three Pierids, *Cænonympha pamphilus*, *Lycæna icarus*, *Hesperia sylvanus*, *H. thaumas*, and *Syrichthus malvæ* were all more or less plentiful. A few *Thecla rubi* and one *Lycæna alsus* were also seen. Among a host of commoner moths *Bapta taminata* was beaten in some numbers, and was much more plentiful than *B. temerata*. *Fidonia piniaria*, *Thera variata*, *Larentia pectinataria*, &c., were also taken. On the 11th a rather curious thing happened. Whilst my father was beating a yew-tree, he saw something drop which he at first thought to be a pebble, but on picking it up he found it was an egg of the gold-crest; the nest was

discovered neatly attached to the under side of the bough; but what astonished us was that the egg did not break, or even crack, though it fell some six feet. On arriving at an uncultivated grassy field surrounded by woods, *Thecla rubi* was seen flitting over the blackthorns. Presently a small *Noctua* started up, but owing to the wind I had some difficulty in netting it; however, I was rewarded with a specimen of *Acontia luctuosa*. I searched for some time in vain for others, but, meanwhile, my father and other members of the party found it plentiful on the sheltered side of the field, and twenty were taken in about half an hour. *Emmelesia decolorata*, *Cidaria russata*, *Agrotis exclamationis*, *Hadena dentina*, *H. genistæ*, and *Euclidia mi* were also taken. Of larvæ, *Iodis vernaria*, of which we took ten, was the best. As there is a tremendous quantity of *Clematis vitalba* all round Shoreham, this insect should be common: the larvæ were scattered over a rather large area. Treacle produced *Grammesia trigrammica*, *Miana strigilis*, *Apamea basilinea*, *Agrotis exclamationis*, *A. corticea*, *Hadena genistæ*, and a good female *Selenia lunaria*. In the station, a fine female *Bombyx rubi*, also *Dipterygia pinastri* and *Apamea basilinea* were taken at the lamp. We failed to find any other *B. rubi*, though my father had observed the males flying in profusion at Shoreham in 1897.

On July 4th, while treacling in the garden at Lee, I was surprised to see an enormous moth on the treacle, which proved to be a female *Cossus ligniperda*. I had never taken this insect before, and had always understood that it was seldom taken in the perfect state. A fortnight later, however, a second specimen was taken, flying round a poplar-tree in the garden. The larva has been unpleasantly abundant in a garden in Lee, where every tree was full of them, and the smell was terrific. They also attacked the fence to such an extent that a fresh one has been put up. Other insects taken at treacle at Lee during July were *Leucania impura*, *L. lithargyria*, *Miana strigilis* var. *athiops*, *Xylophasia lithoxylea*, *X. polyodon*, *Dipterygia pinastri*, *Agrotis exclamationis*, *Apamea ophiogramma*, *A. didyma*, *Mamestra brassicæ*, *M. persicariæ*, *Hadena oleracea*, *Triphæna pronuba*, *Cosmia affinis*, *Euplexia luciparu*, *Nænia typica*, *Amphipyra tragopogonis*, *Mania maura* and *Acronycta megacephala*. Of moths taken by other means, single specimens of *Smerinthus populi* (July 26th), *Leucoma salicis*, *Phibalapteryx tersata*, and *Triphæna fimbria* were the principal ones. I have never seen the last named in Lee before; it was taken by Mr. J. Wilson, in his garden, at rest on an elm-tree. Larvæ of *Smerinthus populi*, *S. tiliæ*, *Cerura vinula*, and *Acronycta megacephala* turned up as usual. Of butterflies, *Vanessa atalanta* favoured us in large numbers, and several *Cynthia* (*Vanessa*) *cardui* and one *V. io* were also seen. We spent the evening of July 6th at Bexley. *Nola strigula* was taken on a tree-trunk, *Hepialus hectus* at dusk, and *Aplecta nebulosa* at treacle. Ten days later we travelled to the same locality for the afternoon, my father staying for the evening. Beating produced ten *Calligenia munitata*, and single specimens of *Lithosia lurideola*, *Limacodes testudo*, and *Lophopteryx camelina*; also larvæ of *Ligdia adustata* and *Ennomos fuscantaria* (one). Among other things at dusk, *Pericallia syringaria*, and a brown-suffused specimen of *Hypsipetes elutata* were taken. Treacle at Paul's Cray, on July 9th, produced *Lithosia complana* (one), *H. elutata*, *Noctua baia*, and *Hydræcia nictitans*.

The additions to the Lee insects during August were *Lycana icarus*, *Orgyia antiqua*, *Pelurga comitata*, *Miana furuncula*, *Triphæna ianthina*, *Catocala nupta*, *Hadena chenopodii*, and *Phlogophora meticulosa*. Larvæ

of *Spilosoma lubricipeda*, *Phalera bucephala*. and *Acronycta aceris* were noticed. Some friends who spent Aug. 7th at Shoreham took, among other things, *Hesperia comma* (in beautiful condition), *Melanargia galatea*, *Argynnis aglaia*, *Lycana corydon*, and *L. medon* (one).

Autumn collecting has been practically nil. *Ennomos tiliaria* has been seen at a street-lamp on Sydenham Hill, and I saw a full-grown larva of *Vanessa atalanta* at Lee on Sept. 23rd.

During October *Oporabia dilutata* is the only moth I noticed.

Chesias spartiata began coming out indoors on Sept. 25th, and kept on till Oct. 18th; *Cerastis vaccinii*, Aug. 23rd till Sept. 9th; and *Orthosia lota*, Sept. 9th to 27th. Surely the *C. vaccinii* were rather early, even for bred specimens, especially as they were kept under the same conditions as the other two species, in a room facing north, with no artificial heat.

A great many more insects were bred during the season, and taking it all round it has been one of the most enjoyable I have experienced.

Some Corrections.—I must apologize for the following mistakes:—Entom. xxxi. p. 295, line 10, *Thera juniperata* should be *T. variata* var. *obeliscata*; p. 296, line 8, *Lithosia griseola* and var. *stramineola* should be *Lithosia helveola* (males); line 10 (females). Entom. xxxii. p. 277, line 14 from bottom of page, delete *A. ophiogramma*. I am exceedingly sorry for having recorded the above without previously making their identification certain.—J. M. B. CARR; 46, Hauden Road, Lee, S.E.

FIELD CRICKET (*Gryllus campestris*) NEAR HASTINGS.—Rev. E. N. Bloomfield has sent me a fine specimen of *G. campestris*, perfect except for the antennæ. It was taken in 1899, at Pett, near Hastings, under a slab of wood in a temporary bathing-shed erected on the beach. It betrayed itself by its shrill cry. To judge by the records, this fine insect is seldom taken in England.—W. J. LUCAS; Kingston-on-Thames.

HEMEROBIUS LIMBATUS IN JANUARY.—On Jan. 6th last I beat a single specimen of *H. limbatus* from *Pinus sylvestris* on Esher Common. The earliest noted in 1899 was March 3rd, in the same locality, when it was taken on the wing.—W. J. LUCAS; Kingston-on-Thames.

LEPIDOPTEROUS EGGS ON SALLOW, &c.—I am much obliged to Miss A. D. Edwards (*ante*, p. 14) and other entomologists, for their assistance in defining the species of the eggs alluded to by me (Entom. xxxii. p. 307). There is no doubt they were those of *Odonestis potatoaria*, a very common moth in the neighbourhood of Chester. Miss Edwards accurately described the general position of the eggs, as there was always plenty of long grass immediately below them, upon which the larvæ could feed. I find the description I gave of the caterpillars agrees with that in Wilson's 'Larvæ' (p. 75), allowing for usual differences in the stage of growth.—J. ARKLE; Chester.

SPHINX CONVULVULI AT PENARTH.—A schoolboy brought me a full-grown larva of *S. convulvuli* on Sept. 1st, 1899. I have also captured three specimens of this beautiful moth at Penarth.—T. L. HOWE.

ACHERONTIA ATROPOS AT PENARTH.—Two fine pupæ of *A. atropos* were brought to me by the station-master. They were obtained when digging potatoes on the railway bank, Sept. 12th. I put them in my breeding-cage, and four days after I found one imago had emerged; the

other followed two days later on. I did not force them.—T. L. HOWE; Beaufort Howe, Penarth.

CATOCALA NUPTA IN 1899.—Seeing Mr. Colthrup's note on *C. nupta* (*ante*, p. 13), I thought that my own captures of this insect might be of some use. I first took *C. nupta* at sugar in my garden about five years ago. Since then the species has become more and more common. In 1898 I took it as late as Nov. 3rd. Last year I took twenty-four specimens between Aug. 7th and Sept. 15th, although it was less common at Dulwich than usual.—S. A. BLENKARN; Clifton House, East Dulwich Road, S.E., Jan. 7th, 1900.

CAPTURES OF ODONATA.—I have taken the following dragonflies at various times, and Mr. Lucas has very kindly identified them for me. He also informs me that the first-named has occurred only very infrequently in England. It was found dead, on the library steps, Folkestone, by Mr. S. G. Hills, to whom I am indebted for the specimen:—

Æschna mixta. Folkestone, Oct. 3rd, 1899.

Orthetrum cærulescens. Three males and one female; New Forest, July 4th, 1899.

Sympetrum striolatum. Two specimens; Ramsgate, Sept. 21st, 1899.

Ichnura elegans. Very plentiful; Leatherhead, June 22nd, 1897.

Agriion pulchellum. Ramsgate, July 27th, 1898.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E.; Jan. 12th, 1900.

RECENT LITERATURE.

The Hymenoptera of Suffolk. Part I.—Aculeata. By CLAUDE MORLEY, F.E.S., &c. Pp. viii, 22; map. Plymouth: James H. Keys. 1899.

THE present instalment of Mr. Morley's catalogues of the insects of "that best of entomological counties, Suffolk," according to Wratishlaw, whose remark is quoted on the title-page, deals with the Aculeate Hymenoptera. Most of the comparatively few entomologists who have studied this very interesting, but still somewhat neglected group of insects, have collected more or less in this county, from the time of the Rev. William Kirby, who published one of his most important works, the 'Monographia Apum Angliæ,' as long ago as 1802, to the present day.

The Aculeata are not a very extensive group; but out of the three hundred and seventy-four British species recognized by Mr. E. Saunders (our best living authority) in 1896, Mr. Morley is enabled to enumerate no less than two hundred and eighty-two as indigenous to Suffolk, though a glance at the map will show that only a comparatively small portion of the county has yet been explored by hymenopterists. Ten years ago only two hundred and thirty-one species were recorded for the adjoining county of Norfolk. We may quote the entry of one species, taken at random, as an illustration of Mr. Morley's method:—

DASYPIDA.

1. *Hirtipes*, *Latr.* *Barhamiæ*, *declivia* *graminosa* frequentans. In floribus etiam *Jacobææ* uterque sexus haud infrequens (Kirby).—

Lowestoft in 1862 (Smith).—Not rare in the Brandon District (Perkins).—One fine ♂ at Mill Heath, Rougham, 7-7-99 (Tuck).

We should like to see similar lists of the insects of all our British counties.

W. F. K.

British Dragonflies (Odonata). By W. J. LUCAS, B.A., F.E.S. Pp. 1-350, with figures and thirty-seven coloured plates. London: Upcott Gill & Co. 1900. 31s. 6d.

NEUROPTERISTS will rejoice at the appearance of this fine work, in which the author, an enthusiastic field naturalist as well as an earnest student, has succeeded in giving us a monograph of this group interesting and useful as well to the tyro as to the more veteran odonatist.

Prefixed by separate lists of the figures and plates, and a table of contents, the book commences with a short general introduction, followed by chapters on the life-history and classification, illustrated by figures showing various stages of the life-history and a figure of that singular hymenopterous parasite on the eggs, *Anagrus incarnatus*.

The classification adopted runs, for the most part, on familiar lines, though not absolutely following any previous system. The author divides the *Odonata* into two "superfamilies;" the first, called ANISOPTERIDES, or unequal-winged species, consisting of the families (1) *Libellulidæ*, containing the subfamilies *Libellulinæ* and *Cordulinæ*, and (2) *Æschnidæ*, containing the subfamilies *Gomphinæ*, *Cordulegasterinæ*, and *Æschninæ*; the second superfamily, called ZYGOPTERIDES, consisting of the species with equal wings and a transversely broad head, forming the single family *Agrionidæ*, containing the subfamilies *Calopteryginæ* and *Agrioninæ*. There are a few changes in specific names, chiefly adopted from Kirby's 'Synonymic Catalogue of the Odonata,' 1890, but those who deprecate change will be glad that the author has not followed Mr. Kirby in every case. The specific name of *Anax formosus*, Lind., is replaced by *A. imperator*, Leach; *Æschna borealis*, Zett., by *Æ. carulea*, Ström.; *Æ. rufescens*, Lind., by *Æ. isosceles*, Müll.; *Lestes nymphæ*, Selys, by *L. dryas*, Kirby; and *Pyrrosoma minium*, Charp., by *P. nymphula*, Sulz.

Chapters iv. and v. are devoted to the nymph and imago stages, and from a scientific point of view are perhaps the most important in the book. Too little attention has been paid by British entomologists generally to the early stages of these insects, and the fine papers by Mr. Cabot are unfortunately not so well-known as they should be. In these chapters, which are copiously illustrated, the diagrams showing the structure and the technical terms used in the book for the various parts are most complete and useful, while the analytical tables should enable any neuropterist to name any imago and even most of the nymphs.

Chapter vi. deals with the genera and species at considerable length. In each case the description is divided by subheadings, which greatly assist the reader in finding any particular portion that may be wanted. These commence with the synonymy, followed by the original description of the insect—the size; a full description of both sexes, and, when necessary, the immature condition; the variation; the nymph; the time of appearance; the habits and the distribution. The descriptions are ample and very clear, and the value of the work is

greatly increased by the careful way in which the references are given when quotations are made.

The plates as a whole are excellent, but in some instances the printing of the pterostigma is a little faulty, and in plate xx. the figures of *Calopteryx* are not sufficiently robust. Some of the figures of anal appendages, magnified, are so beautifully done as to make us wish that similar figures of the anal appendages of all the species were given.

Should a new edition, or a supplement, be issued, it would be useful if a few plates were inserted showing the immature condition of the commoner *Agrioninae*, which, though fully described in the book, are not figured, and are too often a stumbling-block to beginners. Plates also of a few allied species not as yet discovered in the British Isles, but from their distribution not unlikely to occur here—such as *Somatochlora alpestris*, *Æschna affinis*, *Agrion hastulatum*, and a few others—would be useful, and might serve to enrich our fauna by enabling species hitherto undetected to be recognized, in which case our author's gloomy forecast of a decrease in our list would be falsified.

The remaining chapters deal with the reputed species; breeding from the nymph; preparing for the cabinet; addenda; reference to the full titles of books quoted; and a very carefully compiled index.

The book should certainly be in the library of everyone interested in the group, and Mr. Lucas is to be congratulated on having so successfully demonstrated the error of the often expressed idea that a book on British dragonflies could be nothing more than a translation of extracts from De Selys Longchamps' 'Revue des Odonates.'

C. A. B.

V. BIANCHI. *Enumeratio operum opusculorumque ad faunam Hemipterorum Heteropterorum Imperii Rossici pertinentem 1798–1897.* (Ann. Mus. Zool. Petersb. 1898 [publ. 1899], pp. 289–323.)

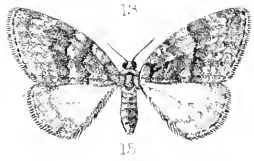
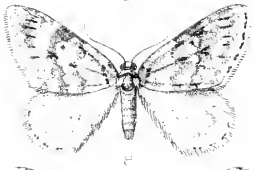
THE author has rendered good service to his colleagues by the preparation of this Catalogue, which enumerates the works treating, during the periods included, of the Heteroptera of the Russian Empire. Nearly sixty authors (and about three hundred and fifty works) are recorded, and further help is afforded by a faunistic summary, nineteen divisions being adopted; neighbouring countries (as, for example, Galicia, the Danubian Principalities, and Corea) are also included—placed under smaller headings. It is to be hoped that Dr. Bianchi will prepare a similar catalogue of the works dealing with Homoptera.

G. W. K.

General Index to Miss Ormerod's Reports on Injurious Insects, 1877–1898.

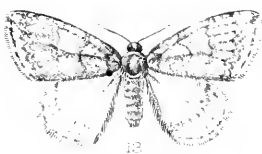
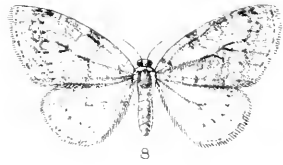
By R. NEWSTEAD. With Preface by the Author of the Reports. Svo, pp. 58. London: Simpkin, Marshall & Co. 1899.

THIS comprehensive Index will considerably enhance the value of the series of Annual Reports presented to the public by Miss Ormerod during the past twenty-two years. In addition to the index to general subjects, there are also a Plant Index, an Animal Index, and an Index to Unclassified Hosts; these further facilitate reference to the various Reports.



West, Newman del.

Oporabia autumnata.



West, Newman litt.

Oporabia autumnata, *filigrammana*, and *nitulata*.

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[No. 442.

OPORABIA AUTUMNATA FROM RANNOCH, WITH REFERENCE TO SEVERAL OTHER RELATED FORMS.

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

(PLATES I. & II.)

Geometra § *nebulata*, Thnb., Diss. i. p. 12 (1784).

G. autumnata, Bork. v. pp. 293, 565 (1794).

? *Phalæna ventilata* (Schneider, N. Cat.), Fb., Ent. Syst. iii. pars 2, p. 191 (1794).

Acidalia dilutata var. **quadrifasciata*, Tr. vi. 2, p. 26 (1828).

Oporabia autumnaria (Dblld., N. Cat.), Weav., Zool. p. 3495 (1852).

O. approximaria, Weav., Zool. p. 3496 (1852).

O. autumnata (Bdv. MS.), Gn., Ur. et Phal. ii. p. 264, No. 1334; Atlas, pl. 18, 7 (1857).

O. filigrammaria varr. *autumnaria* et *approximaria*, Gn., tom. cit. p. 265, No. 1335, A et B (1857).

O. autumnaria, Sta., Man. ii. p. 77 (1859).

Cidaria dilutata var. *autumnata*, Stgr., Cat. p. 187, No. 2642, b (1871).

C. filigrammaria ab. *autumnaria*, loc. cit. No. 2643, a (1871).

Oporabia addendaria, White, Scot. Nat. iv. p. 160 (1878).

? *O. dilutata pallescens*, Ckll., Ent. xxii. p. 3 (1889).

O. guenéata, Prout, Ent. Rec. x. p. 95 (1898).

The above citations will give a sufficient bibliography of this very interesting though much overlooked species. It is somewhat fortunate that the name *nebulata* was a homonym on its inception, and that thus the generally used name of *autumnata* (-aria) is the oldest which is valid.

The present article is written at the instigation of my kind correspondent, Mr. W. M. Christy, of Emsworth, who has been interesting himself in the genus *Oporabia* for the past few years, and has been fortunate in obtaining—partly by capture and

partly by breeding—a grand series of *O. autumnata*, of which it is highly desirable that a selection should be figured and discussed. Mr. Christy suggested to me that this would form an appropriate opportunity for clearing up some of the confusion which still exists regarding this species and its allies, and that, as I have been studying them very closely for some time, I should be a suitable person to take the task in hand. This I have great pleasure in doing; and at the same time I am following a further suggestion, both from him and from Mr. South, in figuring, for comparison, some examples of the allied *filigrammaria*, H.-S., and *dilatata*, Bork.

A few preliminary remarks appear necessary in view of the confusion just alluded to. In the first place, I may perhaps be allowed to call attention to the fact that I read before the City of London Entomological Society on May 4th, 1897, a paper on "The Genus *Oporabia*," which was mainly historical, and that the more important parts of this were published in the 'Entomologist's Record' for 1897, pp. 247, 282, and 315. Readers who want to see a summary of the writings and opinions of Doubleday, Weaver, Gregson, Stainton, and others should consult that paper. After further investigations, I sent to the 'Entomologist's Record' for April, 1898 (vol. x. p. 93), a supplementary note, in which I showed that the *autumnaria* of our English writers was also indisputably the *autumnata* of Borkhausen, and left the question open whether *autumnata*, Gn., No. 1334, was or was not a form of the same species; proposing for this last the provisional name of *guenétata*, in order to avoid collision with *autumnata*, Bork. I have since worked out the life-history of *O. autumnata*, my good friend Mr. A. Horne, of Aberdeen, having kindly supplied me with eggs in the first instance, while the results arrived at were further verified in 1899 upon eggs supplied by Mr. Christy, and by Mr. J. E. R. Allen, of Enniskillen, who is also following up this species with interest, and to whom my thanks are due for much valuable information. I wrote an exhaustive paper on the life-history of the species, and read it at a meeting of the City of London Entomological Society last spring; as this will shortly appear in their 'Transactions,' I need not go into the subject here, but will merely indicate as concisely as possible the most important results of my voluminous notes, my hardly less voluminous correspondence, my omnivorous reading of the literature of the genus, and my study of material in such collections as the old Stephensian collection at Cromwell Road, the Doubleday collection, the Zeller collection, those of Messrs. J. H. Leech, Sidney Webb, W. M. Christy, J. E. R. Allen, and others.

In the first place, I can positively assert that there are two totally distinct species of *Oporabia*, both common in Northern and Central Europe, which are nearly always confused as one,

notwithstanding their great structural differences. There is also a third form, which may be termed a "sub-species," which deserves to be kept carefully distinct from the others by the systematist, though not differing structurally from No. 2. I will return to this third form when I have differentiated the two indisputably valid species :—

No. 1.—*Dilutata*, Bork.

Ova.—Highly polished, hardly perceptibly pitted.

Larva.—Never with conspicuous longitudinal yellow striping. Very generally with brown or reddish blotches.

Imago.—Male genitalia with a hook on the harpes. Male antennæ decidedly thickened.

Ground colour always with a dirty ochreous or brownish tinge.

Fore wings not very glossy.

"Elbowed line" rarely angulated near the costa.

No. 2.—*Autumnata*, Bork.

Much less polished, deeply pitted.

With conspicuous yellow longitudinal lines, though often becoming indistinct in *adult* larva. *Never* with brown or reddish blotches.

Male genitalia with no hook on the harpes. Male antennæ slender.

Ground colour clean white or grey, or even blackish, or with a violet tinge, never ochreous-tinted.

Fore wings very glossy.

"Elbowed line" nearly always angulated near the costa.

I have omitted in this tabulation a large number of less important points, which are nevertheless very interesting to the close student of these species.

The third principal form is our moorland *filiagrammaria*, and though this is such a specialized race that nearly all entomologists can easily distinguish it from both Nos. 1 and 2 of the above, even while failing to distinguish No. 2 from No. 1, yet when we come to an analysis of the differential characters we find that it agrees almost precisely with those given for *autumnata* in the tabulation, and those entomologists who are averse to multiplying species may like to sink it as "*autumnata* var. *filiagrammaria*." To treat *filiagrammaria* as the type and *autumnata* as the variety, as Doubleday ultimately did, is absolutely indefensible on any and every ground; from the bibliographer's point of view, *autumnata*, Bkh., is long prior to *filiagrammaria*, H.-S.; while the student of distribution will lay more emphasis on the fact that, whereas *autumnata* is widely distributed through a great part of the palæarctic region, *filiagrammaria* seems to be restricted to a few limited moorland and mountain localities in certain parts of the British Isles.

The chief differences between *autumnata* and *filiagrammaria* are the smaller size of the latter, its differently shaped female (the fore wings more cut off at the anal angle), its generally browner tone (hardly ever with really white forms) and its usually sharper markings, particularly the somewhat better defined sub-

marginal band on both pairs of wings—see especially Plate II. fig. 6. It also generally appears earlier in the season (August to early September), but *autumnata* fluctuates greatly in this respect. But, as Mr. South remarked to me in conversation on the subject, some of these distinctions are closely paralleled by those observable between *Hypsipetes sordidata* (*furcata*, Thnb.) and its bilberry variety, to the latter of which specific rank has never been accorded. It is only right to add that the forms from the Isle of Lewis appear somewhat intermediate between *autumnata* and *filigrammaria*, and Mr. Christy has a similar form from Argyllshire.

A few further points of interest will be brought out when we come to the consideration of the specimens figured. I may say that, although seventeen of the twenty-nine were taken or bred by Mr. Christy, and two others were reared from ova with which he kindly supplied me, I myself am entirely responsible for the selection of the specimens which are figured. It has not been easy to choose from amongst the many beautiful and interesting forms of *autumnata* which Mr. Christy has lent me, and I should have liked to devote both the plates to these, but for the desirability of showing a number of forms of its allies for comparison. Plate I. contains nothing but *autumnata*, all being Rannoch examples; Plate II. shows two more *autumnata*, four *filigrammaria*, and eight *dilatata*.

Up to the present, I believe that *O. autumnata* has only twice ostensibly been figured, namely, in Westwood's Supplement to Wood's 'Index Entomologicus,' at fig. 1727, and in Guenée's 'Atlas,' pl. 18, fig. 7. The former figure is very satisfactory, the latter somewhat the reverse, and ruined in many copies by the chemical change which has taken place in the whitish ground colour. Newman's "pale variety of this common moth" (*dilatata*) is apparently in reality an *autumnata*, probably also Freyer's pl. 426, 2 (likewise a supposed aberration of *dilatata*), is really a strange form of this very variable species. I ought further to mention an interesting plate (Ent. Rec. vii. pl. iii.), by my friend Mr. J. A. Clark, of Rannoch specimens, unfortunately figured and described as *filigrammaria*, but unquestionably referable to *autumnata*. It has remained to Mr. Christy to first furnish the material for a plate of examples called by their right name, and such should certainly be of great use to our working lepidopterists.

Plate I. figs. 2 and 3 represent the type forms of *autumnata*, Bkh., and are practically the same form which the German entomologists send out as "*dilatata* var. *autumnata*, Gn." Fig. 2, the male, has the groups of lines (two and three respectively) which traverse the fore wings almost united into bands; fig. 3, the female, has them a little weaker than usual, and the precise type-form would stand just mid-way between these two figures. The hind wings also, in the German type, are often as devoid of

markings as in fig. 4. As a matter of fact, the true *autumnata*, Gn., is a somewhat different form, and I have not seen any exactly like it from anywhere excepting Central France, where, curiously, it hardly varies at all, as Guenée says. Until quite lately I had only seen the four worn examples which Doubleday received from Guenée, but the other day, when I was looking through Mr. Leech's series of *dilutata*, I detected several nice examples of the same form; it is very interesting, as showing a specialized local race in that district, that I kept pointing to the examples scattered in this series, and saying "that is like the French form," and "that is another," and each time, on looking at the label, finding "Central France" given as the locality. Under these circumstances, I retain *guenéata* as a varietal name for *autumnata*, Bkh. It may be roughly indicated as a combination of the characters of Plate I. figs. 3 and 6 and Plate II. fig. 1—the white ground colour and weakness of bands of the first-named, the paucity of markings of Plate II. fig. 1, with the general character of markings of Plate I. fig. 6—*i. e.* the transverse bands strongly and coarsely dark-marked on the costa and the central nervure.

Figs. 2 and 3 are both captured specimens, the former taken at the end of September, 1897, the latter in early October, 1898. Figs. 4 and 5 show a more extreme development of the tendency shown in fig. 2, and the bands can here no longer be described as consisting of lines at all, but are veritable dark bars. This handsome form was named *nebulata* var. *sandbergi* by Lampa (Ent. Tids. vi. p. 111), who believed it to be a variety of the species usually called *dilutata*; we may also cite here, as a synonym, Clark's *filigrammaria* ab. *virgata* (Ent. Rec. vii. pl. iii. figs. 9–10), and may regard Wood's figure of *autumnaria* (fig. 1727) as representing somewhat the same. I bred the two examples which we are figuring, together with four others equally striking, in a small brood reared from a worn pale female which Mr. Christy sent me last autumn. The male figured emerged on July 30th, 1899, the female on Sept. 27th, the last of the batch not until Nov. 14th!

The rest of the figures on Plate I. show varieties of all kinds, and are very difficult to classify. Without pretending to have arranged them in any very systematic way, I may call attention to the placing of the darkest specimens at the bottom, and, on the whole, the most strongly banded ones on the right-hand side. The notes which follow will bring out the chief points of interest.

In 1898 Mr. Christy bred a very variable and interesting series (though mostly somewhat undersized) from mixed ova obtained at Rannoch in 1897. Of these we are figuring three. Plate I. fig. 1 is unique as far as our material goes, the abnormal broadening and shortening of the fore wings having

resulted in the reduction of the central area to an extreme degree. I have seen a figure of a parallel form of *Melanippe fluctuata* by Wiskott, in 'Iris,' x. 393, pl. xii. fig. 12, and it occasionally exhibits itself in other species. Fig. 15 is the darkest bred on that occasion, and one of the darkest I have seen; the transverse bands are, however, fairly well marked, and are unusually broad, with the space between them narrow. The specimen is intermediate between the aberrations *obscurata* (Plate I. fig. 13) and *schneideri* (Plate II. fig. 2), as described by Lampa. Plate II., fig. 1, is also very interesting; it seems to be extremely rarely that *autumnata* produces specimens in which the central area shows any definite approach to the single-banded type of markings which I describe as "carpet" banded, as it is normal in such genera as *Melanippe*, *Coremia*, &c.; *filiagrammaria*, on the other hand, very frequently has well-marked carpet band in the female (Plate II. fig. 6).

Plate I. fig. 12 shows a darkened specimen in which the transverse bands are but little more strongly expressed than the numerous other waved transverse lines; this form is the *filiagrammaria* ab. *typica* of Clark (Ent. Rec. vii. p. 289). The specimen was taken at large in 1898.

In 1899 Mr. Christy bred four broods from eggs, keeping them carefully distinct, and the specimens obtained show rather curious results in the matter of the influence of heredity; the parent females were taken wild in 1898. One parent was a striking specimen with slightly darkened ground colour, and two unusually narrow very dark bands, rather widely separated. From this twenty-seven moths were bred, not one of which followed the parent form very closely; they varied greatly, though all were of medium colour or dark, some having more or less distinct bands (Plate I. figs. 9, 11, and 13), others quite the reverse (Plate I. figs. 10 and 14). Plate I. fig. 13 is perhaps the most striking; it is unusual to find a melanic specimen with the bands so very well pronounced.

A second 1898 female was much like the example figured at Plate I. fig. 7—one of her progeny; the whole brood of fifteen specimens (seven males, eight females) follow the parent very closely, and hardly vary at all—a great contrast in this respect to the brood last noticed.

A third female was paler, nearly but not quite as white as the type form (Plate I. fig. 3). Thirteen specimens were bred from her, and they again vary exceedingly, some being quite light, others quite melanic; while some have the bands much better expressed than others. Plate I. fig. 8, and Plate II. fig. 2, show two extremes of this brood; the latter is practically without markings, and were it not for the tone of colour and the intensely glossy appearance it could hardly be distinguished from an extreme melanic *dilutata* (e. g. Plate II. fig. 14).

The fourth female from which any specimens were bred was the one figured on Plate I. fig. 12 (ab. *typica*, Clark), but as only three emerged it would be rash to generalise from them; all the three agree pretty well together, being rather weakly marked, and rather paler than the parent, which they do not in any respect incline to follow at all closely.

The very fine large male figured on Plate I. fig. 6 was taken at Rannoch in 1897; those who hesitate to acknowledge *filigrammaria* as a form worth keeping distinct from *autumnata* should consider such specimens as this before deciding to abandon the latter name. It would only increase the confusion which already exists to begin to write of these great woodland forms as "*filigrammaria*." There is an unnamed *Oporabia* species from Esquimalt in our National Collection, of which this specimen much reminds me in the rugged appearance of its markings.

The examples of *filigrammaria* and of *dilutata* figured on Plate II. may to a large extent be left to speak for themselves. Figs. 3, 5, and 6 were all bred by me from the same female, from Bolton; fig. 6 is Herrich-Schäffer's type form of *filigrammaria*, fig. 4 a female aberration; figs. 3 and 5 (the latter bred by me in 1899 from Huddersfield ova) represent two fairly representative males, and may be useful for comparison with some of the *autumnata* males.

Figs. 7 and 8 show the male and female of a form of *dilutata* which has interested me immensely, and for which I have proposed (Ent. Rec. xi. p. 122) the name of ab. (? var.) *christyi*. Mr. Christy brought ten of the form (eight males, two females) from a birch wood at Rannoch in 1897, including the male which is figured; and eight more (four males, four females) in 1898, including the figured female. Except that four of the 1897 specimens (three males, one female) were slightly infuscated, the form hardly varies appreciably, and it is in many respects so closely parallel to Guenée's *autumnata* (var. *guenéata*, mihi), especially to his *figure* (Atlas, pl. 18, fig. 7), that for a long while it greatly mystified me. The respects in which it agrees with *autumnata* var. *guenéata* are:—

1st. The comparative absence of sexual dimorphism, and the approximately equal size of the sexes.

2nd. The weakness of the markings, except at the costa and on the nervures.

3rd. The tendency to angulation of the "elbowed line" (extremely rare in ordinary *dilutata*).

4th. Its attachment to birch.

The proofs, however, that it is *not* a form of *autumnata* are:—

1st. The male genitalia agree with those of *dilutata*.

2nd. The ground colour has somewhat of the dirty yellowish tinge which is wanting in *autumnata*.

3rd. The egg is apparently even *more* highly polished and brightly orange-tinted than typical *dilutata*, instead of much *less* so, as in *autumnata*.

4th. The larva often has reddish dorsal blotches.

Unfortunately neither of us has yet succeeded in breeding this form right through, though fertile ova have been obtained; at one time I fancied it might be a distinct species. As stated in the 'Entomologist's Record' (*loc. cit.*), Doubleday was also puzzled by the resemblance of "*christyi*" to *guenéata*, for he has left specimens of it in his collection labelled "*autumnata?*" (i. e. *autumnata*, Gn. ?).

Ab. *christyi* also has a remarkably small central spot—often practically obsolete; whereas the normal Scotch *dilutata* (figs. 9 and 10) has the central spot well developed, in the female often opened out into a small ring (as in the ab. *inscriptata* of Donovan).

Plate II. fig. 11 was bred from Glasgow, and shows the true ab. *obscurata* of Staudinger. Fig. 14 is even more extreme, and is my ab. *melana* (Ent. Rec. xi. p. 122); it was bred from a Chingford larva.

Plate II. fig. 12 is a handsome female, which I believe came from Wheeler's collection, and represents the form which I call "carpet banded" (ab. *latifasciata*, mihi). The remaining figure (fig. 13) is interesting as having been bred from Chingford, where these pale forms are of extremely rare occurrence; it may be profitably used for comparison with the equally pale ab. *christyi* (Plate II. fig. 8), and with the pale type of *autumnata* (Plate I. fig. 3), from both of which it differs materially, though perhaps the actual specimens need to be seen in order that the differences in *tone* may be fully realized.

In conclusion, I should like to urge our entomologists, especially those residing in the north, to make a careful study of this fascinating genus; and to say how pleased I shall be to determine their specimens, or render any assistance in my power.

EXPLANATION OF PLATES.

FIG.	PLATE I.	
1.	<i>Oporabia autumnata</i> ,	♀ abnormality (bred 1898).
2-3.	" "	Bkh., type, ♂ ♀ (1897, 1898).
4-5.	" "	ab. <i>sandbergi</i> , ♂ ♀ (bred 1899).
6.	" "	ab. ♂ (1897).
7-11.	" "	varied forms (bred 1899).
12.	" "	ab. <i>typica</i> , ♀ (1898).
13.	" "	ab. <i>obscurata</i> , ♀ (bred 1899).
14-15.	" "	other dark aberrations, ♂ ♀ (bred 1899, 1898).

FIG.

PLATE II.

1. *Oporabia autumnata*, ab. ♂ (bred 1898).
2. " " ab. *schneideri*. ♀ (bred 1899).
- 3-4. *Oporabia filigrammaria*, ♂ ♀ (bred 1897, Bolton).
5. " " ♂ (bred 1899, Huddersfield).
6. " " type, ♀ (bred 1897, Bolton).
- 7-8. *Oporabia dilutata* ab. *christyi*, ♂ ♀ (Rannoch, 1897, 1898).
- 9-10. " " ♂ ♀ (Aberdeen, 1893).
11. " " ab. *obscurata*, ♀ (bred 1898, Glasgow).
12. " " ab. *latifasciata*, ♀ (? Norfolk).
13. " " pale ♀ (bred 1896, Chingford).
14. " " ab. *melana*, ♀ (bred, Chingford).

NEW INSECTS FROM ARIZONA, AND A NEW BEE
FROM MEXICO.

By T. D. A. COCKERELL, N. M. Agr. Exp. Sta.

THE following insects were taken on a recent trip to Arizona; the main result of the trip will be set forth in a Bulletin of the Arizona Experiment Station, but it is thought expedient to present the descriptions of the new species in an entomological journal. The *Perdita* from Juarez was taken on the same trip, and so is included.

APIDÆ.

Perdita baccharidis, sp. n.

♀. Length not quite 6 millim.; head and thorax dark green, with yellow markings; abdomen banded. Cheeks hairy, but face nearly bare; front and vertex strongly granular; frontal fovea elongate; maxillary palpi 6-jointed; labial palpi 4-jointed, the first joint not greatly longer than the other three together; flagellum dark brown above, except at apex, yellow beneath; scape yellow, with a dark spot at apex; mandibles yellow, the tips rufous; labrum yellow, a dark mark at base; clypeus yellow, the usual dots small and very near the margin; supraclypeal mark well-developed, a little more than semi-circular; no dog-ear marks; lateral marks broad below, ending at a point above, angulate opposite the antennal sockets, owing to the interference of the fovea. Mesothorax almost entirely nude, very shiny, with distinct but very sparse punctures; pleura all dark; prothorax, except a subtriangular lateral area, entirely yellow; tegulæ hyaline, with a yellow spot; wings perfectly hyaline, nervures very pale brownish, subcostal nervure and margin of stigma rather dark: stigma hyaline; marginal cell almost squarely truncate, the substigmatal portion a trifle longer than the poststigmatal; second submarginal narrower fully one half to marginal; third discoidal distinct. Femora all yellow; anterior legs entirely yellow; middle tibiæ dark brown on the outer side; hind tibiæ and tarsi entirely dark brown; claws cleft. Abdomen yellow, with four broad dark brown bands, about as broad as the intervals between them; basal part of first segment mostly dark;

hind margin of fifth segment darkened; venter yellow. The abdominal bands do not unite on the lateral margins.

Hab. Tempe, Arizona, Oct. 28th, 1899 (*Ckll.*). Two females at flowers of *Baccharis* at the foot of Tempe butte. The types are unfortunately somewhat discoloured by cyanide.

Allied very closely to *P. townsendi*, but differs by its smaller size, nude or nearly nude mesothorax, and the entire supra-clypeal mark. From *P. stottleri* it differs by its entirely yellow femora, the entire supra-clypeal mark, and the marginal cell less obliquely truncate. From *P. bigeloviae* it differs by the yellow femora, shape of face-marks, &c.; from *P. zebrata* by the details of the face-marks, markings of the legs, &c.

This insect finds no place in Mr. Ashmead's generic tables, having the mouth-parts of *Perdita*, with the abdominal markings of *Neoperdita*.

Perdita mellina, sp. n.

♂. Length about $4\frac{1}{2}$ millim.; head and thorax very dark green, almost black; metathorax dark blue; abdomen brownish orange, the first two segments strongly suffused with black. Labial palpi with the first joint longer than in typical *Perdita*; clypeus with the median (upper) portion small and hemispherical; clypeus, labrum, lateral face-marks, and dog-ear marks, yellowish white or very pale yellowish; no supra-clypeal mark; lateral marks nearly equilateral triangles, with the upper angle at the level of the antennal sockets; mandibles white, with dark tips; cheeks simple, the extreme lower part white; face moderately hairy; head large, subquadrate; antennæ yellow beneath, yellowish brown above; vertex shining, minutely and obscurely granular; mesothorax shiny, fairly pubescent; tubercles, and two transverse marks on upper border of prothorax, cream-colour; pleura entirely dark; wings slightly milky, iridescent; nervures and stigma yellowish white; marginal cell fairly long, nearly squarely truncate; second recurrent nervure rudimentary; femora black, with yellow ends; tibiæ yellow, the hind tibiæ suffused with blackish; tarsi yellowish white; abdomen rather short and broad, hairy at tip, venter immaculate.

Hab. One at flowers of *Heterotheca subaxillaris*, Phoenix, Arizona, Oct. 15th, 1899 (*Ckll.*). *P. mellina* differs from *P. chamæsarachæ* by the smooth front, differently-shaped clypeus, &c.; from *P. sidæ* by the colour of the abdomen, shorter marginal cell, &c.; from *P. semicrocæa* by the colour of head and thorax, rather longer marginal cell, &c.; from *P. rhodura* by the pale nervures, dark femora, colour and markings of head, &c.

Perdita heterothecæ, sp. n.

♀. Length about $4\frac{1}{2}$ millim.; head and thorax black, with a metallic lustre; mesothorax rather brassy, metathorax bluish; head ordinary, cheeks and occiput with abundant white hair, face hairy at sides; mandibles yellowish white, with ferruginous tips; labial palpi with the first joint longer than the other three combined, but not twice

as long; clypeus (except the usual dots, which are very near the margin) and lateral face-marks dull white, the latter triangular, with the upper angle on the orbital margin about on a level with the antennal sockets; no supraclypeal or dog-ear marks; antennæ dark brown above (yellowish brown towards the tips), yellowish beneath; vertex minutely granular, but still shiny; mesothorax shining, sparsely punctured, rather hairy; tubercles, and two transverse marks on hind border of prothorax, white; wings opaline, nervures colourless, stigma faintly yellowish, marginal cell moderately long, nearly squarely truncate; second submarginal large, narrowed at least one-half to marginal; third discoidal distinct. Femora black, knees light; tibiæ (very hairy) dark brown or black, anterior tibiæ cream-colour in front; tarsi yellowish white. Abdomen broad and flat, very dark brown, with straight yellowish white bands at extreme bases of segments 2 to 4, each band with a linear median interruption, the bands all abruptly ending some distance before the lateral margins. The band on the fourth segment is absent in one specimen. Tip of abdomen hairy, pygidial plate long, orange-brown; venter dark brown, the margins of the segments hyaline.

♂. Like the female, but there is a minute supraclypeal mark, and the abdomen is hardly so dark, while the bands are browner and less well defined.

Hab. At flowers of *Heterotheca subaxillaris*, three females, one male, Tempe, Ariz., October, and Phoenix, Ariz., Oct. 15th, 1899 (*Ckll.*). At both places, and on the same flowers, I also took *P. asteris*, *Ckll.*

P. heterotheca (♀) is very like *P. ignota*, *Ckll.*, but differs in the shape of the lateral face-marks, and the second submarginal cell less narrowed above.

Perdita heliotropii, sp. n.

♀. Length about $4\frac{1}{2}$ millim.; head and thorax dark brassy green; abdomen lemon-yellow, with four broad entire dark-brown bands. Head ordinary; face almost free from hair, but a good deal of hair above the antennæ; labial palpi, with the last three joints together somewhat more than half the length of the first; vertex strongly granular; labrum dark brown; clypeus, two spots representing the supraclypeal mark, and lateral marks, pale lemon-yellow; no dog-ear marks; clypeus with the usual dots, and also two brown spots on its upper portion; lateral face-marks narrow, tapering to a point a little above the level of the antennal sockets, slightly angulate a little before the point; cheeks wholly dark; antennæ dark brown above, yellow beneath; mesothorax shining, with scattered punctures and sparse hairs; tubercles, and both borders of prothorax anteriorly, lemon-yellow; nervures and stigma very pale brown; marginal cell nearly squarely truncate; third discoidal distinct; femora black, with yellow apices; front and middle tibiæ and tarsi yellow; hind tibiæ and tarsi dark brown; venter of abdomen yellow.

♂. Length 4 millim.; labrum yellow; clypeus yellow, without the two brown spots; supraclypeal mark transversely hour-glass-

shaped; no dog-ear marks; lateral face-marks ending in an emarginate truncation at about the level of the antennal sockets; first four tibiæ dark behind; abdomen very dark brown, with obscure transverse yellow bands, not reaching the lateral margins, at bases of segments 2 to 4; venter dark brown, becoming pale reddish apically; second recurrent nervure scarcely visible.

Var. *a.* ♂. Upper part of clypeus occupied by a quadrate dark brown patch, emarginate on its lower edge; supraclypeal mark divided into two spots; abdomen with only the bands on the second and third segments, these very obscure, and interrupted in the middle.

Hab. Juarez, State of Chihuahua, Mexico, Oct. 6th, 1899 (*Ckll.*); two females, five males, all at flowers of *Heliotropium curassavicum*. *P. heliotropii* ♀ is close to *P. stottleri*, but smaller, with the light parts of the abdomen much yellower; the male has face-markings a good deal like those of *P. bigelovici*.

Hypomacrotera callops, Ckll. & Porter, subsp. nov. *persimilis*.

Both sexes a trifle smaller than the type; female with the spot at the apex of the wings usually distinct. Male with the flagellum clear cream-colour beneath; the legs with the black rather less developed, and the light part of the face slightly tinged with yellow. There is also a well-developed supraclypeal mark, and the marginal cell (male) is considerably shorter than in *callops*. Face not so hairy in male as in type.

Hab. One male at flowers of *Tribulus grandiflorus*, Oct. 7th; many females at flowers of *Physalis*, Oct. 9th. All at Phoenix, Arizona (*Ckll.*). I should hardly separate this on the female, but the male is palpably distinct.

Calliopsis coloradensis coloratipes (Ckll.).

This was described as a variety of *C. glaucifrons*, but it is really a subspecies of *C. coloradensis*. The female, not before described, resembles that of *coloradensis*, but is easily distinguished by the clypeus having only two minute dots, instead of two black bars, and by the presence of the dog-ear marks.

Hab. Mesilla Park, N. M., Sept. 1st, at flowers of *Isocoma wrightii*, two males, two females, in cop. (*Ckll.*); Phoenix, Arizona, Oct. 7th, at flowers of *Isocoma hartwegii*, also rolling in the dust, many males and females in cop. (*Ckll.*). Compared with the typical (N. M.) form, the Arizona male has the face-markings yellower, and the female has the dog-ear marks smaller, and the clypeus often with rudimentary bars, thus approaching true *coloradensis*.

Xenoglossa patricia, Ckll., subsp. nov. *angustior*.

♂. A little smaller and less stout, hind legs noticeably smaller and more slender; apical plate of abdomen narrower, and rounded at the tip, like the end of a finger, instead of truncate.

Hab. Buckeye, Arizona, at flowers of *Cucurbita palmata*, October (*Ckll.*).

MUTILLIDÆ.

Spherophthalma foxi, *Ckll.* (= *heterochroa*), var. n. *arizonica*.

♀. Similar to the type, but in place of red hair on the head and thorax it is pale ochreous; the scarlet on the second abdominal segment is very vivid. The colour-contrast is very striking, and gives the insect a great superficial resemblance to *S. dugesi*.

Hab. Phoenix, Arizona, Oct. 15th, 1899 (*Ckll.*).

Spherophthalma heliophila, sp. n.

♀. Length not quite 8 millim., rather slender, ferruginous. Head large, a little wider than thorax, subquadrate seen from in front, but the vertex rounded and large; cheeks ample, rounded, not keeled or spined; eyes small, faceted, slightly oval, very convex; antennal fovæ bounded above by a ridge; mandibles long, the apical half or more black, slender, a well-developed tooth a little beyond the middle; antennæ ferruginous, tips a little darkened, scape bent; punctures of front and vertex strong; upper part of head with scanty appressed shining orange hair, and upright black hairs, some quite long; scape and lower parts of head with scanty white hair. Thorax seen from above pyriform, the dorsal surface rough, becoming reticulate on the hinder part, with the same appressed shining orange hairs, and erect black hairs, as on the head, except that on the metathorax (middle segment) the orange-fulvous hairs are wanting, and there is a median longitudinal band of appressed silver hair. Sides of thorax with very scanty white hair, and a dense band of silver hairs extending from the hind end as far forwards as the middle coxæ. Legs slender, ferruginous, with scanty white hairs; spurs white; tibial and tarsal spines and bristles black. First segment of abdomen small, nodose, constricted at its junction with the second, ornamented above with a broad longitudinal band of dense silver-white hair, basal projections thorn-like seen from above, pyramidal seen from behind; second segment yellowish ferruginous, with strong but sparse punctures, a central oval blackish patch, due to black hairs, connected vaguely with a broad band of black hairs on the hind margin, extreme sides with a band of silvery white; segments 3 to 5 with silvery-white hair in the middle and at the sides, but black in the subdorsal region; apex with black hair; ventral segments 2-4 fringed with white. The tibial spurs are serrated.

Hab. Glendale, Arizona, running on the railroad track, Oct. 31st, 1899 (*Cockerell*).

In Ashmead's table this runs into the restricted genus *Spherophthalma*. It does not fall exactly in any of Fox's groups; the faceted eyes throw it out of group *occidentalis*, and the serrated spurs out of the three following groups. From the other groups it is excluded by the non-emarginate eyes and the non-tridentate mandibles. It is a pretty species, known by its slender form and the silver-white bands as described.

PHYMATIDÆ.

Macrocephalus arizonicus, sp. n.

♂. Length 8 millim.; breadth of abdomen 4, of scutellum $2\frac{1}{4}$, length of scutellum 4, breadth of thorax $3\frac{1}{2}$ millim. Entire insect orange-brown, the colour of dried apricots; abdomen somewhat redder; antennæ pale, terminal half of last joint bright green; anterior tibiæ blackish; four hind legs with the coxæ, trochanters, and femora blackish with small white warts, tibiæ pale yellowish, tarsi darker and greenish. Abdomen broad, heart-shaped, the lateral margins visible nearly to the end of the scutellum; thorax with the usual lateral angular projections quite large, and the two longitudinal keels distinct, though concolorous with the rest of the surface; keel on scutellum distinct, reaching the apex, broadened on the basal fifth, but nowhere at all bullate; sides of scutellum presenting the usual gentle double curve; upper surface of head and thorax rough, with minute pallid pimples; hinder part of thorax irregularly and confusedly cancellate; scutellum distinctly cancellate basally, otherwise rough and sub-cancellate, with innumerable punctures. Antennæ with the first joint stout, cylindrical, a little longer than the third; second short and more or less heart-shaped; third a little longer and more slender; fourth large, larger than the second and third together.

Hab. Tucson, Arizona, in the region of Larrea and Mesquite, Nov. 7th, 1899 (*Ckl.*). Allied to *M. prehensilis*, Fab., and *M. lepidus* Stål. The antennæ are rather like those of *M. pulchellus*, and the colour is nearest to that of *M. inæqualis*.

Phymata salicis, sp. n.

Length 8 to 9 millim.; breadth of abdomen $3\frac{1}{2}$ to 4 millim. Similar in most respects to *P. fasciata*, Gray, but smaller than that species usually is, and narrower, with the frontal process always longer, so that the lateral profile of the face is quite concave. The hinder lateral angle of the thorax is also less prominent, the margin between the lateral angles being almost or quite straight, instead of concave. The colouration is markedly different from that of *fasciata*, being a mixture of very pale yellow and light green, the dark abdominal band merely nebulous, and all the markings suffused. The green becomes quite bright on the middle of the thorax, and on the legs and antennæ; the anterior lateral angles of the thorax are stained with dark fuscous, and the top of the head is in some specimens marked with the same colour.

Hab. Phoenix, Arizona, numerous (♂ ♀) on twigs of *Salix fluviatilis*, preying upon butterflies (*Lycæna*) and flies (*Syrpitta*), Oct. 7th, 1899 (*Ckl.*). This could be considered a race of *P. fasciata*, but in a long series its characters are perfectly constant, and distinct from those seen in *fasciata*, in the manner described. *P. fasciata* is a flower-inhabiting species, whereas *P. salicis* is adapted for life upon the twigs of the willow.

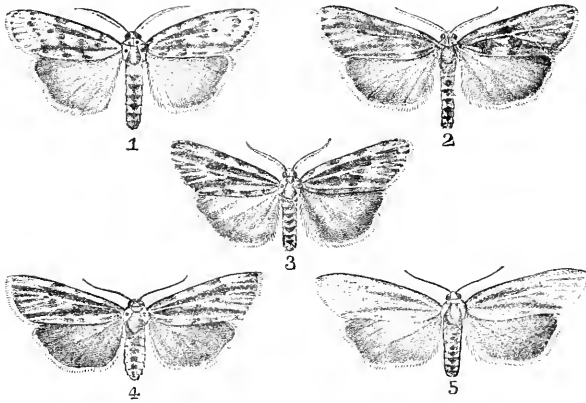
VARIATION OF *EMYDIA CRIBRUM*, L., IN ENGLAND.

Eulepia cribrum, Curtis, Brit. Ent. ii. pl. lvi. (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 92 (1829); Stainton, Manual, i. p. 149 (1857); Newman, Brit. Moths, p. 30 (1869).

Emydia cribrum, Boisdu., Ind. Meth. p. 39 (1829); Guen. Ind. Meth. p. 56 (1840).

Spiris cribrum, Walker, Cat. Lep. Het. ii. p. 472 (1854).

Coscinia cribraria, Kirby, Cat. Lep. Het. p. 343 (1892).



Mr. Fowler, of Ringwood, has been good enough to send me, for examination, the whole of his extensive collection of *Emydia cribrum*. The majority of the specimens are from the Ringwood locality, and others are from the New Forest. Although it might possibly be a difficult matter to say from which locality individuals came if all the examples had been mixed together, the two series as arranged show certain differences. The most striking feature of the New Forest contingent appears to be the generally clearer ground colour; whilst among the Ringwood specimens there is a tendency to fuscous suffusion, chiefly in the males, and to greater prominence of the transverse bands and the longitudinal streaks in both sexes (figs. 2 and 3 ♂♂). Fig. 6 represents a suffused male specimen, but this is not the darkest in the series. In five female examples and one male from the New Forest, and in three females from Ringwood, the transverse markings are only faintly indicated (fig. 5 ♀). Most of the female specimens from the last-named locality are strongly marked (fig. 4), but two examples have the spots rather small (fig. 7). In the large proportion of the specimens, the transverse markings referred to as bands are series of more or less confluent spots, but in several examples the sub-basal, ante-medial, and post-medial bands are

entire or almost so (fig. 1). The spots forming the submarginal series are often linear or cuneiform, but rarely round; in some specimens the submarginal spots unite with those of the marginal series, forming internervular streaks (figs. 3 ♂ and 4 ♀). Sometimes the area between the base of the wing and the sub-basal band is blackish (fig. 2 ♂).



Fig. 6.



Fig. 7.

Comparing the series of *E. cribrum* under consideration with continental representatives of the species, I find that the English specimens differ from all foreign examples that I have seen in the matter of the longitudinal streaks. None of the continental specimens in the National Collection at South Kensington, or in Mr. Leech's collection, have these streaks; there is no mention of these characters in the original description, neither does Esper's figure exhibit them. On the other hand, in not one of the one hundred and seventy odd specimens in Mr. Fowler's series are the streaks absent. There is nothing in the variation of the English specimens tending in the direction of var. *candida*, Cyr., beyond the form represented by fig. 5, but the continental named form has white fore wings, and is devoid of marking except two black dots at the outer extremity of the discoidal cell. Some of the suffused specimens from Ringwood approach var. *rippertii*, Boisd., but cannot be correctly referred to that form.

The streaks referred to are certainly not typical of *E. cribrum*, it might therefore be well that the forms in which they are present should have a varietal name, and I would propose *bivittata* as being a suitable one. All the other characters are so exceedingly variable that it would seem to be useless to suggest names for the numerous modifications.

RICHARD SOUTH.

Note.—The antennæ in figs. 1, 2, and 3 have not been correctly drawn; this was, unfortunately, only noticed when too late for alteration.

NOTE ON ANTHOCHARIS.

BY T. A. CHAPMAN, M.D., F.E.S.

HAVING obtained a few pupæ of *Anthocharis belemia*, and so had the opportunity of observing the butterfly alive at leisure, I observed one little fact that is probably well known, but may be new to others as it was to me, and is interesting in connection with the protective colouration in the genus. We are all familiar with the green and white spotting of the under side of *A. cardamines* and its nearest allies, and how the insect at rest assimilates closely to white flowers over green foliage both in general and detailed effect. No doubt the flowers contemplated are such white Cruciferæ as *Erysimum alliaria* (garlic mustard), the most frequent food-plant of the species with us, but not at all out of harmony with many Umbelliferæ and other flowers.

The colours are the same in *belemia*, but they are here disposed in irregular stripes crossing the wings at an angle, irregular both as to width and intersection, but still distinct transverse stripes instead of spots. Now my one little fact is, as to the resting attitude of the butterfly, which sits with the wings closed in the usual way, the head close down to the surface in which the butterfly is seated, and the antennæ protracted so as to lie close together and appressed to the resting surface. The abdomen and the inner margin of the hind wings between which it is hidden are raised from the surface at a considerable angle (30° – 40°), with the result that the stripes of green and white are exactly parallel in general direction with that surface. Supposing this to be a blade of grass or a petiole of a flower, amongst others all substantially parallel, then the green stripes would accord with these. Someone who has seen the butterfly at home may be able to tell us with what the white stripes agree. Probably the white really agrees with those portions of foliage that strongly reflect light and look white and glistening, the green portions according with the general tone. I should imagine, however, that this insect rests amongst foliage of a spiked or grassy character and not close to the flowers, as in the case of *cardamines*, *belia*, *daphidice*, &c.

In these there is little doubt that the white does refer to the flowers, when we see in *euphenoides*, a species that is attached, I fancy exclusively, to *Biscutella*, with yellow flowers, that the surface that is white in the other species is here yellow.

We can hardly help comparing this case with that of the tiger and the leopard, where striping and spotting are co-related with hiding in grassy jungle and leafy forest, and with the parallel difference in marking between *paphia*, &c.—and *adippe*, &c., which has not, so far as I know, been attributed to any differences as to their preference in hiding-places.

Betula, Reigate: February, 1900.

ENTOM.—MARCH, 1900.

H

NOTES ON JAMAICAN RHYNCHOTA.—No. 2.*

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

CORRECTIONS, &c., TO No. 1.

6. *Notonecta undulata*, Say.

It is not this species which comes to "light," but a small *Corixa*, which will be noticed later on.

New localities.—"Rain-water tank, Yardley Chase, Oct. 31st, 1899" (leucochroic forms). Mr. Taylor writes me:—"Owing to the peculiar geological formation of the district there are absolutely no rivers or streams of any kind in the Santa Cruz Mts., the inhabitants depending entirely on rain water for all their needs. For this purpose large tanks are constructed, the water being conveyed from the roofs of the houses and from the 'barbecues'—as the cemented terraces used for drying coffee and pimento are termed—by gutters of various constructions. I did not therefore expect to get any bugs, especially as owing to the severe and protracted drought most of the water supply had been used up, and the tanks were very low in consequence. About a week before my return home, however, the island was visited by a hurricane and series of floods that filled up all the tanks, but wrought incalculable damage to property all over the country. . . . Some idea of the extent of the downpour may be gathered from the fact that a large lake some miles in extent has formed among the mountains to the west of the Santa Cruz range, and at the present moment is increasing to the great consternation of the inhabitants of the surrounding district. In parts this body of water is seventy feet deep. . . . I went the round of the tanks. . . . Some plants (known here as the water hyacinth) have almost entirely covered the whole surface, but a small space of clear water at one end was occupied by quite a large number of *Notonectas*." (C. B. Taylor, Dec. 5th, 1899, *in litt.*)†

9. "*Trochopus plumbeus* (Uhler)" = *marinus*, Carpenter.

This species was included on the authority of Mr. Carpenter's description. Since writing the first note I have examined the types of Prof. Uhler's and Mr. Carpenter's insects, as well as

* See "On some Aquatic Rhynchota from Jamaica," Entom. xxxii. pp. 28-30 (1899).

† I admitted the name "*maculata*" for a var. of *N. undulata* in my revision of the genus (1897, Trans. Ent. Soc. Lond. p. 410): as, however, the name was previously used for a var. of *N. glauca* (p. 419), it must be altered, and I now propose "*selene*." For the cream-coloured forms (head, pronotum, scutellum, elytra, &c.) common in Jamaica, it may be useful to use the name "*albida*."

fresh material sent by Mr. Taylor, which confirms my opinion expressed in the 'Bolletino Mus. Torino,' xiv. No. 350, pp. 5-6 (1899), viz. that *Trochopus* is not generically distinct from *Rhagovelia*.

It may be useful to discuss the matter again briefly, and, first of all, to reproduce a portion of the paper mentioned above, which is possibly not very accessible to British entomologists:—

“The chief differences between *Rhagovelia* and *Trochopus* appear to be (*teste* Carpenter and Champion) that:

“(1) In *Trochopus* the tarsi are (according to these authors) 3, 2, 2-segmentate; in *Rhagovelia* 3, 3, 3.

“(2) The pronotum in *Trochopus* is sutured off from the mesonotum; in *Rhagovelia* (except *R. tenuipes*, Champion, *l. c.* p. 137) these nota are fused together.

“(1) Now I have elsewhere expressed my opinion of the unsatisfactory character of these minute tarsal ‘segments.’ I think I may say that in average ‘good’ museum specimens preserved in the ordinary way they are very difficult to observe with any degree of certainty without a certain amount of preparation, which is very undesirable, if not improper, in dealing with borrowed material, especially types, and examination under a compound microscope. The fact that such a careful worker and able entomologist as Mr. Carpenter failed—in working with material preserved in alcohol—in his original description (*l. c.* p. 78) to detect more than two segments in each anterior tarsus shows the undesirability of employing such a character. Moreover, these minute segments (or ‘nodes,’ as they may preferably be termed) are apparently not always constant in the Gerridae, for Prof. Uhler, in describing *Trepobates pictus* (Proc. Zool. Soc. Lond. 1894, p. 214), writes:—‘In two specimens the basal joint of tarsi was present on one side, and not on the other.’

“(2) The exception to the fused pro- and mesonota (in the apterous *R. tenuipes* female) can scarcely be deemed to prove the rule; indeed, it appears almost to render further discussion unnecessary. Moreover, a species from Venezuela in the Turin Museum, which I have determined as *R. femoralis*, Champion, and another from Venezuela and Darien, referred by me to *R. angustipes*, Uhl., noticed in the first part of this paper), have distinctly separated pro- and mesonota in both sexes, and at the same time there are three distinct (as seen with a compound microscope) segments in each tarsus. In short, *Trochopus* may perhaps be on the way to developing into a new genus or sub-genus, but it cannot be said, in my opinion, to have attained as yet to that point.”

In examining the material sent by Mr. Taylor from the spot where the original captures were made, differences in the segmentation of the tarsi, similar to those mentioned by Prof.

Uhler in *Trepobates*, are observable in a few examples. In reviewing the subject, I have little hesitation in writing "*Trochopus*" as a synonym of "*Rhagovelia*," and the Jamaican species as:

Rhagovelia plumbea, Uhler = *Trochopus marinus*, Carpenter = *Taochopus plumbeus* (Uhler), Carp. and Champ.

New locality.—Rock Fort, St. Andrew (*C. B. Taylor*).

ADDITIONS TO THE AQUATIC FAUNA.

11. *Corixa kollarii*, Fieber.

I recorded this species doubtfully from females in Part I. I can now confirm its presence from specimens sent by Mr. Taylor from Yardley Chase, Santa Cruz Mts., St. Elizabeth (Oct. 31st, 1899); taken at light (*C. B. Taylor*).

12. *Corixa pygmaea*, Fieber.

Same locality as the preceding, and also from Rae Town, Kingston; at light (*C. B. Taylor*). This is the species referred to previously under *N. undulata*.

13. *Anisops pallipes* (Fabr.)

One female from rain-tanks, Yardley Chase (*C. B. Taylor*).

14. *Gerris guerini*, Leth. & Sev. (= *marginatus*, Guer. nec Say).

Macropterous and apterous females and nymphs from (α) Yardley Chase, Southfield District of Santa Cruz Mts., St. Elizabeth (altitude 1500 ft.), Oct. 31st, 1899, from rain-water tank; and (β) Rock Fort Road, St. Andrew, four miles east of Kingston, April 16th, 1892; shallow pool at roadside under limestone bank (*C. B. Taylor*).

15. *Rhagovelia tayloriella*, sp. nov.

Elongate; head above distinctly sulcate [? generic character]. Basal segments of antennæ and the legs with long scattered bristly hairs. First antennal segment one-half longer than second, which is very slightly longer than the third, the latter a *triple* longer than the fourth. Rostrum reaching to the middle of the mesosternum. Intermediate femora two-fifths longer than tibiæ, not constricted medially; tibiæ subequal to the tarsi, armed with a short straight spine at apex; third tarsal segment one-seventh longer than the second. Posterior femora very slightly longer than the tibiæ, which are nearly three times as long as the tarsi; second tarsal segment three-fifths longer than the first; posterior tibiæ straight. *Macropterous form*: pronotum somewhat obsoletely carinate longitudinally. Long. 5 mill.

♂. Third antennal segment noticeably incrassate; anterior tibiæ considerably dilated (especially towards the apex), and excavated beneath. Posterior femora considerably incrassate, and armed beneath with ten to eleven strong teeth, from the centre to the apex, diminishing regularly in size towards the apex; tibiæ conspicuously denticulate; trochanters denticulate. Sixth (? seventh) abdominal segment

greatly depressed beneath on its apical half (except at the lateral margins), apical margin slightly excavated; first three segments longitudinally carinate; connexivum semivertical. *Macropterous form*: pronotum produced basally into a short acute porrect spine; elytral neuration distinct.

♀. Third antennal segment and anterior tibiæ not so strongly dilated as in the male, but more so than in the other species of the genus. Posterior femora incrassate (similarly to the same sex of *R. distincta*), armed beneath with one large and two or three small teeth. Sixth (? seventh) abdominal segment very long, nearly twice as long as the fifth, slightly biexcavate apically; abdomen scarcely (except slightly towards the base) carinate ventrally. Connexiva vertical in apterous form, and much narrowed in from the base at first, afterwards continuing subparallel. *Macropterous form*: pronotum produced basally in a long stout process, which is about equal in length to the space between its origin and the humeral angles of the pronotum. It arises at an angle of about 45° , curves around near its apex, and is then deflected downwards slightly. Elytral neuration feebler than in the male.

Habitat. (α) Rio Cobre, Spanish Town, St. Catharine, Nov. 7th, 1892; clear water—no surface growth—sluggish current; taken close to bank of river. (β) Black River, Elysium Estate, Portland, April 4th, 1899 (*C. B. Taylor*).

Black; the posterior and intermediate femora and tibiæ slightly greenish blue (metallic lustre), furnished somewhat sparsely (more densely on the nota) with pale gold pubescence. Base of first antennal segment, base of anterior femora and anterior margin of pronotum, ventral surface of ambulaera, coxæ, trochanters (usually), &c., pallid testaceous. Teeth of posterior femora pallid except at apex. Dorsum of abdomen shining black, connexivum rufo-testaceous; ventral surface usually bluish grey (often greatly rufescent), except the brownish genital segments.

The male of this fine little species, which I have much pleasure in naming after its discoverer, is readily distinguishable from the same sex of all the other American species of the genus by the dilated anterior tibiæ, except *R. collaris* (Burm.), in which the posterior tibiæ are notably sinuate. I think also that the form of the sixth (? seventh) abdominal segment in the male is different from that of any other species.

The type of *R. tayloriella* is the winged male individual. The species is probably that recorded by Johnson and Fox as *R. collaris* (Burm.) in 1892, Ent. News, iii. p. 60. [See also Entom. 1899, p. 30, No. 10.]

16. *Microvelia* sp.

A macropterous individual and two nymphs of a species I have not yet been able to identify.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH
AUTHORS.

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

(Continued from p. 42.)

2. *E. Donovan*: 'The Natural History of British Insects,' 1792-1813.

In the sixteen volumes comprising this work we have presented to us a large number of generally well-executed hand-coloured plates of British Insects, with accompanying letterpress in English. It is got up somewhat in the same manner as Curtis's later and well-known work, and is a decided advance on that of Harris.

VOL. I. PL. XXIV. P. 53.

Libellula depressa ♀ = *Libellula depressa* ♀.

PLATE XXXVI. P. 79.

Libellula virgo (fig. 1) = *Calopteryx virgo* ♂. [It is called *Lib. puella*; but this is evidently a misprint for *virgo*, under which designation it appears in the index.]

Libellula puella (fig. 2) = *Pyrrhosoma nymphula*. [By the figure apparently a male.]

VOL. II. PL. XLIV. P. 21.

Larva of *Libellula depressa* = nymph of one of the *Æschnidæ*.

VOL. III. PL. LXXXI. P. 23.

Libellula depressa ♂ = *Libellula depressa* ♂.

VOL. V. PL. CLXVI. P. 77.

Libellula grandis = *Æschna cyanea* (♀ apparently). [This insect cannot be *Æ. grandis*, for it is a blue-spotted species, and has hyaline wings. In some respects it bears a little resemblance to *Æ. juncea*; but, judging by the small pterostigma and other points, there is little doubt that it is intended for *Æ. cyanea*.]

VOL. X. PL. CCCXXXVII. P. 29.

Libellula vulgata (fig. 1) = *Sympetrum striolatum* ♀. [No doubt it is intended for this species of the genus *Sympetrum*, if only because it is described as very common.]

Libellula grandis (fig. 2) = *Æschna grandis* ♂. [The insect is figured with saffron wings.]

VOL. XII. PL. CCCCVII. P. 39.

Libellula quadrimaculata = *Libellula quadrimaculata* ♀. [The unsuffused, Scotch form.]

PL. CCCCXV. P. 61.

Libellula ænea = *Cordulia ænea* (♀, apparently). [There are two figures, the lower one with yellow wings, Donovan calls the latter a variety; but the variation is probably due to the figure being taken from an immature specimen.]

PL. CCCCXIII. P. 81.

Libellula forcipata = *Gomphus vulgatissimus* (♀, apparently). [Below the figure of the imago is one of a pupa, as Donovan

calls it. It is perhaps intended for a nymph of this species, but does not resemble it in shape. The eyes are like round beads at the fore corners of the head, which ends in a point in front. The distal edge of the mask is round. The wing-cases are small.]

PL. CCCCXXV. P. 85.

Libellula quadrifasciata = *Libellula fulva* (♀, apparently). [The abdomen is not blue, and there is a fuscous band at the tip of all the wings.]

PL. CCCCXXX. P. 97.

Libellula boltonii = *Cordulegaster annulatus* ♂.

VOL. XIII. PL. CCCCXLIX. P. 35.

Libellula biguttata = *Orthetrum carulescens* ♂. [The abdomen is blue.]

VOL. XIV. PL. CCCCLXXII. P. 17.

Libellula cancellata = *Orthetrum cancellatum*. [The sex is somewhat doubtful; by shape the insect is perhaps a male, but the abdomen is yellow.]

VOL. XV. PL. DXXIII. P. 39.

Libellula scotica = *Sympetrum scoticum* (♂, ♀). [This insect Donovan was the first to describe. He gives two figures—one of each sex.]

NOTES ON THE GREAT EARWIG AND OTHER BRITISH FORFICULIDÆ.

BY C. W. DALE.

Labidura riparia, Pall. = *gigantea*, Fab.—This fine species of earwig has hitherto been found only in the vicinity of Bourne-mouth, where examples were secured by the Rev. W. Bingley, on the 7th of July, 1808; these were exhibited the following November by Mr. G. B. Sowerby at a meeting of the old Entomological Society. Mr. Bingley, in a letter to the Treasurer of the Linnean Society, states that as he was walking on the beach west of Christchurch, just at the close of the evening, he saw two or three large insects running along the sand, about or rather below high-water mark, and from their size and manner he took them to be young mole crickets. Surprised at seeing such insects in that situation, he examined them as well as the light would permit, and, by their immense forceps and size, found them to be a species of *Forficula* hitherto undescribed as British. He took home some specimens, and ascertained them to be the *Forficula gigantea* of Fabricius. Mr. Sloman, a friend of Mr. Bingley, sought for them afterwards in the same place, and found a great number concealed under large stones on the sands. Mr. Bingley put three or four together into his box; and the consequence was that one of them was devoured by the rest.

In their habits these insects greatly resemble the common earwig; but when approached they turn up their abdomen in the manner of the large Staphylini, bending the extremity quite over the head, which they defend by means of their enormous forceps. The largest he could procure was nearly fifteen lines in length (=about 30 mm.), exclusive of the antennæ, which measured somewhat more than half an inch.

Mr. Sloman, who lived at Wick, and old Lochyer, of Christchurch, accompanied my father and Mr. Dashwood to the same spot—Mount Misery—in 1818, but with no success.

Upon what was once a most dreary and desolate spot now stands the rising seaside resort of Southbourne-upon-Sea.

This earwig came to be reckoned amongst the extinct British species (its native origin being actually questioned by the Rev. W. Kirby in his 'Introduction to Entomology') until 1865, when a few were taken on the shore close to Hengisbury Head by Mr. Dossetor. The next was taken near the pier at Bournemouth, by Mr. E. Saunders, in 1874.

Mr. Kemp-Welch, in an article on the great earwig ('Transactions' of Dorset Field Club, vol. viii. p. 61), records and figures a specimen in his possession as having been taken on the beach under Branksome Park, some two miles westward from Bournemouth, within the limits of Dorsetshire, on the 27th of May, 1886, by Mr. E. Lovett, of Croydon. The Rev. J. G. Wood, in his 'Insects at Home,' mentions one as having been taken, also on the beach, at Folkestone, but gives no date.

Like the common earwig, the large one appears to conceal itself as much as possible in the daytime, probably in chinks and crannies of the cliffs, and only emerges at the approach of evening to seek its food, which consists probably of the various small animals, molluscous and otherwise, that are left on the shore by the tide.

It is widely distributed on the Continent, and has been taken as far north as Brittany and Berlin, but appears always to frequent the sea-shore or the banks of rivers. It also occurs in Asia, Africa, and America.

Chelidura albipennis, Meg.—The only examples of this species were taken in a nursery garden at Ashford, in Kent, in June, 1832, by Professor Westwood.

Forficula lesnei, Finot.—Under the two names of *pubescens*, Géné, and *decipiens*, Géné, this species first appeared as British in a 'List of British Euplexoptera, Orthoptera, Thysanoptera, and Hemiptera,' compiled by Mr. Walker in 1860. It was first taken by my father at Charmouth in September, 1837. He also found it near Weymouth and at Bonchurch in the Isle of Wight, and I have found it besides at Bournemouth, Sidmouth, Falmouth, and in the Scilly Isles. It hibernates in the stems of the common reed. Under the name *decipiens*, Géné (Weekly Entomologist,

1863, p. 11), my father states that Mr. Curtis took a specimen near Salisbury, at Wilton, in May, 1852, and that he "took one in the middle of November, 1860, from laurels here close to our house, and as no reeds were in either place he considered that those examples might have been referable to *decipiens*." Although *F. lesnei* has not been a rare species, still no one else appears to have met with it until Mr. Burr took a specimen at Folkestone, in the Warren, in 1896, and Mr. Donisthorpe one at Wallingford in Berkshire. (See 'British Naturalist' for December, 1897, where Mr. Burr first announced its right name.) Judging by the recent captures at Leatherhead, it appears to be as much an inland as a coast species, although apparently confined to the southern counties.

[*Chelidura* (= *Apterygida*) *albipennis* has also been taken in Norfolk. Only last year Mr. J. Edwards sent to Mr. Burr, for inspection, a pair which he took near Norwich some ten years ago. *F. lesnei* is, in Surrey, by no means confined to Leatherhead.—W. J. L.]

ON ÆGALEUS BECHUANA, A NEW SPECIES OF CIMICIDÆ, REPORTED TO INJURE COFFEE-BERRIES IN BRITISH CENTRAL AFRICA.

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

THE *Strachia* group is perhaps the most injurious, economically, of the Cimicidæ. Usually conspicuously coloured, some of the species do immense damage, particularly to Cruciferous and Rubiaceous plants in both hemispheres. In America, *Murgantia histrionica* (Hahn) ravages cabbages, mustard, radish, turnips, grapes, corn, sunflowers, and Cucurbitaceæ! * while the closely-allied *M. munda* (Dallas) also infests cabbage; and in Europe similar reports have been circulated as to *Eurydema ornatum* (Linn.). In the Oriental region, two species, *viz.* *Antestia cruciata* (Fabr.) † and *Bagrada picta* (Fabr.), have been sent to me by my friend Mr. E. E. Green, Government Entomologist of Ceylon, as injurious to coffee-berries. The genus *Antestia* has also a similar evil reputation in Africa.

A pair of bugs (♂ ♀) have recently been sent me from British Central Africa through Mr. Green, with the report that they were puncturing coffee-berries. Closely related to *Antestia*, a detailed examination shows that they belong to the genus

* See especially Lintner's 'First New York Report for 1882' (1883), pp. 264-71; and U.S. Dept. Agriculture's Tenth Circular (2nd series), 1895, pp. 1, 2.

† Quoted in Nietner's 'Enemies of Coffee Tree' (1861), p. 18 [revised edition, p. 13], under the name of *Strachia geometrica*, Motsch.

Ægaleus, Stål (of which four species, all from Africa, were previously known), and are apparently as yet undescribed. The details upon which *Ægaleus* has been separated from *Antestia* appear trivial enough, even in the much discredited Cimicidæ, but as Lethierry and Severin (Cat. Hém. i. 175) follow Stål, I have also fallen into line.

Ægaleus bechuana, sp. n.

Densely punctured. Head longitudinally somewhat convex. Tylus passing a little beyond the juga. Second segment of abdomen destitute ventrally of a spine or tubercle. Thorax with the antero-lateral margins slightly rounded. Scutellum somewhat wide at the base ("apex," auctt.!).

♂. Sixth segment beneath roundly excavated, the apical margin continuing in a curve to the lateral margin; apical margin of fifth segment distinctly angular in the centre.

♀. Sixth segment deeply roundly excavated, apical margin turning off at an angle at the connexivum; apical margin of fifth almost angular in the centre.

Long. ♂ $7\frac{3}{4}$ mm., ♀ 8 mm.; lat. ♂ $4\frac{3}{4}$, ♀ 5 mm.

British Central Africa (through E. E. Green), on coffee [No. 49].

Shining black; juga, antero-lateral margins of pronotum (except posteriorly), a central anterior spot on the pronotum, two large spots near the base of the scutellum, base of exocorium, apical margin and an elongate spot near the middle of the exterior margin of the corium proper, greater part of under side of head, apices of femora broadly, basal segment [others broken] of antennæ, &c., orange yellow. An interrupted longitudinal line on tylus, basal margin of head, sublateral margin posteriorly of the antero-lateral margin of pronotum, four longitudinal abbreviated lines on pronotum, a central longitudinal thin streak on the middle of the pronotum (the anterior part cutting through the orange yellow round spot before-mentioned); the lateral margin (basally), a short line in the middle close to the anterior margin, and the whole of the base ("apex," Stål) of the scutellum; base of corium and a spot in the middle of exocorium; apical half of each connexival segment above; venter (ground colour); basal half of femora—luteostramineous. [Ground colour of elytra black, with a reddish tinge.] Apical half of membrane hyaline, wings infuscate with a greenish tinge. Femora with a black spot between the apical orange yellow and the stramineous basal part; tibiæ and tarsi infuscate. Lateral margins of abdomen beneath irregularly chequered with black (or dark green), stramineous (tinged partly with luteous), and fuscous; the second to sixth segments each have an elongate orange yellow spot sublaterally, terminated interiorly and exteriorly by brown spots.

Closely allied to *Æ. inermiventris* (Stål) and *Æ. sparmanni* (Stål), but differing by the colour, and probably by the structure; but of the latter Stål has given very meagre details.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

BY W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from p. 32.)

SERICORIS LITTORALIS, *Curt.*—Howth, plentiful at the foot of the cliffs. Mr. Barrett found a second brood in September of the true Irish type—light ground colour, with rich dark markings. Co. Cork (*McA.*); Sligo (*R.*); Tramore, Co. Waterford (*K.*); Belfast (*W.*).

S. FULIGANA, *Haw.*—Minehead, Co. Waterford (*K.*).

S. CESPITANA, *Hb.*—Howth, abundant on the top of the cliffs (*B.*), Minehead, Co. Waterford (*K.*), Sligo (*R.*), Bundoran (*J.*)

S. RIVULANA, *Scop.*—Howth (*B.*), Armagh (*J.*).

S. URTICANA, *Hb.*—Everywhere common.

S. LACUNANA, *Dup.*—Everywhere common.

MIXODIA SCHULZIANA, *Fb.*—Howth, Mourne Mts., Co. Down (*B.*), Carlingford, Armagh (*J.*), Belfast Hills, locally abundant (*W.*). On Lugduff, Co. Wicklow (*G. V. H.*), Galway (*R. E. D.*).

M. PALUSTRANA, *Zell.*—Lugduff, Co. Wicklow (*G. V. H.*); Enniskillen (*P.*).

EUCHROMIA PURPURANA, *Haw.*—Howth (*B.*), Roches Point, Co. Cork (*K.*).

ORTHOTÆNIA ANTIQUANA, *Hb.*—Howth, and Wicklow Mts. (*B.*), Roches Point, Co. Cork (*K.*), Valentine's Glen, Belfast (*W.*), Armagh (*J.*), Sligo (*R.*).

O. ERICETANA, *Westw.*—Co. Cork (*McArthur*).

ERIOPELA FRACTIFASCIANA, *Haw.*—Galway (*R. E. D.*).

CNEPHASIA POLITANA, *Haw.*—Galway (*B.*), Favour Royal, Tyrone (*K.*), Sligo (*R.*), Belfast (*W.*).

C. MUSCULANA, *Hb.*—Wicklow Mts., Favour Royal, Tyrone (*K.*), Armagh (*J.*), Belfast, locally common (*W.*); L. Gill, and Glengarriff (*K.*).

SCIAPHILA CONSPERSANA, *Dougl.*—Belfast (*W.*), Clonbrock, Co. Galway, very dark form (*R. E. D.*). Minehead, Co. Waterford (*K.*); Coolmore, Donegal (*J.*); Portrush, Favour Royal, Tyrone (*K.*); Sligo (*R.*), Howth (*H.*).

S. SUBJECTANA, *Gn.*—Common everywhere. The ? var. *passivana* is common at Howth.

S. VIRGAUREANA, *Tr.*—Dublin Coast, common. Derry (*C.*), Belfast (*W.*), Armagh (*J.*), Enniskillen (*P.*), Sligo (*R.*); Tyrone (*K.*).

S. CHRYSANTHEANA, *Dup.*—Farnham, Cavan (*K.*).

S. HYBRIDANA, *Hb.*—Dublin; Killough, Co. Down.

S. COLQUHOUNANA, *Sta.*—Howth, on the cliffs. Magilligan, abundant, Roches Point, Co. Cork, and other localities on the rock-bound southern coasts of Cork and Kerry; as well as on the rock islands lying three to six miles in the offing, such as the Blaskets, &c. Flies towards midnight, and is attracted by light (*K.*).

SPHALEROPTERA ICTERICANA, *Haw.*—Killarney. Sligo (*R.*); Belfast (*W.*).

CAPUA FAVILLACEANA, *Hb.*—Killarney, Wicklow Mts.

CLEPSIS RUSTICANA, *Tr.*—Killarney. Belfast, local (*W.*), Clonbrock, Co. Galway (*R. E. D.*); Enniskillen (*P.*).

BACTRA LANCEOLANA, *Hb.*—Howth, abundant. Favour Royal, Tyrone (*K.*), Armagh (*J.*), Belfast (*W.*), Derry (*C.*), Sligo (*R.*), Clonbrock, Co. Galway (*R. E. D.*), near Belleek (*J.*).

B. FURFURANA, *Haw.*—Killarney. Roches Point, Co. Cork, one (*K.*).

PHOXOPTERYX SICULANA, *Hb.*—Killarney.

P. UNGUICELLA, *L.*—Glendalough, Co. Wicklow (*G. V. H.*); Favour Royal, Tyrone (*K.*).

P. UNCANA, *Hb.*—Belfast. Sligo (*R.*), Clonbrock, Co. Galway (*R. E. D.*), Co. Cork (*McArthur*), Armagh (*W. F. J.*).

P. BIARCUANA, *St.*—Galway (*C. G. B.*), and Clonbrock (*R. E. D.*), Sligo (*R.*); Favour Royal, Tyrone (*K.*).

P. COMPTANA, *Fröl.*—Sligo (*R.*).

P. MYRTILLANA, *Tr.*—Wicklow Mts., Belfast.

P. LUNDANA, *Fb.*—Common everywhere.

P. MITTERPACHERIANA, *Schiff.*—Roebuck, near Dublin, Belfast, Galway.

GRAPHOLITHA RAMELLA, *L.*—Wicklow Mts., Favour Royal, Tyrone (*K.*), Westport, Mayo (*W.*), Enniskillen (*P.*).

G. NISELLA, *Clerck.*—Wicklow (*G. V. H.*); Enniskillen (*P.*); Hollybrook near Boyle, and Favour Royal, Tyrone (*K.*).

G. NIGROMACULANA, *Haw.*—Sligo (*R.*), Donegal (*J.*).

G. SUBOCELLANA, *Don.*—Killarney (*Meek*), Belfast, abundant (*W.*), Sligo (*R.*).

G. TRIMACULANA, *Don.*—Dublin, Wicklow? Belfast, abundant (*W.*).

G. PENKLERIANA, *Fisch.*—Belfast, Armagh (*J.*), Sligo (*R.*), Powerscourt (*K.*).

G. NEVANA, *Hb.*—Belfast, Derry (*C.*), Sligo (*R.*), Enniskillen (*P.*).

G. GEMINANA, *St.*—Wicklow Mts., Sligo (*R.*).

PHLEODES TETRAQUETRANA, *Haw.*—Generally common.

P. IMMUNDANA, *Fisch.*—Wicklow Mts., Clonbrock, Co. Galway (*R. E. D.*), Sligo (*R.*), Enniskillen (*P.*).

HYPERMECTIA CRUCIANA, *L.*—Enniskillen (*P.*). Dublin, Killarney, common, Sligo (*R.*): Portrush (*C.*).

BATODES ANGSTIORANA, *Haw.*—Killarney, Belfast (*W.*), Enniskillen (*P.*).

PÆDISCA BILUNANA, *Haw.*—Killarney (*K.*), Armagh (*J.*), Clonbrock, Galway (*R. E. D.*), Sligo (*R.*), Enniskillen (*P.*), Belfast (*W.*).

P. CORTICANA, *Hb.*—Howth, Belfast (*W.*), Sligo (*R.*), Enniskillen (*P.*).

P. OPHTHALMICANA, *Hb.*—Enniskillen (*P.*).

P. SEMIFUSCANA, *St.*—Enniskillen (*P.*), Sligo (*P.*).

P. SOLANDRIANA, *L.*—Killarney, Enniskillen (*P.*), Sligo (*R.*), Favour Royal, Tyrone (*K.*).

EPHIPPIPHORA SIMILANA, *Hb.*—Belfast, Killarney, and Favour Royal, Tyrone (*K.*).

E. CIRSIANA, *Zell.*—Coast near Dublin, Sligo (*R.*), Clonbrock, Galway (*R. E. D.*), Collin Glen, near Belfast, abundant (*W.*), Armagh (*J.*).

E. PFLUGIANA, *Haw.*—Dublin, Galway, Sligo (*R.*), Killynon, Westmeath (*K.*), and Killarney, Galway (*R. E. D.*); Donegal (*J.*).

E. BRUNNICHIANA, *Fröl.*—Wicklow Mts., Howth, abundant, Belfast, abundant (*W.*), Armagh (*J.*), Sligo (*R.*), Clonbrock, Galway (*R. E. D.*), Dingle, Kerry (*C. G. B.*).

E. INOPIANA, *Haw.*—Armagh (*J.*).

E. TRIGEMINANA, *St.*—Howth, plentiful, also at Favour Royal, Tyrone; near Donegal, and at Glengariff (*K.*); Belfast (*W.*), Bundoran (*J.*), Sligo (*R.*).

E. POPULANA, *Fb.*—Enniskillen (*P.*).

OLINDIA ULMANA, *Hb.*—Galway, Newcastle, Co. Down, and Westport, scarce (*W.*).

SEMASIA IANTHINANA, *Dup.*—Cork? and Wicklow Mts.? (*C. G. B.*), Sligo (*R.*).

S. RUFILLANA, *Wilk.*—Galway, Howth, and Favour Royal, Tyrone (*K.*).

S. WÆBERIANA, *Schiff.*—Belfast.

COCCYX TÆDELLA, *Clerck.*—Clonbrock, Galway (*R. E. D.*), Sligo (*R.*).

C. USTOMACULANA, *Curt.*—Sligo (*R.*).

C. VACCINIANA, *Fisch.*—Raheny, Co. Dublin (*G. V. H.*); Derry (*W. H. C.*).

PAMPLUSIA MERCURIANA, *Hb.*—Slieve Bingian, Mourne Mts., 2500 ft., abundant (*W.*); Dublin Mts. (*G. V. H.*).

RETINIA BUOLIANA, *Schiff.*—Belfast (*W.*).

R. PINIVORANA, *Zell.*—Holywood, Co. Down; Galway; and Clonbrock (*R. E. D.*).

CARPOCAPSA POMONELLA, *L.*—Cork? Sligo (*R.*).

C. SPLENDANA, *Haw.*—Donegal (*J.*).

ENDOPIISA NIGRICANA, *St.*—Wicklow Mts.?

STIGMONOTA RAVULANA, *H.-S.*—Killarney (*Salvage*).

S. PERLEPIDANA, *Haw.*—Raheny, near Dublin, Armagh (*J.*), Collin Glen, near Belfast, abundant (*W.*), Enniskillen (*P.*), Sligo (*R.*).

S. COMPOSITELLA, *Fb.*—Sligo (*R.*).

S. REGIANA, *Zell.*—Roebuck, near Dublin, and at the Rocka-bill lighthouse, two miles off Skerries shore (*K.*), Armagh (*J.*).

S. GERMARANA, *Hb.*—Killarney.

DICRORAMPHA ALPINANA, *Tr.*—Sligo (*R.*).

D. PETIVERELLA, *L.*—Howth, abundant. Cork? Minehead, Co. Waterford (*K.*). Sligo (*R.*).

D. PLUMBANA, *Scop.*—On the slopes of G.N.R., near Dublin, Howth; Knockagh, Co. Down (*W.*), Sligo (*R.*), Ardahan, Galway (*K.*), abundant.

D. PLUMBAGANA, *Tr.*—Sligo (*R.*).

D. HERBOSANA, *Bar.*—Donegal (*J.*); Belfast Hills.

D. ACUMINATANA, *Zell.*—Howth, Sligo (*R.*).

PYRODES RHEEDIELLA, *Clerck.*—Dublin, Holywood, Co. Down, Armagh (*J.*).

(To be continued.)

ON THE MOULT TO PUPA IN *PTEROPHORUS*.

BY T. A. CHAPMAN, M.D., F.E.S.

THE pupæ in the PTEROPHORINA are suspended by the cremaster only, and are suspended in all attitudes, as, for example, with head upwards or downwards on a vertical surface, or even back downwards under a horizontal one. Being quite ignorant on the point, I desired to see how the hold on the cremaster was obtained, and how the pupa was sustained at the critical moment of quitting the larval hold of the silken carpet. Incidentally, I desired to learn the precise arrangement of the cremaster, which in this family consists of two portions—a forward portion and a terminal one. I have usually considered the forward portion as springing from the eighth abdominal segment, and this proves to be correct; the doubt arises from the fact that in many species the tenth segment appears to stretch forwards anteriorly—does, in fact, so stretch forwards that it almost appears to reach

the anterior group of hooks, and one cannot help a suspicion that it reaches further and actually carries them; in the mature pupa or in the empty case it is not easy to be satisfied that this is not the fact. At the period of the moult it was abundantly plain that the anterior hooks belonged to segment eighth abdominal.

I obtained some larvæ of *Pterophorus galactodactylus*, and was fortunate enough to observe three individuals moulting to pupa. This is a species that pupates beneath a leaf, and therefore often inverted. The moult took place in all three examples about 1 p.m., after some two days' quiescence. The larva spins a slight silken carpet, on which it rests, and which extends about one-twentieth of an inch all round the larva beyond it, and is no thicker at the critical position under the anal segments than elsewhere.

When the moult takes place the larva holds on by the anal prolegs only; the prolegs of the ventral legs stand out stiffly, but the hooks now take no hold of the silk; how this happens I did not ascertain. In many Pierids the body hangs arched away from the silken pad, preventing the ventral prolegs from touching it; but I do not know how this is managed in the Pierids, Papilionids, and Lycænids, where the prolegs touch the pad, as they certainly do in *P. galactodactylus*. The anal prolegs hold well, so that they must be managed differently from the ventral ones. It is less difficult to understand how *all* the prolegs take no hold, as in pupæ in cocoons, &c.

The moulting is done rather rapidly—within, that is, about fifteen minutes from the first efforts noticed. The rhythmic movements, beginning at the last segments, at first push the abdominal segments, about the second to sixth, forwards within the larva skin, as evidenced by the tracheal threads very plainly seen through the transparent skin being withdrawn from the pupal spiracles. When these have passed forwards about one segment, or rather when the larval skin has passed backwards so far, all the abdominal tracheæ are withdrawn more or less, the first not quite a full segment's length. The thoracic segments are now crowded forwards, and the stretching of the larva skin raises the front part of the larva from the surface in a curve. Shortly it is seen that the anal segments of the pupa still occupy those of the larva, and the skin, as it is pushed backwards, gathers in a roll on the eighth abdominal segment. The skin splits dorsally down the head and thoracic segments, but not quite to the hind margin of the third one. The uncoiling of the antennæ from within the larval head is easily seen. The crest of hairs on the pupal wing enables it to be seen occupying its own segment in the larva, and rapidly expanding as it assumes its pupal direction and position. When once the skin splits it slips back rather rapidly, and one has to be alert to see what is happening. It continues to form a roll round the

eighth abdominal segment. Just before the posterior margin of the opening reaches here, the ninth and tenth segments are seen within the larva skin to be actively directing the extremity of the pupa dorsally, and pushing the dorsal part of the roll of larva skin backwards. The pupal extremity thus curls forwards, with a definite step at each vermicular movement, and, before one quite expects it, it appears through the opening dorsally. It is not the stiff spike one knows in the mature pupa, but contorts itself as actively as the same segments in the most lively Tortrix or Tinea larva, bending not only at the incisions of segments, but in their length. It then stretches and pushes over the side of the larva skin, and reaches the silken carpet. The remainder of the pupa then leaves the larval skin, and pushes it away.

The larva of *galactodactylus* has many stiff hairs, and it seemed that the larva, when inverted, maintained its position, and did not swing free, like a *Vanessa*, by the pressure of the hairs of the last segments posterior to the prolegs against the surface of suspension. This does not explain how the problem is met in the smoother larvæ, if, indeed, these do assume so difficult a position. *Agdistis*, for instance, takes usually a vertical attitude, with head downwards.

The larval skin accumulates round the eighth abdominal segment and ventrally remains there, whilst dorsally it is pushed further back by the ninth and tenth segments, which, as I have noted above, thus escape from the dorsal slit in the larval skin, and find the silken pad to which the cremastral hooks on ten become fixed. What prevents the skin going further back ventrally, and what supports the pupa after the cremaster is withdrawn from the larval skin? The same answer solves these two questions. The cremastral hooks on the under side of eighth (abdominal) segment, which, like the anal ones, are already stiff and chitinised, stand out like a brush and form an obstacle to the further progress of the larval skin backwards. One specimen which I arrested, at the critical moment when the cremaster was freed, had these hooks in a sort of pocket of the larval skin, of which the anterior lip was the roll of larval skin, the posterior the margin of the slit in the larval skin, and in some degree the roll of dorsal skin behind this and the inside of the bases of the anal prolegs of the larva.

I have remarked that the last segments are very soft and mobile, and the under surface of eighth being sharply curved and made very convex by the dorsal movements of ninth and tenth, will spread the cremastral hooks of its armature in a radiating manner, so that taken together they form a sort of a knob in the pocket of larva skin, and hold the pupa firmly and safely. It is evident that when the end of the pupa seizes the pad of silk, and the pupa then straightens itself, the radiating hooks will fall together and easily free themselves from the pocket. There

is, however, a second string to the bow. I so interfered with one pupa that it did not secure a grip with the hooks of tenth segment, and then got the hooks under eighth from their pocket. The pupa nevertheless did not fall, but was sustained by the adhesion of the thoracic larval skin to the front of the fifth and sixth abdominal segments, and was so sustained for a considerable time till the pupa reached the silk. It did not, however, do so very satisfactorily, and the hooks of eighth failed to get a proper hold. It would seem that the proper use of this adhesion is to increase the pressure of the hooks of eighth segment against the margin of the pocket, and, after the terminal hooks are engaged in the silk, to steady the pupa, whilst those of eighth segment are freed from the larva skin and fixed on the silken carpet.

In *Hypercallia* and *Anchinia* the method of pupal suspension is precisely the same as in *Pterophorus*; and in these the anal hooks are supplemented by some on the ventral aspect of the eighth abdominal segment in like manner. There can be little doubt that their use is the same as in *Pterophorus*, both to secure safety at the time of moult and stiffness in the pupal position afterwards. Are these instances of the separate origin of complex apparatus and functions, in unrelated species, or is there any possible relationship? The pupæ are certainly otherwise so very different that such relationship must be distant.

Betula, Reigate: June, 1899.

NOTE ON THE COCCID GENUS OUDABLIS, SIGNORET.

By T. D. A. COCKERELL, N.M.Agr.Exp.Sta.

SIGNORET in 1875 proposed the name *Boisduvalia* for Coccids resembling *Dactylopius*, but having four white caudal filaments in the male, instead of only two. Later, he changed this name to *Oudablis*, because he had himself used *Boisduvalia* in 1868 for a genus of Aphididæ. Loew (Wien. Ent. Zeit., 1883) objected to this substitution, on the ground that the *Boisduvalia* of 1868 was a *nomen nudum*; but this objection cannot hold, since there were already genera named *Boisduvalia*, Desv., 1830 (Diptera). and *Boisduvalia*, Montr., 1855 (Coleoptera).

Signoret in 1875 recognised two species of *Oudablis*, both found in France—namely, *O. lauri* (Boisduval) and *O. quadricaudata* (Sign.). Both of these resembled *Dactylopius* in the female having 8-jointed antennæ. Lichtenstein in 1881 added a third species, *O. parietariae* (Licht.), but unfortunately never published a full diagnosis of it.

In 1882 Lichtenstein (Bull. Soc. Ent. France, p. lxxv) recorded an insect found on the leaves of *Rubus discolor*, proposing

for it a new generic name, *Tetrura*. The female was of a dark red purple, much like the Mexican cochineal; and the male, appearing in March, was red, with four white caudal filaments, as in *Oudablis*. Lichtenstein called the insect *Tetrura rubi*, erroneously supposing it to be the *Coccus rubi* of Schrank. Since the latter is in reality a *Lecanium*, it is herewith proposed to employ the name *rubi* for the *Tetrura*, since no confusion will be caused thereby.

So far as Lichtenstein's account goes, *Tetrura* is not separable from *Oudablis*, but he says it is easily separated from that genus by the form of the female, as he intended to explain in detail in a subsequent work, which unhappily never appeared. European coccidologists should have no trouble in recognising the insect when found, and it is to be hoped that before long we may hear of its rediscovery.

The next contribution to the subject of *Oudablis* was an important one by Loew in the 'Wiener Entomologische Zeitung' for 1883. Loew described a new species (*O. piceæ*) found on *Abies excelsa* in the country about Vienna. This insect had in the male the four caudal filaments of *Oudablis*, the posterior ones the longer; but the female had 9-jointed antennæ, like a *Phenacoccus*.

So far, all the species found were European. In 1899 M. d'Emmerez de Charmoy published (Proc. Soc. Amicale Scientifique, p. 42, pl. iii. figs. 3, 3a) an insect found in the island of Mauritius on *Solanum*, calling it *Phenacoccus nivalis*, Maskell. The description of the female given by De Charmoy is practically a translation from that of Maskell; but the figures of both sexes, and the description of the male, pertain to the Mauritius insect, which is evidently distinct from that found by Koebele in Australia, and described by Maskell.

Maskell says the male of his *P. nivalis* has the two usual cottony tails, and two shorter median setæ. The latter, I imagine, were mere naked bristles. The Mauritius insect (male) is figured with four long tails, which are stated in the description to be cottony—that is, the male is that of an *Oudablis*. The female, however, has 9-jointed antennæ, as in Loew's *O. piceæ*.

On October 8th, 1899, at 8.15 a.m., I found some females of *Phenacoccus helianthi* (Ckll.) on *Helianthus annuus* at Phoenix, Arizona. Flying round the plants were what seemed to be a number of little midges, but on capturing some I found they were the hitherto unknown males of *P. helianthi*. These males were pale grey; mesosternum shining yellowish; eyes purplish; wings mealy white, iridescent. But I was surprised to see that they had four white caudal filaments, the outer ones shorter than the inner, but still long.

Thus it appears that both *Dactylopius* and *Phenacoccus* are to be divided into two groups, a normal one with two cottony fila-

ments in the male, and one in which the male has four filaments. If it is worth while to recognise *Oudablis* as distinct from *Dactylopius*, the parallel forms in *Phenacoccus* should similarly be separated, and it is here proposed to call them *Paroudablis*. Typical *Phenacoccus* will include such species as *P. aceris*, and even, so far as the filaments of the male go, the otherwise peculiar *P. yuccæ*. *Paroudablis* will include Loew's *picæ*; De Charmoy's Mauritius insect, which is at present nameless; and my *helianthi*. For the present, however, I would treat it only as a subgenus of *Phenacoccus*; and *Oudablis* may be considered a subgenus of *Dactylopius*.

A word should be added regarding *Phenacoccus socius* (Newstead), found at Wakefield, Yorkshire. The male is said to have "two long and two short white filaments, the latter not reaching beyond the closed wings." This points to a *Paroudablis*. The species is stated to be near *P. mespili*, but to differ in being greenish-yellow. This is almost exactly what might be said of *P. pruni* (Burmeister), but in view of Burmeister's inadequate description, the identity of *pruni* with *socius* could only be surmised, hardly proved.

Mesilla Park, New Mexico: Dec. 14th, 1899.

NOTES AND OBSERVATIONS.

A SECOND GENERATION OF VANESSA IO, Linn.—M. Ude records (Entom. Nachrichten, 1899, xxv. 366) that on Sept. 20th last he found at Rehberge, near Berlin, a number of half-grown larvæ of *V. io* (found as a rule only in May or June, sometimes in July), which produced normal butterflies in due course. The author remarks that in the course of twelve years' collecting he has never before found a second generation of this species.—G. W. K.

EARWIGS BENEFICIAL.—*Forficula auricularia*, Linn., is reported ('Rovartani Lapok,' 1899, p. 175, and appendix, p. 16) to be beneficial by exterminating larvæ of *Cochylis ambiguella*. This supports Rühl's opinion as to the normal diet of the earwig being carnivorous (1887, M.T. Schweiz. Ges. vii. 310).—G. W. K.

THE FLAVOUR OF CATERPILLARS.—"De La Lande—the celebrated astronomer," says d'Isjonvalle, "often supped with me on Saturdays, and found nothing more to his liking than to eat caterpillars and spiders when in season. As my room opened directly on to a fine garden, he easily found the wherewithal to satisfy his first hunger; but as Madame d'Isjonvalle likes to do things well, she used to collect some during the afternoon, to offer him on his arrival. As I always declined my share of this relish, I can only trust to hearsay for the difference in flavour between a spider and a caterpillar. The first, says our astronomer, has a nutty taste, the second a taste exactly like that of stone-fruit." (A. Daguin, in 'Le Naturaliste,' 1899, p. 25).—G. W. K.

OPORABIA AUTUMNATA.—All the specimens of *O. autumnata* that I have taken at Rannoch were obtained in woods, chiefly birch, and the species appeared to be confined to such places. I did not observe it on the moors, even on portions adjoining the woods. If disturbed in the woods and carried by the wind on to the moorland, they quickly make their way back to the shelter of the trees. In this habit they seem to differ from *filiagrammaria*.—WILLIAM M. CHRISTY.

NOTES ON THE NYMPH OF *ÆSCHNA CYANEA*.—From a pond about thirty yards long by four yards wide were taken, last year, seventy-four nymphs of *Æschna cyanea*, of which sixty-one managed successfully their final change, and were set free. Of this number thirty-one were females and thirty males. Quite forty or fifty more nymphs emerged from this same pond, as the empty skins clinging to the rushes fringing the pond remained to testify. The year before last one hundred and fourteen nymphs were taken from the same small pond, all of the same species. Of the sixty-one nymphs observed last year, a very large proportion changed by night, *viz.* fifty-four, as against seven that changed during the day. Of those observed in 1898, the complete record has unfortunately been lost; but of thirty-five emergences, twenty-five were by night and ten by day. The earliest emergence last year was that of three females on June 25th; in 1898 the earliest emergence was July 9th. Of the sixty-one insects set free last year from the first emergence on June 25th to the last on July 28th, every one went right away, and not one was seen near the pond or garden for more than a month. In the autumn, however, the usual number, about five or six perhaps, appeared, but at no time did more than one pair frequent the pond at the same time. On August 6th a nymph of *Æschna cyanea* was found, about three-fourths of an inch long, together with its cast skin, but whether this nymph came from an egg laid by one of the earlier emergences in June could not be determined. This particular pond at South Leigh, Oxfordshire, appears to be entirely monopolised by *Æschna cyanea* and *Agrion puella*. The latter, owing probably to their invisibility on the weed and their habit of lying very still, do not seem to be molested by *Æ. cyanea*. I shall be glad to exchange *Æ. cyanea* for any other nymphs at any time from now to July. The length of the nymphs now (Jan. 25th) varies from half an inch to an inch and a quarter.—ARTHUR EAST; South Leigh Vicarage, Witney, Oxon.

ÆSCHNA GRANDIS ON THE WING AT DUSK.—On the evenings of July 12th, 13th, and 15th, from about half-past eight until almost dark, I was much interested in watching a specimen of *Æschna grandis* busily hawking round several apple trees in my garden and in a neighbour's adjoining. It was evidently in quest of *Carpocapsa pomonella*, Linn., which was unusually abundant at the time, as I saw it catch them several times. At Reading, several years ago, whilst netting Lepidoptera at dusk, I unexpectedly caught a male of the same species of dragonfly, which in the uncertain light I had mistaken for a large moth.—A. H. HAMM; 52, St. Mary's Road, Oxford.

[*Æschna grandis* has often been noticed hunting long after the usual time for dragonflies to retire. It appears also that *Æ. juncea* and *Anax imperator* have an inclination in the same direction. It

would be interesting to hear if a similar habit has been noticed in any subfamily other than the *Æschniinæ*.—W. J. L.]

SETTING RELAXED INSECTS.—In the last volume of the ‘*Entomologist*’ (xxxii. 307) Mr. A. H. Rydon asked a question as to the use of cement in setting relaxed insects to avoid springing. The method I have always adopted—and I have set many hundreds of relaxed insects—is to let well alone. If they are well relaxed, and allowed to dry thoroughly on the boards, I do not think Mr. Rydon will find any trouble from springing.—J. C. WARBURG.

BRITISH ORTHOPTERA.—I am engaged in collecting material for a detailed account of the Orthoptera of Great Britain and the Channel Islands, and would very gratefully receive notes as to localities, habits, dates of appearance, &c., from different parts. List of captures from Ireland would be especially welcome.—MALCOLM BURR; Dormans Park, East Grinstead; February, 1900.

COLLECTING AND REARING DRAGONFLIES, &c.—In a short paper, published during 1899 by the Smithsonian Institution, Washington, U.S.A., Dr. J. G. Needham gives some interesting directions for collecting and rearing dragonflies, stoneflies, and mayflies from the nymph. For this purpose he divides the nymphs into three groups—(a) those that live on the bottom; (b) those living above the bottom in still or slowly flowing water; and (c) those living in the rapids of streams—and naturally considers that special methods of collecting are required for each group.

For those living on the bottom a garden-rake is suggested to bring to the bank the loose material containing them, especially in small bays and eddies or similar spots; but for mud-loving species a sieve fastened to the end of a long handle is better. Members of the second group may be taken in ordinary dredging nets; but for those inhabiting rapid streams a large net is to be used, and in conjunction with it an instrument consisting of a long handle, terminated at one end by a brush having on its back two hooks. This instrument is used to overturn stones and then brush off the insects, which are carried by the stream into the net held just below. The captures are to be taken home in wet water-weed in a pail. Should imagines be found emerging or on the point of doing so, they and the nymphs are to be placed in distended paper bags, to contain which, as each nymph will require a separate bag, a basket is to be taken to the collecting-ground. No doubt these suggestions are admirable; but unless the ditch or pond is situated near one’s back garden the transportation of the impedimenta would be a serious undertaking.

Dr. Needham suggests breeding nymphs under their natural conditions by pressing down into the mud, in shallow water, a cylinder, about fifteen inches high, made of close-meshed galvanised wire. The cylinder must be closed at the top with a lid of the same material, and of course the cage must be hidden “away from the eyes of the untutored and irreverent.” But something of this kind, to be used in a somewhat different manner, has been suggested before by Mr. Marshman Wattson, who, in England, has paid a good deal of attention to breeding some of the dragonfly nymphs. He has contrived a smaller cylinder

perforated zinc, with a layer of plaster of Paris at the bottom, and covered at the top, if necessary, with a sheet of glass. It is intended to be used in aquaria, and particularly for eggs or very young nymphs. These are to be placed in the cylinder, while the food supply is outside in the body of the aquarium, and, the perforations being small, animals likely to prey on the little nymphs are not able to get in.

Not every one will agree with Dr. Needham when he says that to get good specimens of the largest dragonflies it is easiest to breed them. They will not feed in captivity, and therefore die before their colours are matured.

Besides the points called attention to above, this interesting paper contains many other hints on collecting, breeding, and preserving Neuroptera with aquatic nymphs.—W. J. LUCAS; Kingston-on-Thames, February 10th, 1900.

THE USE OF "FORMALIN" AS A PRESERVATIVE OF INSECTS.—Now that this liquid is coming so much to the front as a universal antiseptic, it behoves entomologists to ascertain how far they can apply it to their own ends with advantage. There appears to be some doubt as to its suitability for preserving museum specimens in place of spirit (see 'Nature,' 61, 204), and, on account of the rigidity imparted to the insects, formalin would be an obviously unsuitable medium in which to collect Coleoptera, or for killing purposes either. On referring to past volumes of the 'Entomologist,' I find that formalin has been used with success to retain the natural form and colour of larvæ and pupæ after death (xxxii. 132, 188), but no account is given of employment as a preservative for the collection, although suggested by Mr. Blandford (xxx. 21). Having myself had some acquaintance with the remarkable germicidal property of formalin, which is stated by some of the best authorities to be second only to sublimate, I have used it to destroy mould among my insects, with results which are to me quite satisfactory. Every entomologist living in a damp locality will know how easily boxes of insects become infested with this plague, and when once established how difficult to eradicate. Painting with sublimate solution is sure but troublesome, and does not add to the beauty of the specimens; carbolic acid also must be applied *directly* to the insect. As far as my experience goes, formaldehyde (of which formalin is a forty per cent. solution in water) is the only substance completely efficacious as a vapour. The method I employ is to render the infested box or drawer as nearly as possible *air-tight*, and to enclose in it a piece of cotton-wool on which are poured from six to twelve drops of formalin according to size. This is then set on one side for a week, when the spores should all be killed. If any mouldy insect is then examined, it will be seen that the mycelium has shrivelled up, and, in the case of Coleoptera, may be removed with a brush. As it is generally more satisfactory to destroy at once Lepidoptera which are attacked to any extent, it is rather as a preventive than a cure that I would suggest its use to collectors of this order. By treating all drawers and boxes two or three times a year in the way recommended, and submitting all fresh specimens to a dose, one may, I think, be reasonably sure of not seeing mould or mites either, though ordinary care is sufficient to prevent the appearance of the latter. A natural

question at once presents itself, *viz.* what is the effect on the colours of specimens? I have made several experiments to ascertain this, and can return a satisfactory answer in all cases except greens. Several species of Coleoptera have been *painted* with the solution, and no alteration could be detected in any except *Cicindela compestris*; this was slightly darkened in colour, but the vapour in a dilute form does not even effect this. The following species of Lepidoptera, among others, were subjected to a strong dose of the vapour:—*Gonoptyryx rhamni*, *Anthocharis cardamines*, *Lycæna icarus*, *Melitæa athalia*, *Arctia caia*, *Orgyia antiqua*, *O. gonostigma*, *Hepialus velleda*, *Euchelia jacobæ*, *Hemithea strigata*. There was not the slightest alteration visible in any except the last named, which was distinctly darkened. The precaution must therefore be taken of removing green Lepidoptera before applying the reagent. Formalin has the advantages of being cheap and readily procurable; it is not a strong poison, and although the vapour has an irritating effect on the eyes and mucous membrane, it is quite harmless and hardly noticeable in the quantity which it is necessary to use; an occasional sneeze when examining one's collection will alone remind us of its presence. It has no appreciable action on pins, in the form of vapour.—W. S. GILLES; Bocking, Braintree, Essex.

CAPTURES AND FIELD REPORTS.

COLIAS HYALE IN 1899.—A friend of mine has just given me a fine male specimen of *C. hyale*, which he took near Ashford on August 31st last. I think it must have been a stray specimen.—S. A. BLENKARN; Clifton House, East Dulwich Road, Jan. 18th, 1900.

SPHINX CONVULVULI IN 1899.—During last season I captured twenty specimens of *S. convolvuli* here. These were taken between August 25th and September 20th. The weather here was unfavourable for this insect, which probably accounts for none being seen after the latter date.—JOHN P. HYDE; The Grove, Portland, Jan. 20th, 1900.

EARLY OCCURRENCE OF ANISOPTERYX ÆSCULARIA.—This evening, January 23rd, a Geometer flew to light at my dining-room window at half-past nine. I went outside, just for the pleasure, as I thought, of once more seeing *Hybernia rupicaprararia*, when, to my surprise, I discovered the moth to be *A. æscularia*. During the many years I have kept a look-out, I have been able to record no earlier date than February 6th, just a fortnight later than in the present instance. It has been exceptionally mild all day (the thermometer standing at 50°), a fact which no doubt accounts for this premature emergence.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex, Jan. 23rd, 1900.

ÆSCHNA CYANEA.—This dragonfly was apparently very abundant during the last summer (1899). Though I observed many specimens flying about, I only secured two: one taken on glass in the greenhouse; and the second flying in through the verandah doors and over the dinner-table was there promptly bottled. These seem unusual visits for such insects. There is little water at this somewhat high elevation (clay), save a few small ponds; and I have previously reported the species

from the valley at Purley, which is a similarly waterless spot (chalk).—W. L. DISTANT; Upper Warlingham, Surrey.

MAMESTRA FURVA.—The specimens of *M. furva* recorded by me in my notes on the "Macro-Lepidoptera of the Galashiels District in 1899" (*ante*, p. 44) were taken at the end of July, not in May, as there stated.—JAMES C. HAGGART.

DWARF VANESSA ATALANTA.—In September, last year, I captured a couple of *V. atalanta*, both of which are very much smaller than the usual size. One measures one inch and a half (37 millim.) in expanse, and the other is only a little larger. Both were captured in a garden at Tendring, near Colchester.—ALAN W. CARDINALL; 18, Cromwell Road, Brighton.

[Such small examples of *V. atalanta* are not perhaps often met with on the wing, but dwarf specimens are not infrequently produced from larvæ reared in confinement.—ED.]

THAMNOTRIZON CINERUS IN THE NEW FOREST.—I took a specimen of this grasshopper in the New Forest, Sept. 20th, 1898.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E., Jan. 12th, 1900.

NOTE ON PHLOGOPHORA METICULOSA.—I obtained two female *P. meticulosa* at Portsmouth, at rest on a wall near electric-light lamps, on Dec. 6th last. They both laid eggs on the following day, from all of which caterpillars emerged on Jan. 1st, 1900, and which are still feeding up on cabbage and wallflower leaves. Both the moths were in good condition.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E., Jan. 12th, 1900.

CAPTURES AT ELECTRIC LIGHT IN CHESTER DISTRICT.—During last year I took the following species, among others, at the electric lights here:—September 3rd, one example of *Cirrhædia xerampelina*, and one of *Epunda lutulenta*; the latter had settled on the ground and been trodden on by someone passing by, but, strange to say, was practically none the worse. *Ennomos fuscantaria* and *E. alniaria* (*tiliaria*) were both extremely common. I also secured one specimen of *E. erosaria*. *Xylophasia monoglypha* (*polyodon*) occurred in hundreds; two of the examples I captured were of the dark form, without any light markings whatever on the fore wings.—T. H. COURT; 7, Cambrian View, Chester.

LEPIDOPTERA AT LIGHT IN 1899.—During the greater part of last season I used a light trap in our garden for the first time; and on the whole the result has proved very satisfactory. Excluding *Micros*, I captured sixty-one species. The first captures were made on April 28th, when I obtained single specimens of *Taniocampa gothica* and *T. stabilis*. In May I took, in addition to several more specimens of the above species, *Spilosoma menthastri* and *Anticlea nigrofasciaria* (*derivata*). Captures became somewhat more frequent in June: *Spilosoma menthastri* turned up in some numbers; and *Hepialus lupulinus*, *Cilix spinula*, *Agrotis exclamationis*, *Noctua festiva*, *Rumia cratægata*, *Odonoptera bidentata*, *Hemerophila abruptaria*, and *Melanippe fluctuata* also occurred. July proved a very productive month, and on favourable nights moths came to the trap in large numbers. On the 30th of the month I captured a specimen of *Orthosia suspecta* in the trap; and on August 2nd another specimen came to light at my window. These have been kindly identified by Mr. C. G. Barrett, to whom they were shown by Mr. Arthur Cottam. Is not this a new species for Hertfordshire? On July 21st I obtained a

specimen of *Calymnia pyralina*; and on the 18th a fine *Plusia moneta* (previously recorded, Entom. xxxii. 212). Other trap captures during the month included:—*Lithosia lurideola* (plentiful), *Arctia caia*, *Bombyx neustria*, *Drepana lacertula*, *Phalera bucephala* (common), *Bryophila perla*, *Acronycta pisi*, *Leucania lithargyria*, *L. comma*, *L. pallens*, *Dipterygia scabriuscula* (pinastri), *Cerigo matura*, *Caradrina morpheus*, *C. alsines*, *Rusina tenebrosa*, *Noctua augur*, *Hadena oleracea*, *Selenia juliaria*, *Halia wavarra*, *Lomaspilis marginata*, *Melanthia ocellata*, *Cidaria associata*, *Pelurga comitata*, and *Aventia flexula*. A few additional species were taken in the trap in August: *Luperina testacea* suddenly appeared about the 8th, and was common for a few nights; and *Lophopteryx camelina*, *Triphæna ianthina*, and *Epione apiciaria* were also noticed. From the middle of August to the end of September I was away from home, and, consequently, was unable to do anything with the trap during that period. In October *Anchocelis pistacina*, *A. lunosa*, and *Miselia oxyacanthæ* were captured; and in November *Asteroscopus sphinx* (one male) and *Cheimatobia brunata*. Several additional species came to light at my window during the season, of which may be mentioned:—*Hybernia marginaria* (common in March), *Xylocampa lithoriza*, *Hadena dentina*, *Calymnia trapezina*, *Ennomos tiliaria*, *Coremia unidentaria*, and *Hydræcia nictitans*.—PHILIP J. BARRARD; Bushey Heath, Herts, Feb. 2nd, 1900.

LEPIDOPTERA IN 1899.—During the exceedingly mild and open winter and early spring which we experienced last year, the common Geometræ which put in an appearance at that season were very abundant in the neighbourhood of Reading. The sawflies in that district were mostly in full bloom during the latter part of March, but nightly attention failed to produce anything worth having. The most curious thing about the early Noctuæ was the extraordinary abundance of *Tæniocampa stabilis*, which outnumbered all the other common moths by at least six to one. About this time a few nice specimens of *Selenia illunaria* were attracted by the lamp in a room.

Early in April a fine specimen of *Vanessa polychloros* was found hibernating in a greenhouse. This butterfly, which appears to be getting scarce, was in remarkably fine condition for the time of year.

The results of collecting during May and the earlier part of June were decidedly disappointing, and, indeed, the only decent insects taken during this period were three *Chærocampa elpenor*, which were captured while hovering over honeysuckle in the garden. About June 13th, when the weather was beautifully fine, *Macroglossa stellatarum* was abundant, but seemed to disappear again until the end of July. Sugaring produced scarcely anything until the middle of July, when *Cosmia diffinis*, *C. affinis*, *Mania maura*, and *Cerigo cytherea* were plentiful. I also took several *Gonoptera libatrix* at sugar about July 20th, which seems to be rather an early date for this species. On July 23rd a full-fed larva of *Smerinthus ocellatus* was brought to me, and on being placed in the breeding-cage immediately disappeared beneath the soil. Rather earlier than this date Pamber Wood was visited with small success, although several *Vanessa polychloros* and one beautiful *Limenitis sibylla* were seen. *Argynnis paphia* was also very plentiful.

Aug. 8th found me at Bude, in Cornwall. The best locality for insects there is the small strip of sand-dunes near the mouth of the haven. As no

posts or trees were available, sugar was applied to the flowers of thistles with good effect. By this method swarms of common Agrotidæ were attracted, especially *A. tritici*, and Geometræ, particularly *Melanippe galiata*, were common. Among other insects taken in this way were *A. suffusa*, *A. exclamationis*, *A. lunigera* (two), *A. segetum* (numerous), and *A. præcox* (two beauties). *Noctua c-nigrum*, *N. baia*, *N. umbrosa*, and numerous Apameas which hung about very late. The most abundant insect during the day was *Macroglossa stellatarum*, which swarmed everywhere. Many came into the house and were captured on the window-frames, and many more were released. I remember counting fifteen of them, hovering over a strip of valerian on the roadside leading down into Boscastle. Only one specimen of *Colias edusa* was seen, but other butterflies were very plentiful; indeed, I never remember having seen so many in one day as I did on Aug. 12th, on the road between Bude and Morwenstow. *Gonopteryx rhamni* was abundant, and *Argynnis paphia* was still in good condition. The common Vanessæ, and especially *V. atalanta*, swarmed. I also noticed several specimens of *Zygæna filipendulæ* flying on the Bude sandhills during the early part of August. The weather throughout this month was remarkably fine and hot.

Having returned to Reading in September, I resumed collecting in that district. The autumn butterflies were plentiful, as was also *Macroglossa stellatarum*. No sugaring was done in the autumn, but attention was paid to the ivy-bloom. Insects were extremely scarce, owing to cold foggy nights. The only moth which was at all common was the ever-present *Phlogophora meticulosa*, while *Cerastis vaccinii* came next. *Vanessa atalanta* was on the wing as late as Nov. 5th, and about this date swarms of *Cheimatobia brumata* and *Hybernia defoliaria* made their appearance in the orchard at night. These moths appear to defy cold, and may be seen flying freely any frosty night. No more insects were captured during the year. It will thus be seen that on the whole the season did not produce much here, though I have heard of others who had better luck.—E. T. B. REECE.

LARVÆ-BEATING IN 1899 COMPARED WITH 1898.—It may be interesting to lepidopterists living in the London district, and who use the beating-tray, to compare the following rough notes on the past two years with their own experiences. Speaking generally, 1899 must be considered, if not better, at least an equal of its predecessor. The localities visited were, with the exception of a few days spent in the New Forest, within the twelve mile radius. *Halias quercana* was scarcer in the generally worked localities, but in a favourite haunt, which I believe is little known and less worked, it was quite as abundant as in 1898, being as usual attended with many common larvæ. *Thecla betulæ*, which in the former year had been exceedingly scarce (only four larvæ being taken), was decidedly plentiful, during four or five excursions upwards of four dozen falling to the tray; the first day, June 10th (when the larvæ were very small), being the most successful. *T. quercus* was more plentiful in the New Forest during the past year, but larvæ of this species very few and far between in the London district. *Liparis monacha*, *Bombyx neustria*, *Trichura cratægi*, *Amphidasys betularia*, *Odontopera bidentata*, and *Cleora lichenaria* were scarcer than in 1898; the latter of course really requires searching for. *Diloba cæruleocephala*, *Notodonta camelina*, *Miselia oxyacanthæ*, *Himera pennaria*, *Uropteryx sambucata*, *Crocallis elinguaria*, *Selenia lunaria*, *S. illunaria*,

were all to be had in moderate numbers, the first five being decidedly commoner. *Notodonta dromedarius*, *Platypteryx lacertula*, *P. falcata*, *P. unguicula*, and *Demas coryli* were in sufficient quantities to be worth working for, but were rarer. *Halias prasinana* and *Catocala sponsa* were conspicuous by their absence, although in 1898 the former was quite the commonest thing on birch. Among other good larvæ taken were single specimens of *Notodonta trepida* and *Boarmia roboraria*. With regard to *Thecla betulæ*, I may add that this species seems to become decidedly common every fourth year, although I have certainly met with not less than three or four larvæ every season.—E. W. LANE; 9, Teesdale Street, Hackney Road, N.E.

NOTES FROM NOTTINGHAM.—During the month of August, 1897, I spent two or three weeks at West Bridgford, Nottingham, and while there noted the following:—The larvæ of *Phalera bucephala* were exceedingly plentiful, and one morning, before breakfast, my cousin and I took over fifty in about five minutes, off a small poplar. I noticed this larva feeding on willow, poplar, lime, and many other trees, including sweet chestnut and rose. I found a few larvæ of *Acronycta psi* feeding on lime. On willows (pollard) growing by the river the larvæ of *Smerinthus ocellatus* and *S. populi* were found, the former being much commoner than the latter. Here I also picked up a full-fed larva of *Cossus ligniperda*, and saw, but did not trouble to take, hundreds of *P. bucephala* larvæ and an occasional *Dicranura vinula* larva. The space in which I found the *ocellatus* and *populi* larvæ was about fifty or sixty yards long, and beyond this not one was to be seen. There, however, *Aromia moschata* was very plentiful. I obtained more than twenty in the space of one hour. This separation of the beetles and larvæ struck me as very curious. Common as this beetle was in 1897, my cousin did not see any at all during the following summer. A specimen of *Dytiscus marginalis* was noted in a rain puddle barely three feet wide and six inches deep.—OSCAR WHITTAKER; Morelands, Heaton, Bolton-le-Moors.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Sixty-seventh Annual Meeting, January 17th, 1900.*—Mr. G. H. Verrall, President, in the chair.—It was announced that the following had been elected as officers and members of Council for 1900–1901: President, Mr. G. H. Verrall; Treasurer, Mr. R. McLachlan, F.R.S.; Secretary, Mr. C. J. Gahan, M.A.; Librarian, Mr. G. C. Champion, F.Z.S.; and as other members of the Council: Mr. Charles G. Barrett; Dr. T. A. Chapman, M.D., F.Z.S.; Messrs. W. L. Distant; H. St. J. K. Donisthorpe, F.Z.S.; F. D. Godman, D.C.L., F.R.S.; A. H. Jones, and R. W. Lloyd; the Hon. Walter Rothschild, D.Sc., M.P., and Messrs. E. Saunders, F.L.S., and C. O. Waterhouse. The election to fill the vacancy on the Council and in the office of secretary, caused by the resignation of Mr. J. J. Walker, R.N., was adjourned to March 7th, the Council having signified their intention to announce at the meeting on Feb. 7th the name of the candidate whom they recommend to be elected. The President delivered an address, in which he reviewed the advantages and disadvantages under which entomologists and other men of science now

labour, as compared with the conditions existing at the beginning of the nineteenth century. He called attention to certain abuses prevalent, instancing, among others, the hasty and ill-digested nature of much of the work now published, the result, as he believed, of the facilities that are given for publication. Having referred also to the vast increase in the number and variety of the publications which a student must consult in order to be fully acquainted with the work done in his special branch of study, Mr. Verrall proceeded to suggest that there should be an international agreement for the purpose, not only of restricting the number of the publications to be recognized, but of exercising some control over their contents, in order that worthless papers might be excluded. In conclusion, he briefly summarised the reforms which he considered most essential to be effected at the beginning of the new century. A vote of thanks, proposed by Prof. Meldola, and seconded by Mr. Blandford, was unanimously accorded to the President for his address, and to the President and the other officers for their services to the Society during the past year. Messrs. Verrall, McLachlan, Gahan, and Champion spoke in reply, and the proceedings terminated.

February 7th.—Mr. G. H. Verrall, President, in the chair.—The President announced that he had appointed Dr. T. A. Chapman, F.Z.S., Mr. W. L. Distant, and Mr. C. O. Waterhouse as Vice-Presidents. He announced the death of William Blundell Spence, who had been a member of the Society since its foundation in 1833, and who was for some years past the only surviving original member. Mrs. M. de la B. Nicholl, of Merthyr Mawr, Bridgend, was elected a Fellow of the Society. Mr. O. E. Janson exhibited examples of *Achias longivideus*, Walk., a remarkable fly from New Guinea, in which the eyes are set at the end of very long stalk-like processes. The specimens showed great variation in the length of the eye-stalks, which in the most fully developed males considerably exceeded the length of the wings. Mr. J. W. Tutt exhibited a series of specimens of *Epunda tutulenta*, including those remarkable variations to which he had referred in his notes on the species, read at a previous meeting. Mr. Champion exhibited a large number of Coleoptera collected by Dr. Chapman, Mr. Edwards, and himself, in July last, in Switzerland. He called attention to the great variation in colour of one or two common species of the Chrysomelid genus *Orina*, and said he believed that the forms known as *O. cacaliae*, Schrank, *O. speciosissima*, Scop., and under other names, all belonged to one extremely variable species. Prof. T. Hudson Beare showed specimens of *Dinoderus minutus*, Fab., obtained from a bamboo basket in his house at Richmond. They were specifically identical with the *Dinoderus substriatus* of Stephens. Mr. H. Donisthorpe exhibited a larva-case of *Clythra quadripunctata* taken from a nest of the red wood-ant, *Formica rufa*. He commented upon the unsatisfactory state of our knowledge as to the food-habits of the larvæ of *Clythra*, and said he believed the larvæ fed upon the eggs of the ant. The President remarked that there was a species of *Microdon* of which the pupa-case had an obvious similarity to the larva-case of *Clythra*, and was, he believed, found in the nest of the same species of ant. Mr. Gahan mentioned, in connection with the genus *Clythra*, that these beetles possess a stridulating organ on the mesonotum, not

along the middle, as in Longicorns and Megalopidæ, but towards the lateral edges, and consisting of two widely separated striated areas over which the edge of the pronotum moves. The stridulating areas were present, he said, in nearly all the genera of Clythridæ, and might almost be regarded as a characteristic of the family. The fact that these beetles stridulate was apparently known to Darwin, who, in the 'Descent of Man,' erroneously stated that the stridulating area was situated on the pygidium.—C. J. GAHAN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*December 14th, 1899.*—Dr. Chapman, F.E.S., in the chair. Mr. Robson exhibited a bred species of unusually large specimens of *Dianthæcia irregularis*, from Tuddenham. Major Ficklin, a specimen of *D. luteago* var. *jicklini*, which he presented to the Society's collection. Mr. Lucas, a specimen of *Somatochlora metallica*, a rare dragonfly, taken by Mr. C. A. Briggs, and presented by him to the Society's collection. Mr. Adkin, examples of *Crambus geniculæus*, taken in his garden, of a much less robust appearance than usual, and with very faintly indicated markings. Mr. Edwards, long series of the following species of *Erebia*, taken by himself in the neighbourhood of Fusio, the Simplon, and the Macugnago:—*E. ceto*, *E. lappona*, *E. goante*, *E. tyndarus*, *E. euryale*, *E. flavofasciata*, *E. melampus*, *E. epiphron*, *E. mnestra*, and a few specimens of *E. ligea*, *E. pronœ*, *E. medusa*, and *E. gorge*. Mr. F. M. B. Carr, a series of insects taken at sugar, including two *Cossus ligniperda*, and about a dozen *Macrogaster arundinis* from Wicken.

January 11th, 1900.—Mr. A. Harrison, F.L.S., President, in the chair.—Mr. Buckstone exhibited larvæ of *Triphana jimbrina*, some of which were of a light form and others of a dark form; and read notes on their growth, mortality, and pupation. Mr. Turner, (1) a specimen of *Periplaneta americana* from the Zoological Gardens, (2) a var. of *Melanippe fluctuata* with the central band only represented by a narrow costal fascia, (3) a specimen of *Abraxas grossulariata* with a large black spot surrounded by a white ring, outside of which the black was nearly continuous. Mr. Lucas, several lantern-slides of well-known scenery in the neighbourhood of Esher. Mr. F. Clarke exhibited a large number of very admirable photomicrographic slides of insect anatomy, including a long series of *Orgyia antiqua*; antennæ of various orders; a few of tongues, feet, &c.; a curious water hymenopteron; numerous ova of various species of Lepidoptera; a few Desmids; and living examples of *Argulus foliaceus*, the parasite of the stickleback.—HY. J. TURNER, *Hon. Report Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*December 18th, 1899.*—Mr. G. T. Bethune-Baker, President, in the chair. Mr. Chas. Pumphrey, 5, Park Road, Moseley, was elected a member of the Society. Mr. Colbran J. Wainwright showed *Physocephala rufipes* from Cornwall, and other Conopidæ and Syrphidæ. Mr. P. W. Abbott, a series of *Nola cucullatella* from London, including two very dark ones. Mr. G. T. Bethune-Baker, a number of Palæartic insects of the genus *Satyryx*—*S. semele* and var. *bischoffi* from Asia Minor; *S. staudingeri* from Samarcand, *S. anthelea* from Asia Minor, and *S. josephi* from the Pamirs, &c.

January 15th, 1900.—The President in the chair.—Mr. R. C. Bradley showed *Halictus lavigatus* from Sutton, and said that it was not a common species locally. Mr. A. H. Martineau, a boxful of Aculeata Hymenoptera, chiefly Pompilidae, including, among other rarities, *Agonia variegata* from Selsley, Glos., and Nevin, North Wales; *Sapyga clavicornis*, a species which was regarded as extremely rare a short time ago, but which he had found at Solihull and various other midland localities, and which appeared to be a more common insect in the midlands than was supposed; also *Calicurgus hyalinatus*, one from Wyre Forest. Mr. G. T. Bethune-Baker showed two drawers of *Satyrus*, including, among other good species, *S. pamirus* and *S. parisatis* from Turkestan; *S. aurantiaca* from the Caspian; and a very fine series of *S. abdelkader* from Algeria. Mr. C. J. Wainwright, a box containing *Chelonia* and allied genera of Diptera.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*Annual Meeting, January 15th, 1900.*—The President in the chair. The Treasurer, Mr. H. Locke, presented his Report, which showed a balance on the right side. The election of officers resulted as follows:—President, S. J. Capper, F.E.S.; Vice-Presidents, B. H. Crabtree, F.E.S., and E. J. Burgess Sopp, F.E.S.; Hon. Secretaries, F. N. Pierce, F.E.S., and Fredk. Birch; Hon. Treasurer, Dr. J. Cotton; Hon. Librarian, Fred. C. Thompson; Council, Dr. J. W. Ellis, F.E.S., Herbert Massey, Rev. R. Freeman, R. Wilding, and H. Locke. The President gave an interesting address on his entomological experiences from boyhood. At his first school his passion for insects got him into scrapes, but when he removed to the Friends' School at Epping this same passion was fostered by some of the masters until it grew into a determined study. On coming to Liverpool he had very little time for collecting, but he became acquainted with Mr. Nicholas Cooke, Mr. C. S. Gregson, and other eminent entomologists. His (for a youth) exceptionally good collection of southern insects filled Mr. Cooke with delight, and was the means of increasing their friendship. Thus, when Mr. Capper at length found time for collecting, they made frequent excursions together to all the noted "localities" of the district, their chief rendezvous being Delamere Forest. His New Forest experiences next occupied Mr. Capper's attention. These and his friendship with the two Gullivers, father and son, he dwelt upon with much pleasure, telling some amusing anecdotes about the latter. He then mentioned his acquaintance with Mr. Alfred Owen, and the acquisition of that gentleman's collection, thus making his own one of the richest in England. Mr. Capper referred to the years 1855, 1870, and 1888, as having been made memorable by the appearance of *Deilephila gullii* on the Wallasey sandhills. The last occurrence was further commemorated by a clever sketch by Mr. C. H. H. Walker, entitled "Liverpool Entomologists on the War Path." This the President described at some length. In conclusion, he referred warmly to the valuable friendships he had formed through the study of entomology, and the happiness he had derived from it personally. A vote of thanks to the President was proposed by Mr. H. Locke, and seconded by Mr. R. Wilding. Mr. H. B. Prince sent for exhibition an

interesting case with the imago, cocoon, and pupal skin of *Cossus ligniperda*, and the hanging puparium of *Uropteryx sambucata*: also a box of sandhill Lepidoptera.—FREDK. BIRCH, *Joint Sec.*

THE ENTOMOLOGICAL CLUB.—Since our last Report (Entom. xxxii. 49), meetings were held as follows:—December 4th, 1899, at Wellfield, Lingard's Road, Lewisham, the residence of Mr. Robert Adkin. January 16th, 1900, at the Holborn Restaurant; Mr. G. H. Verrall in the chair.—R. SOUTH, *Hon. Sec.*

RECENT LITERATURE.

Transactions of the City of London Entomological and Natural History Society for the year 1898. Pp. 68. Published by the Society, November, 1899.

ALTHOUGH rather late in appearance, the 'Transactions' of this Society just to hand are in no way behind previous volumes in the matter of interest. Besides the Reports of Meetings and the President's Address there are five papers, four of which deal with insects, and the first instalment of "The Fauna of the London District." The entomological papers are as follows:—"Some Cicadides," by Ambrose Quail (3 pp.); "On some Heredity Experiments with *Coremia ferrugata*," by Louis B. Prout (9 pp.); "Beetle Coloration," by H. Heasler (8 pp.); "Notes on the Broads," by H. Fuller (3½ pp.). The district list of Lepidoptera is that of Dr. F. J. Buckell, edited, with additions subsequent to 1893, by L. B. Prout. The present portion extends to thirteen pages, and enumerates one hundred and seventy-one species. The arrangement, except as regards the butterflies, is that of the 'Entom. Syn. List,' but the generic nomenclature is not in accordance with that list or any work on British Lepidoptera.

Fauna Hawaiiensis. By E. MEYRICK. Vol. i. pp. 123-275, plates iii-vii. Macro-Lepidoptera. June 8th; 1899.*

In this Part are included all the Lepidoptera, "except the Pterophoridae, Tortricina, and Tineina." 292 species (arranged under forty-nine genera) are described, of which 200 are new; of the former, 261 (= 89 per cent.) are endemic.

The geographical distribution of the genera and species is dealt with at some length, but although such considerations—particularly from a specialist—should receive every attention, due caution in the acceptance of the results is very necessary. Distant exposed,† several years ago, the empiricism of drawing "great conclusions in geographical distribution from generic calculations alone." The specific constitution of the islands is as follows:—

Caradrinina	51 species.
Notodontina	50 ,,

* See also Entom. 1900, pp. 23-4.

† 1878, Trans. Ent. Soc. Lond. p. 173, "Notes on Some Hemiptera Homoptera."

Sphingidæ	7	species.
Papilionina	7	„
Pyralidina	178	„

The general resemblance of the Hawaiian fauna to that of New Zealand is very marked, and its origin seems to have been mainly South Pacific, with admixture of Asiatic and American forms. The author considers that the genera may be grouped under four successive periods of time, viz. :—

(1.) South Pacific in origin, *Sisyrophyta* and *Scoparia* being representative.

(2.) Possibly coincident “in time with the considerable extension of the Hawaiian Islands to the north-west, which seems to have once existed,” with *Agrotis*, *Pyrausta*, &c.

(3.) Under “circumstances much as at present,” with 18 genera.

(4.) Due probably “to the influence of the north-east trade winds,” mainly consisting of wholly apodemic genera.

Of the 257 endemic species (261, less 4 whose distribution is unknown), 173 (= 67 per cent.) are confined each to a single island*; “of the remaining 84 species, 36 have been taken both in Hawaii and Kauai, at opposite ends of the group,” and may therefore be counted as ranging throughout.

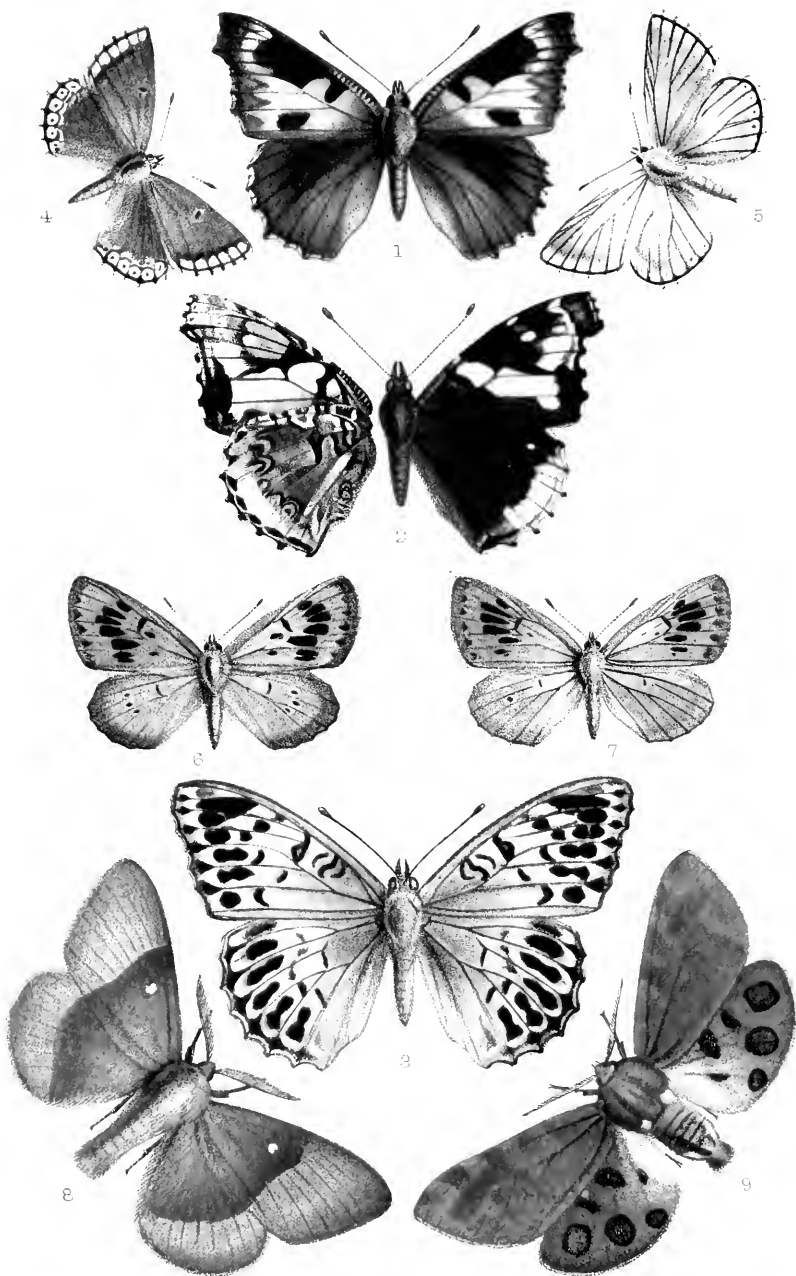
The author echoes the opinion of everyone who has dealt with any part of this fauna in noting the extraordinary variability, structurally and in colouration, of the species. “An unusual proportion of species show strong variability, which in perhaps 15 or more species becomes excessive. . . . The variation of such insects as *Hyphenodes altivolans* and *Lucymatoge monticolans* is quite phenomenal, and the proportion of highly variable forms is certainly much larger than in an ordinary fauna.” A tendency to dull colouring is noted, as also the fact that “in many of the Pyranstidæ there is an unusual tendency to increased development of the dorsal scale-projection towards the base of the fore wings, which is normally inconspicuous.” Mr. Meyrick is of opinion, however, that the latter is of no importance as a test of relationship.

The endemic genera, that is to say, those whose species appear to be entirely confined to the Hawaiian Isles, contain two very remarkable forms, viz. *Scotorythra*, Butler, and “its derivate” *Sisyrophyta*, Meyrick. They are distinguished from the other genera of the Selidosematidæ by their peculiar antennæ, which, in the males, are bipectinate, simple towards the base and on the apical third; in the same sex the posterior tibiæ are more or less “dilated, containing hair-pencil in groove.” Of *Sisyrophyta* 2 species are known, of *Scotorythra* 30 species. Lastly, we call attention to the genus *Scoparia*, Haw., of which no less than 57 species—26 figured—all (according to the author) remarkably constant, are found in the Hawaiian group.

G. W. K.

	Total No.	Peculiar Species.	Percentage.
* Hawaii	128	65	51
Maui	66	26	39
Lanai	32	5	16
Molokai	49	12	24
Oahu	51	17	33
Kauai	97	48	49





F.W. Frohawk del. et lith.

West, Newman chromo

Aberrations of British Lepidoptera.

THE ENTOMOLOGIST

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APRIL, 1900.

[No. 443.

ABERRATIONS OF BRITISH LEPIDOPTERA.

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

PLATE III.

FIG. 1.—*Vanessa urticæ*, ♀. The fine example figured is one of two bred in July, 1896, from a brood of larvæ taken the previous month at Heathfield, Sussex, by Mr. A. W. Peach; both specimens are very similar in pattern. The whole of the remainder of the brood were normal. The one figured, now in the collection of Mr. A. B. Farn, has no trace of the usual blue marginal spots. The second and third costal spots of the primaries are united, forming a large black blotch, and the two usual central black dots are missing; the secondaries are unusually dark, having the upper central area black, and sprinkled with a few red scales in the centre of the wing; the basal half is clothed with fulvous down. On the under side the primaries are fairly normal, but the secondaries are uniformly dusky.

FIG. 2.—*Vanessa atalanta*, ♀. As variation in this species is of rare occurrence, I am pleased to be able to give a figure of such a handsome example as the one represented; it will at once be noticed that the character of the apical white markings is very unusual. The first costal blotch, which in normal specimens is by far the largest, is in this aberration narrowed and cut up into three small spots, the central one being reduced to a few white scales. The amount of white which should occupy this portion of the wing has apparently shifted its position lower down, forming a large white spreading blotch occupying the whole width between the lower radial nervure and second median nervule; below this on the red band is a comparatively large white spot spreading outwards into the black margin; at the

extremity of the red there are a few white scales forming an additional spot; surrounding the white apical blotches are patches of lavender-coloured suffusions, obliterating much of the black ground colouring. The secondaries are equally remarkable, or even more so, as they have a clearly defined white spot situated between the subcostal and upper radial, and the red marginal band is without the usual black spots. The under side exhibits even more beautiful variation than the upper. The costal third of the primary has a bright blue suffusion bordered with black, and most of the lower half of the wing is of a bright rose-red; the white of the apex is of much the same pattern as on the upper side, the great central area of the secondary is clouded with purple-brown and lilac, and towards the anal angle with various shades of lilac, metallic green, and blue; the marginal band is pink shaded with lilac over the apical third, and greenish over the anal fourth. This splendid specimen is unfortunately rather undersized, probably from the larva having had insufficient food in the last stage. It was bred by Mr. B. P. Kemp from one of only three larvæ casually found at Erith, and is now in the collection of Mr. E. Sabine, to whom I must offer my thanks for the loan of such a handsome specimen for figuring. I should add that he informs me that he bred over six hundred specimens of *V. atalanta* last autumn without obtaining anything special in the way of variation among them.

FIG. 3.—*Argynnis paphia*, ♀. As will be seen by the figure, the ground colouring is richer than in the normal female *A. paphia*, and more resembles the colouring of a male in this respect. The submarginal series of black spots are confluent, forming a conspicuous band of markings which become suffused into a large subapical blotch on the primaries; the markings over the median area of the wings, which in normal specimens are the boldest, are in this example much reduced in size. The under side presents no striking variation, excepting that the black markings on the primaries are considerably reduced. This fine butterfly, which is in very perfect condition, was captured on July 11th, 1897, in New Park Enclosure, New Forest, by Mr. A. W. Peach, who has kindly placed it at my disposal for figuring.

FIGS. 6, 7. — *Lycæna arion*, ♀ ♀. These two handsome specimens have both been lent me by Mr. A. B. Farn, selected for the purpose of figuring from his superb series of the species captured by himself in Cornwall in 1896-7. These specimens, from their large size and bold markings, resemble a form of frequent occurrence in Germany; the markings on the primaries form a broad median band. The marginal series of spots on the

secondaries in normal examples are absent in those figured, and the dusky margins blend into the blue, especially in fig. 7, which is without the central dots on the right secondary. The under sides do not show any noteworthy variation.

FIG. 8.—*Bombyx quercus*, ♂. This extraordinary aberration is also in the rich collection of Mr. Farn. It bears a label, "Bred by Purbrook, Brighton." The median pale band is of a light greenish olive, and gradually blends into the marone or purple-brown margin. The under side is similarly coloured to the upper, but somewhat paler.

FIG. 9.—*Arctia caia*, ♂. I am again indebted to Mr. Farn for the loan of this splendid insect, which he bred on Oct. 18th, 1899, from the ovum; the female parent was taken in July last at Greenhithe, Kent. The ground colour of the primaries is pale brown with an indistinct pattern of rusty brown, and dusky markings. The secondaries have the ground colour of a smoky grey-brown, darkest on the margins, and ochreous buff at the base along the inner margin; the metallic blue-black spots are normal, which give a peculiar and beautiful harmony of colouring to the specimen. On p. 33 of Newman's 'British Moths' a variety of *A. caia* is figured, apparently agreeing closely to the above.

January, 1900.

[Specimens of *V. urticae* with the markings on the primaries somewhat resembling those in the example represented by Mr. Frohawk are figured in Newman's 'British Moths,' p. 52, and in the 'Entomologist' for 1896 (vol. xxix. p. 73); while a very similar aberration is depicted in the 'Iris' for 1890, pl. ii. fig. 6.

| The extremely pretty aberration of *V. atalanta* from Mr. Sabine's collection very closely resembles an example of the same species from Jersey which was figured in the 'Entomologist' for 1893 (vol. xxvi. p. 27); but it still more nearly corresponds with a specimen figured in the volume of the 'Iris,' cited above (pl. ii. fig. 3). Neither of the last mentioned, however, have the white spot on the upper surface of the secondaries, and the under surface of each of them is far less variegated.

A male specimen of *A. paphia* from Germany in Mr. Leech's collection agrees very closely with the female aberration now figured by Mr. Frohawk.—ED.]

LYCÆNA CORYDON VAR. *FOWLERI*, NOV.

PLATE III., figs. 5 ♂, 4 ♀.

BY RICHARD SOUTH.

MR. J. H. FOWLER (Entom. xxxii. 269) recorded the capture, on the Dorset coast in 1899, of some forms of *L. corydon*. As the descriptions of these varieties did not accord with any modification of the species with which I was acquainted, I wrote to him about them. In reply he most kindly sent me a fine series for examination, and for this courtesy I am very greatly obliged to him, as I am thereby enabled to have figured an exceedingly interesting form of *L. corydon*. The male examples with orange markings on the outer margin of hind wings are curious, but the most striking form is that represented by figures 4 and 5 on Plate III. In this form, of which there are six males and one female in the series, the remarkable feature is that the border of the outer margin is white instead of the usual black; the inner limit of this border is, on the fore wings, defined by a dusky shade, and the black nervules break up the border into six spots; on the hind wings four or five of the white spots are centred with black dots. Three other male examples and two females exhibit gradations between the form figured and typical *L. corydon*.

BUTTERFLIES COLLECTED IN THE SOUTH OF FRANCE,
AND IN CORSICA.

BY HENRY CHARLES LANG, M.D., &c.

THE places collected in last year were Avignon, near the Pont de Gard (one day only, June 16th); Digne, from June 18th to 23rd, and again from July 18th to 20th; Saint Martin Vesubie, from June 28th to July 7th; Corsica (Vizzavona and Bastia), from July 9th to 14th; Nice (Vallon obscur), June 25th and on July 15th; Annot, Basses-Alpes, one day, July 17th. I have referred occasionally to species taken in the spring of 1898.

PAPILIONIDÆ.

Papilio podalirius. — Generally common; Digne, abundant on Col de St. Vincent, St. Martin, Nice, Avignon. Not seen in Corsica.

P. alexanor. — First taken at Digne, June 20th; right bank of Bleone; afterwards, July 18th to 20th, abundant in a valley opposite the thermal springs. (Some specimens very large.) Three only at St. Martin.

P. machaon.—Digne, common in the same locality as *P. podalirius*; Nice, St. Martin.—Var. *aurantiaca*. Once at Vizzavona.

Thais medesicaste.—One specimen at St. Martin, June. A very late appearance.

Parnassius apollo.—Digne, common; St. Martin Vesubie, on the route de Madone. The commonest butterfly in many places.

P. delius.—St. Martin, at the Madone de Fenestre, 6000 ft.

PIERIDÆ.

Aporia crataegi.—Not rare at Digne, St. Martin, and Nice.

Pieris brassicæ.—Found in all the localities.

P. rapæ.—Found in all the localities.

P. napi.—Digne and St. Martin.

P. daphnidice.—Digne and St. Martin.

Anthocharis cardamines.—Three or four at St. Martin.

A. eupheoides.—One specimen at Nice on June 25th. Late appearance. I found it at Digne, Nice, and St. Martin in May, 1898.

A. belia.—Too late for type, but it was common at Nice and Digne in May, 1898.

A. belia var. *ausonia*.—One at Digne, July 18th.

A. simplonia.—St. Martin, April and May, 1898; common.

A. tagis var. *bellezina*.—Over; it is locally common at Digne in April and May, 1898.

Leucophasia sinapis.—Found in all the localities.

L. duponcheli var. *astiva*.—Digne, July 1st. The spring brood common at Digne, May, 1898.

Colias hyale.—In all the localities.

C. edusa.—In all the localities.

Rhodocera rhamni.—Digne and St. Martin.

R. cleopatra.—In all the localities but Corsica, where I did not see it.

LYCÆNIDÆ.

Thecla spini.—Digne and St. Martin; common.

T. ilicis.—St. Martin, Digne; very common; at Avignon abundant.

T. rubi.—Digne and St. Martin, abundant. (In April, 1898, I found this species and *Lycæna melanops* the commonest butterflies at Digne.)

T. roboris.—I took one specimen of this rare insect at St. Martin, and saw several others at the beginning of July. It was also taken by Miss M. Fontaine and Mr. Rowland Brown at Digne (Eaux-chaudes).

Polyommatus virgaureæ.—Common at St. Martin.

P. hippothoë var. *eurybia*.—Frequent in elevated meadows at St. Martin; route de Madone.

P. doris.—Digne and St. Martin; not very common.

P. aleiphron var. *gordius*.—Digne, St. Martin, Annot; common.

P. phleas.—In all the localities; in Corsica as a dark form approaching var. *eleus*.

Lycæna telicanus.—A male and female at Nice, near the entrance of the "Vallon obscur," June 25th.

L. argiades.—Three specimens at Digne, June.

L. agon.—In all the localities; generally common. At Vizzavona, Corsica, a small local form.

L. argus.—In all the localities.

L. orion.—Two at Nice. Commoner earlier in the season.

L. baton.—Digne and St. Martin; a few good specimens, but generally *passé*. It was very abundant at Digne in April and May, 1898.

L. eros.—One specimen at St. Martin.

L. icarus.—Common in all the localities. In Corsica with a light under side, and a very bright ante-marginal orange band on hind wings.

L. astrarche.—Digne, a few only.

L. eumedon.—One specimen at St. Martin.

L. amandus.—Fairly common at St. Martin, and two or three at Annot. Only one female.

L. escheri.—Abundant at Digne and St. Martin; settling in numbers on puddles in company with *Syrichthus carthami* and *Melanargia procyda*.

L. bellargus.—Digne, St. Martin, Nice; not common.

L. hylas.—Digne, St. Martin; fairly common.

L. corydon.—Digne, Avignon, St. Martin.

L. meleager.—Common at St. Martin in some localities off the Nice road. At Digne the male abundant, female rare.—Var. *stevenii*. One taken on the Nice road between St. Martin and Roquebillière.

L. ripartii.—One at Digne, July 19th (hardly out).

L. argiolus.—Digne and St. Martin; not very common. At Vizzavona with a very light under side and small spots.

L. sebrus.—Only at Digne (getting worn), June; commoner earlier in the year.

L. semiargus.—Digne, St. Martin; common. A few at Nice and one in Corsica.

L. minima.—Digne and St. Martin; not common.—Var. *lorquinii*. Two males at Digne.

L. cyllarus.—Only at Digne, June; common earlier.

L. melanops.—A few at Digne at the beginning of my visit (it is very abundant at the end of April and in May).

L. arion.—Digne and St. Martin; locally abundant.—Var. *obscura*. Occasionally at Digne and St. Martin.

ERYCINIDÆ.

Nemeobius lucina.—Only three at Digne; rather worn.

LIBYTHEIDÆ.

None seen. *L. celtis* occurs at Digne, probably on cherry.

APATURIDÆ.

None seen.

NYMPHALIDÆ.

Limenitis camilla.—Common near the Pont de Gard, Avignon; also at Digne, flying near streams; none elsewhere.

Vanessa egea.—One at Digne, near baths; one at St. Martin, Venanson Road; and one at Vizzavona.

V. c-album.—Digne, St. Martin, Vizzavona.

V. polychloros.—Digne and St. Martin; not common.

V. urticae.—In all the localities except Corsica. I was too early for *ichnusa*, which appears at Vizzavona about July 20th.

V. antiopa.—None on this occasion; hibernated specimens common at Digne, April, 1898.

V. io.—Not common; a few at Digne, and also at Vizzavona.

V. atalanta.—Digne, St. Martin, Vizzavona. At Digne it seems to emerge early in the season, as I found it fresh there in April, 1898.

V. cardui.—I only saw this once, at Vizzavona; probably too early for it.

Melitæa didyma.—Digne, St. Martin. One remarkable aberration at Digne, July 19th.

M. aurinia.—Was common at St. Martin in May, 1898 (var. *iberica*); a few worn specimens at Digne.

M. cinxia.—Three at St. Martin.

M. phoebe.—Digne and St. Martin; common. Annot (abundant).

M. parthenie.—Digne and St. Martin; not rare.

M. athalia.—Digne and St. Martin.

M. deione.—Digne and St. Martin; three or four.

Argynnis euphrosyne.—A few in the above two localities.

A. selene.—A few in the above two localities.

A. dia.—Only at St. Martin; not common.

A. amathusia.—St. Martin, above the Boreon waterfall, and Madone de Fenestre.

A. daphne.—Digne, near the baths; St. Martin, on the route de Madone, and Venanson Road; not common.

A. latonia.—Digne, Avignon, St. Martin, and at Vizzavona.

A. elisa.—At Vizzavona; fairly common in the pine forest, and on the road to Tattonne.

A. aglaia.—Only at St. Martin, at high elevations.

A. adippe.—St. Martin; very large and bright at Digne. No *cleodoxa* seen.

A. paphia.—Digne, St. Martin, Vizzavona.

A. pandora.—One fine green-coloured female at Vizzavona, another at the railway station at the same place, a third seen on the station platform at Vivario.

SATYRIDÆ.

Melanargia galatea.—Digne and Avignon; mostly very common.—Var. *procida*. At St. Martin, where it is abundant, replacing type.

M. lachesis.—Six fine specimens at Avignon, near Pont de Gard, June 16th.

M. syllius.—Too late for this species, which I found in profusion on Mount Boreon, and Villefranche, Nice, in May, 1898.

Erebia evias.—Only at St. Martin, at about 4000 ft.; locally common.

E. ceto.—In same localities.

E. euryale.—St. Martin; common locally.

E. stygne.—St. Martin; only one specimen.

E. epistygne.—Too late for this; common at Digne in April, 1898, on the Montagne de St. Vincent.

Satyrus hermione.—Digne and St. Martin ; common.

S. circe.—Avignon, Digne, Annot ; very common in the last locality.

S. neomiris.—Common between Vizzavona and Tattone, and in fresh condition.

S. semele.—In all the localities except Corsica, where it is replaced by var. *aristæus*. Vizzavona ; not very common. Two at Bastia.

S. cordula.—Abundant at Digne, in same locality as *P. alexanor*.

S. jidia.—Digne ; one fine specimen on outskirts of town, July 18th.

Pararge mæra.—St. Martin, common ; in chestnut woods, &c.

P. megera.—Common in all the localities except Corsica, where it is replaced by var. *tigelius* ; common at Tattone and Bastia, a few seen at Vizzavona. Seems to prefer lower elevations.

P. egeria.—The typical form taken at Digne and in Corsica. At Nice and St. Martin it is much lighter, intermediate between *egeria* and *egerides*.

Epinephele ianira.—In all the localities.—Var. *hispulla*. At Digne, Nice, and in Corsica.

E. lycaon.—Digne ; locally common.

E. ida.—Avignon, common ; Nice (" Vallon obscur"), and at Bastia.

E. pasiphaë.—Only at Avignon, where it was common near the Pont de Gard.

E. tithonus.—Digne and Bastia.

E. hyperanthus.—Only at St. Martin.

Cænonymphe arcanius.—Digne and St. Martin ; common.

C. dorus.—St. Martin, but more abundant at Digne.

C. corinna.—Very abundant in Corsica between Vizzavona and Tattone. I did not see it near the coast.

C. pamphilus.—Digne, St. Martin, and Corsica.

HESPERIDÆ.

Spilothyrus althææ.—One specimen of this not very common butterfly on the bank of the Rhone at Avignon.

S. lavateræ.—Digne, St. Martin, Nice ; common on mountain paths, Annot.

Syrichthus carthami.—Common at Digne and St. Martin.

S. serratulæ.—Digne and St. Martin ; rare.

S. alveus var. *cirsii*.—One at Annot.

S. sao.—Digne and St. Martin ; fairly common.

Nisoniades tages.—A few seen at Digne.

Hesperia thauwas.—Digne and St. Martin ; common.

H. lineola.—Digne and St. Martin ; common.

H. actæon.—Nice ; abundant in " Vallon obscur " ; St. Martin.

H. sylvanus.—Digne and St. Martin.

NOTES ON CERTAIN SCOPARLÆ.

BY H. GUARD KNAGGS, M.D., F.L.S.

THOUGH our best entomologists have, for considerably more than a quarter of a century, recognised *Scoparia atomalis*, Dbld., *basistrigalis*, Knaggs, and *ulmella*, Knaggs (Dale MS.) = *conspicualis*, Hodgkinson, as species distinct from *ambigualis*, Tr., there are still several who fail to distinguish the characters which separate them, the difficulty, as I pointed out many years ago, probably arising from the retention of poor specimens, and the mixing up of species in collections. It is therefore my purpose further on in these notes to suggest a method of regarding them which was found, in years gone by, to be very serviceable to my friends and myself, and which may in the future be useful to others; but first let us compare each separately with *ambigualis*, T., and begin with *atomalis*, Dbld., which most nearly approaches that species.

I am aware that those observant entomologists, Messrs. Banks and Briggs, for whose opinion I entertain the greatest respect, having satisfied themselves as to connecting links between *ambigualis* and *atomalis*, regard them as identical; and certainly, in the gradations of their sombre tints, and the inconspicuity of their markings, their examination is very perplexing; but neither of these gentlemen makes any reference to the shape of the fore wings, which to my eye is, in *ambigualis*, broader transversely between the costa and anal angle, giving the wing a somewhat triangular form; while in *atomalis* the corresponding part is narrower, and consequently the wing appears to be proportionately longer. There also seems to be a greater difference between the respective fore wings of the sexes of *ambigualis* than in those of *atomalis*. To my fancy these insects, even when occurring in the same locality, whether in England (as Cumberland), Scotland (as Rannoch), or Ireland (as Sligo), may be separated by this character, not to mention, as a corroboration, the relation of the claviform stigma to the first line; for I quite agree with Mr. Banks that, although it is about as unusual to find the claviform stigma attached to the first line in *ambigualis* as it is to find it detached in *atomalis*, the occurrence is not of a sufficiently



S. ambigualis, ♂ and ♀.

character, not to mention, as a corroboration, the relation of the claviform stigma to the first line; for I quite agree with Mr. Banks that, although it is about as unusual to find the claviform stigma attached to the first line in *ambigualis* as it is to find it detached in *atomalis*, the occurrence is not of a sufficiently

constant nature, alone, to constitute a specific distinction. This character is much more reliable in such species as *murana*, and in less degree in *cratægalis*, though Mr. Meyrick applies it to *basistrigalis* and *ulmella*, which looks as if he had never seen these species, for in the former the detached claviform occurs so seldom (four or five per cent., say, and then perhaps only on one side), while in the latter it never occurs, so far as I am aware.

Perhaps it should here be mentioned parenthetically that some time ago my friend Mr. Sidney Webb kindly lent me the whole of his collection of this group, thus enabling me to compare hundreds of specimens from all parts of the United Kingdom.

Then, again, *ambigualis* seems to be more variable in size than *atomalis*, southern specimens running larger, northern ones about the same size; but *S. dubiella*, Gregson, which I take to be a diminutive form of *ambigualis*, is much smaller than the least *atomalis* I have ever seen, its alar expanse reaching only seven lines. There are half a dozen of this dwarf form, with its dull and undefined markings and detached claviform stigma, in Mr. Webb's collection, but he is unfortunately unable to furnish positive informa-

tion as to the locality in which they were captured, though he believes that the late Mr. Gregson probably took them in one of his favourite hunting-grounds, such as Cumberland, North Lancashire, Isle of Man, or North Wales. It would be very interesting to accurately locate the precise haunts of these puzzling little pigmies.

But if I am right in saying that *ambigualis* is the more variable in size, *atomalis* would appear to be the more variable in markings; the strongly marked specimens here figured hailed from Scotland, but the most striking varieties, in Mr. Webb's collection, are from the North of Ireland. In these the basal and apical areas are very dark, the medial area being of quite a light colour; whilst the tendency to leucomelanic variation in *ambigualis* is just the reverse, namely, dark in the medial area, light in the others. We also sometimes find a similar kind of variation in *basistrigalis*, *mercurella*, *ulmella*, *alpina*, &c.

Again, *ambigualis* has a much wider range of distribution than *atomalis*, the former being ubiquitous from the northernmost Shetland isle to North and Central Europe; while of the latter, Cumberland is, I believe, the most southern limit. I throw out these hints for what they are worth, for, though I do



S. atomalis, ♀ and ♂.

not deny the possibility or even probability of these (let us say "forms") being identical, it does not at present seem to me advisable that my good friend the late Henry Doubleday's specific name "*atomalis*" should be dropped until something definite respecting their earlier stages has been worked out.

The figures here given are reproduced by shadowless photography, talc having been substituted in place of glass, which I recommended in a recent suggestion (*Entom.* vol. xxx. p. 265); the enlargement of all the figures is the same, namely, about two and a half diameters.

A comparison between *basistrigalis*, Knaggs, and *ambigualis*, Tr., is our next consideration. Your older readers will probably remember that in 1866 I described the former species in the pages of the *E. M. M.* (vol. iii. p. 1), and that I then drew attention to the greater width of the fore wing, its rounded apex and vertical hind margin; also to the oblique commencement of the angulated first line, the denticulated second line, the distinct basal streaks, the cilia neatly intersected with black squares, &c.

Messrs. Bankes (*E. M. M.* n. s. vol. i. p. 7) and Briggs (*Entom.* vol. xxii. p. 17; *E. M. M.* n. s. vol. i. p. 51), in their revisions of the Scopariæ, have not yet offered an opinion as to the identity of *basistrigalis* with, or its distinctness from, *ambigualis*, but suspend their judgment until they have seen the insect in a state of nature. Since then some very strong evidence in favour of the specific status of *basistrigalis* has been recorded; in fact, in the very next number of the *E. M. M.* after my friend Mr. Briggs's communication, my old correspondent, Mr. G. T. Porritt, of Huddersfield, contributed a most interesting note (*E. M. M.* n. s. vol. i. p. 88) on the subject, from which I extract the following: "If Mr. Tutt, or any of your other correspondents who doubt the distinctness of *basistrigalis* from *ambigualis*, had seen the former in the numbers I and several other lepidopterists saw it in Edlington Wood, near Doncaster, on Aug. 4th, 1879, I fancy their doubts would have for ever been dissipated. . . . I remember distinctly that on seeing the first specimen on that occasion, although I had never seen the insect alive before, I at once recognised it as *basistrigalis*; and, on calling the late William Prest, of York, who was working some distance from me, he, on coming up and seeing the specimen on the tree, instantly said, '*basistrigalis*.' . . . Although I suppose I have never seen any I was inclined to suspect *might be basistrigalis*." Mr. Porritt refers also to its broader fore wings, as compared with allied species, and mentions its erratic disappearance from Edlington Wood. He adds that Mr. Prest subsequently took it in Bishop's Wood, near Selby.

About five years after this Mr. B. A. Bower, a gentleman who seems to have made *basistrigalis* one of his special studies,

exhibited, at the Entomological Society of London, a wonderful series of varieties of this insect, which created great interest; and later on he contributed an excellent paper on the subject to the E. M. M. (vol. vi. n. s. p. 273). Mr. Bower has had plenty of experience with *basistrigalis*, and says:—"The shape of this species will always distinguish it from *ambigualis*, its fore wings,



basistrigalis, ♂ and ♀.



ambigualis, ♀.

though narrow at the base, being decidedly broader than in that species, with a greatly arched costa, especially so in females. And, again, the time of its occurring would tend to prove it distinct, as, although there is actually no definite period between its emergence and the disappearance of *ambigualis*, the latter has become greatly diminished in numbers and in a dilapidated condition before *basistrigalis* puts in an appearance. Added to which anyone having seen the species in nature cannot but have been struck with the peculiarly robust look of the insect, due to the width of the united fore wings." Mr. Bower says that the moths are not uncommon in one or two Kentish woods, but in these are restricted to a very small area, and even then show a partiality for certain trees. He believes it not to be a moss-feeder, for the reason that he has failed to breed it by placing females in pots of growing moss, whereas *mercurella* and *crategalis*, thus treated, breed freely. He does not agree with the theory that the variation is solely due to more succulent food or damp situation, because most of his captures, dark as well as light, were made in an abnormally dry locality—sand on a chalk subsoil. At the end of his paper Mr. Bower

gives a very interesting enumeration of the variations of this species.

Such testimony from two eminent lepidopterists, given quite independently of each other, ought surely to satisfy all who are open to conviction, but I do not despair of eventually bringing home to the minds of the most sceptical the fact that *basistrigalis* and *ambigualis* are distinct species. Ah me! I wish I could feel as I did twenty years ago, just for a season or two, that I might experience the delight of collecting the insect, and distributing it

to all who cared to accept it, so that everybody should know it; as I did with *T. bondii* in days of yore; but, as I cannot do this, it will give me much pleasure to express an opinion upon any supposed specimens of *basistrigalis* which may be forwarded to me for the purpose, although no doubt it is better for the instruction of entomologists that they should each collect, and name their own captures.

To those who would prefer to make their own comparisons between *basistrigalis* and *ambigualis*, I would draw attention to the following points: The greater alar expanse, particularly of the females of the former; the more rhomboidal shape of the fore wings, with their rounded tips and more vertical hind margins; the richer clothing of scales; the more ample hind wings, and their whiter, more pearly, and translucent appearance (through which, in a favourable light, you can distinguish the label beneath), as compared with the decidedly fuscous tone of those of *ambigualis*; this is very distinctive when a series of each, side by side, is inspected; the distinct basal streaks; the oblique commencement of the first line, from costa to orbicular stigma, which if continued would about bisect the anal angle, as compared with the less oblique commencement of the same in *ambigualis*, which if produced would arrive about the dorsal end of the second line; then the greater angulation of the first line, especially the middle angulation, which almost invariably meets the dash-like claviform stigma, is deeper and more acute than in *ambigualis*; the renal stigma more clouded with ochreous brown, the inner lower cornu of the \times mark generally projecting basewards—not so in *ambigualis*: the more distinct denticulation of the second line, which is less inclined to conform to the lines which enclose an angle than in *ambigualis*; the neatly intersected cilia, and other little matters which I shall attempt to explain by and by, which should enable anyone “in the know” to separate these species at a glance.

As for *ulmella*, Knaggs (Dale MS.) = *conspicualis*, Hodgkinson, I do not think that anyone but Mr. Meyrick has been bold enough to assert that it is identical with *basistrigalis* and the others. It has always appeared to me that the sleek natty little *ulmella* was not very closely allied to any of our Scopariæ, but that on the whole it came nearest to *dubitalis*; and in my original description (E. M. M. vol. iii. p. 217, 1867) I placed it between that species and *mercurella* (and fine specimens certainly bear a remarkable though superficial resemblance to the “*phæoleuca*” var. of the latter), while my old correspondent the late Mr. Hodgkinson, who described it quite separately from me, and many years afterwards (Entom. vol. xiv. p. 223, 1881) under the name *conspicualis*, also remarked its affinity to *ingratella* (now considered to be a variety of *dubitalis*), and placed it between that species and *atomalis*. Mr. Hodgkinson made some interesting

remarks as to its appearance in a state of nature. He noted "its peculiar light appearance when on the wing, which readily distinguishes it from any *Scoparia* but *S. pallida*. This may be easily understood by laying a specimen on its back. The under side is all alike, of a creamy satiny spotless white." Again: "It sits triangularly, and may be known from any other of the genus, when at rest, by the peculiarly distinct light first space, standing out as a white dot on the tree the insect is resting on"; hence, I presume, the name *conspicualis*. The imago appears July and August. Mr. Hodgkinson's captures were made at Windermere.

On a former occasion (E. M. M. vol. vi. p. 41, 1869), Mr. Hodgkinson mentions that, fifteen years previous to his note, he took some *Scopariæ* on elm trees in Brockholes Wood, near Preston, which agreed with *ulmella*. They were, however, returned to him as *delunella* = *resinea*; but he was at the time satisfied that they were not that species. He adds that the trees were cut down after he made his captures, so that I suppose he did not meet with it again in that locality. It may be remembered that Mr. Dale's original specimens were taken off the trunk of a wych-elm in a thick wood at East Meon, adjoining Bordean Hanger, in July.

I do not know that I need refer further to the peculiarities of *ulmella*, except to observe that it is the first line which partakes of the character of that of *mercurella*; while it is the stigmata, and particularly the reniform and claviform, which, with their ochreous arrangements, remind one of *dubitatis*, and this is more especially observable in some specimens than in others. Unfortunately photography does not afford an accurate record of ochreous marks, and so we must do without them; but that does not matter, as we have ample evidence without them to show that *ulmella* is neither *basi-*



S. ulmella, ♂ and ♀.



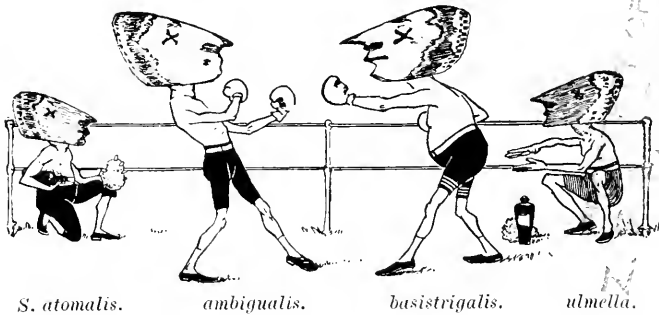
S. basistrigalis, ♀.



ambigualis, ♀.

strigalis, nor *ambigualis*, nor *atomalis*. In comparing two or more species with one another, the same sex should be selected.

I now propose to view these four insects as a group, and in doing so trust that your readers will take me seriously, for I can assure them that I am very much in earnest, though my methods may appear to be grotesque. If the student will look at the fore wing of either of these Scopariæ he will find that the middle and apical areas (that is, the space bounded by the first line, the costa (in part), the hind margin, and the dorsal margin (in part)) present the similitude of a human head, the features looking basewards; humanity, it is true, of a low type, with very receding forehead and deficient cranial development, but still sufficiently appreciable for the purpose we have in hand. The reader will see, by my rough caricatures below, to which I have got Mr. Victor Prout to put respectable bodies and limbs, the portion of the wing to which reference is made, and will be able to clearly define the forehead, eyebrow, bridge of the nose, lower border or septum of the nose, wing or ala of the nose, upper lip, mouth, lower lip, chin, jaw, and cranium, encased in head-gear. I have considered it enough to indicate the position of the eye (renal stigma) with a cross. The long narrow head of *atomalis*



will be noted; the sharp nose, compressed lips, mouth projecting forwards, and the angulated chin of *basistrigalis* compared with *ambigualis*; and the short upper lip, the small mouth, and long straightish projecting chin of *ulmella* will be remarked; but of course, in their examinations, a little allowance must be made for individual variation, since no two animals or plants are ever exactly alike in every respect; the shepherd knows every sheep in his flock by the expressions of their faces; the striped ribbon fescue grass of our gardens, in some parts, goes by the name of "match-me-if-you-can." Now, what I want the student to do is carefully to compare, at first, the photographs accompanying this paper by the light of the suggestions made, and afterwards to examine actual specimens (decent, recognisable ones, mind), when I shall be very much surprised if he does not in future come to regard the Scopariæ with a new interest, and find these

physiognomies of great use in rapidly determining the various species of these insects.

In conclusion, I have to thank Messrs. Auld, Farn, and Gardner for kindly assistance with specimens.

Folkestone : February, 1900.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE AUCHENORRHYNCHOUS HOMOPTERA.

BY DR. H. J. HANSEN.*

ANTENNÆ.

It is evident that in all the Auchenorrhynchous Homoptera, the antennæ are composed of a shaft (or peduncle) and a whip (or flagellum). The peduncle always consists of two considerable segments, of which the first at least *is always destitute of sensory organs* : the flagellum—its base included—is always much thinner than the second segment of the peduncle, and usually consists of several segments, but by amalgamation it sometimes appears to consist of a thicker short basal part, with a long thin tapering non-segmented apical bristle. There does not appear to be any noteworthy distinction between the two sexes in the sensory organs.

○ 1. *Stridulantiæ*.

The antennæ are set in pits between the eyes right under the upper margin of the forehead (*frons*) ; they seem to be singularly uniform in all the species. The segments of the peduncle are simple ; the first is more or less concealed, roofed over in the antennal pit, and is, at least usually, the longest ; the second is *without sensory organs*, and is always considerably thicker than the first segment of the flagellum. The flagellum is fairly long,

* This very important work was published in Danish in 1890, in the 'Entomologisk Tidsskrift' (xi. pp. 19-76, two plates), under the title of "Gamle og nye Hovedmomenter til Cicadariernes Morphologi og Systematik," but scarcely any notice having been taken of it, among English-speaking rhynchotists at least, a free translation of the third, fourth, and fifth parts is now offered to the 'Entomologist.' The learned author, whose knowledge of English is almost as thorough as that of his native language, has been so kind as to look over my manuscript. The original paper, to which the interested reader is referred, was accompanied by two finely executed plates, containing more than fifty figures, illustrating the antennæ, claws, &c., of a number of forms. The more original portion of the paper which is now translated was preceded by a short personal introduction (pp. 19-22), and an historical *résumé* of the classification of the Auchenorrhynchous Homoptera (pp. 22-34). Dr. Hansen's new considerations are drawn principally from the structure of the antennæ and legs, and from the position of the spiracles. The generic and specific nomenclature used in this translation is identical with that in the original work.—G. W. KIRKALDY.

rather thick at the base, and tapering to the apex; it consists (see pl. i. f. 1,* representing *Cicada pruinosa*, Say) of five long, mutually almost equally long, segments; with a lens one can easily perceive the two or three basal (*always mutually long*) flagellum-segments, but in dried specimens the fifth is not always distinguishable separately.

On the under side of the first and second segments of the flagellum there is a very large number of sensory organs. Each of these consists of a pit, from the bottom of which sticks up a blunt spike; these organs are of two somewhat different forms. Some are considerable (fig. 1 a, m), the pits being remarkably wide in proportion to their depth; the spikes are stout, and project somewhat out from the pits. The others (fig. 1 a, n) are much smaller, the pits being narrow and proportionately deep; the spikes are slender, and scarcely project beyond the orifices of the pits.

On the three last segments of the flagellum I have found a few of the smaller kind of these organs.

2. Cercopidæ.

I have microscopically examined the antennæ of a Brazilian *Monecphora*, *Triecphora sanguinolenta*,^o *Aphrophora alni*, and *Philenus spumarius*, that is to say, representatives of the three groups into which the Cercopidæ were divided by Stål ('Hemiptera africana,' iv. 55). I have also examined with a strong lens two examples of *Machærota* (representing Stål's third group), and a large number of examples belonging to various genera of the first two groups. The antennæ have a very close mutual resemblance, both superficially and in their detailed structure, while at the same time differing considerably from the other families. They are always placed in front of the eyes in pits on the forehead close beneath the margin, which, at least just at this place, projects freely, separating the vertex from the forehead. The second segment of the peduncle (pl. i. f. 2 and 3) is subequal to the first, approximately cylindrical, *without sensory organs*, its broad distal end being cup-shaped. The flagellum consists of a single, very thick basal segment, and an extremely fine tolerably long bristle, which is not separated from the basal segment by any articulation in *Monecphora*, while it is somewhat indistinctly articulated in *Aphrophora*. The basal segment is short and obliquely oviform (or almost spherical), its basal part prolonged in a short thin stalk, by which it is fastened to the concave part of the second segment of the peduncle. It has a small number (from six to nine), near the apex on the one side, of simple proportionately very large sensory pits, each with a

* These references are to the plates in the original paper, which should be compared with this translation.—G. W. K.

simple short spike; and one generally finds close to the apex two more or less short (*Tricephora* and *Philænus*) or long (*Moncephora*) thorns, which I have not been able to find in *Aphrophora alni*, in which I found, however, two big pits (f. 3 s), one on each side of the segment, resembling the fastening-place of the thorns, but of whose nature, however, I cannot say anything.

The flagellum has an absolutely different structure in the nymph stages from what obtains in the imagines. In *Philænus spumarius*, Linn., it consists of seven segments (pl. i. f. 4), which, with the exception of the shorter penultimate segment, are nearly subequal in length; the first is very stout, the others tapering towards the apex. The first segment bears a number of small normal sensory organs; similar ones are found also, but singly, scattered about on the 2nd-5th segments. The antenna of the adult is also clearly discernible within that of the nymph; the thick basal segment of the flagellum of the former occupies about half of the capacity of the same segment of the nymph, while the filiform part of the flagellum of the imago extends throughout the far thicker nymphal segment up to the apex.

♂ 3. *Jassidæ*.

Of this mighty family I have examined microscopically the antennæ of *Tettigonia ferruginea*, F., and *obtusa*, F., *Idiocerus populi*, L., male; *Typhlocyba rosæ*, L., *Acoccephalus striatus*, F., *Paropia scanica*, Fall., *Ledra aurita*, L. (imagines and nymphs), *Ulopa reticulata*, F., *Ethalion reticulatum*, L., *Centrotus cornutus*, L., *Membracis tectigera*, Oliv., that is to say, representatives of most of the principal forms. I have examined with a strong lens all the other notable genera known to me.

The antennæ are placed in more or less distinct pits, which in some forms (*Tettigonia*, &c.) are situated before the eyes; but in others (*Idiocerus*, *Ethalion*, &c.) are placed under the eyes very much as in many Fulgoridæ. While they differ very greatly in the various genera, they possess nevertheless a certain family likeness which distinguishes them from the other families (pl. i. f. 5-10). The second peduncular segment is, as a rule, subequal to, or a trifle less than, the first in size. It is often peculiarly sculptured in a scaly-like manner, but is always without sensory organs; its apex never presents such a peculiar cup as that of the Cercopidæ. The flagellum is always clearly multisegmentate, in the first half of its length at least; it is sometimes short and very thick (*Ulopa*, *Centrotus*, *Ethalion*), sometimes long, or very long (*Tettigonia*, &c.), and very thin in the greatest part of its length; but its oval, always somewhat—sometimes greatly—thickened basal part (*Ulopa*) has numerous transverse furrows (or at least tends towards this owing to coalescence of some of

the segments) or consists of from two to six segments which are provided with a few simple sensory organs, consisting of fairly deep small pits, which have a sensory-spike projecting from within. I have never found traces of sensory organs on the remainder of the thin bristle-like segment, except perhaps in the male of *Idiocerus*, in which the apical part of the flagellum forms a large flat oval plate (pl. i. f. 6), on which scattered points appear, which are perhaps peculiar, extremely small sensory organs, but of the nature of which I can say nothing, since my strongest magnifying power (600 times) was quite insufficient. In *Tettigonia ferruginea* (f. 5) the flagellum is very long and fine, except its somewhat thicker but still proportionately very slender sensory basal part (f. 5 a), which clearly consists of five segments, of which the three middle are the shortest, and the last—probably formed by the fusion of two segments—long. The remainder of the flagellum consists of a large number of segments, of which the proximal ones are short, the others longer; each one, however, is somewhat irregularly superficially divided into several extremely short segments (*false segmentation*). The last part of the flagellum is very thin, and in it every trace of segmentation has disappeared. In *Idiocerus populi* ♂ (f. 6) the sensory basal part of the flagellum is of the thickness of the same part in *Tettigonia*, and consists of six segments; the part between the basal segment and the recently mentioned "Palette" is not twice so long as the sensory part, and consists of eighteen to nineteen rather strong and to some extent regular segments, which are not again divided as in *Tettigonia ferruginea*. In *Ledra aurita* (f. 7) the basal part is very similar to that in *Tettigonia*, but consists, however, of only three segments, of which the last is very long. The apical section is shorter and thicker than in *Tettigonia*, but, however, tapers, and is divided from the base to about the middle into numerous small segments, while the remainder is quite without segmentation. In *Ulopa reticulata* (f. 8) the sensory part is extraordinarily thick throughout, and consists of two segments only; but the apical one is very long, and certainly corresponds with more than one in the last mentioned genera; the rest of the flagellum is also thick, though it tapers towards the apex; it is divided into sixteen normal segments, which increase in length towards the apex. In *Centrotus cornutus* (f. 9) the sensory portion is fairly thick, gradually tapering and badly separated from the distal part; its segmentation is not distinct, and is rendered more indistinct from irregular transverse stripes; the rest of the flagellum is coarse, consisting of numerous short irregular segments. In *Æthalion reticulatum* (f. 10) the flagellum is formed very similarly to that of *Centrotus*; the sensory section is, however, separated more distinctly from the rest, which is proportionately somewhat thinner. In *Membracis tectigera* the sensory parts are formed as

in *Ethalion*, but are a trifle shorter, more oviform, and more distinctly separated from the proportionately longer and thinner apical part, which consists, as in *Ulopa*, of numerous regularly disposed segments. In *Paropia scanica* and *Acocephalus striatus* the sensory parts are slender and clearly divided into six segments; the rest of the flagellum is, in *Acocephalus*, almost identical with *Ledra*; in *Paropia* it is longer, and segmented regularly up to the apex.

In sexually immature forms (of which I have examined *Ledra* and two of our indigenous Jassinæ (sens. lat.)), the antennæ do not deviate in structure to any essential extent from the sexually matured.

(To be continued.)

DIPHYLETISM IN THE LEPIDOPTERA.

BY A. RADCLIFFE GROTE, A.M.

IN letters to me Dr. T. A. Chapman proposes to call in the future my numbered vein "IX." of the fore wings in the Papilionides, "Grote's vein," since upon the presence of this vein I have based a separation of the swallow-tail group from the rest of the butterflies, and because also a name which is noncommittal is useful when applied to an organ the homologies of which are doubtful, as in the present instance. At the same time, Dr. Chapman suggests that this vein may be not the third anal, which from its position it might seem to be, but the fourth in the series of internal veins on the primary wing.

While in my original papers I disputed the homology of "Grote's vein" with the "fork" of the Hesperiadæ, which Prof. Comstock regards as the remains of the third pupal vein, it did not occur to me that it might be the fourth, since there seemed no space between "Grote's vein" at base and the second anal to admit of an intercalary longitudinal vein. In my paper on the "Descent of the Pierids," I have given a tentative sketch of a genealogical tree of the Hesperiad phylum, deriving it from an ancestry in which four anal veins on either wing were present, and which would conform with ontogeny. But this four-veined state, now observed in the pupal wing, represents in reality a common ground upon which the existing types of lepidopterous wings have arisen by specialization through reduction. That, in the Hesperiadæ, the fourth vein appears in the pupa, is no proof that the Papilionides have the same origin, since we have to do with a general character shown also by moths in ontogeny. It seems to indicate rather that the diurnal branch referred to sprang directly from a hypothetical Tineid-like ancestry, as I have suggested in the paper already mentioned. Thus the Hesperiadæ,

Sphingides, Saturniades, Bombycides (Agrotides) are possibly converging groups. Now the hypothetical ancestor of the Papilionides must have already differentiated in the direction of retaining "Grote's vein" in the imago. But no other offspring appears, except what seems the probable culmination of the line in the existing swallow-tail group. If the fourth anal vein in the pupa of *Pieris* or *Vanessa* were really related to "Grote's vein," it would be succeeded in the imago by an arrangement of the inner veins, recalling that of *Papilio*. But it is not; and the resultant imaginal wing agrees in this respect with that of *Hesperia*. Perhaps survivals of the ancestry of *Papilio* may turn up among the lower moths of the tropics in the Eastern Hemisphere, where I look for the arising of the Papilionides to have taken place.

The neuration of the swallow-tails, especially that of the more generalized Ornithoptera, has a peculiar impress when compared with that of other butterflies. There is not the same tendency to approach the Hesperid type with divided veins, which we find, for instance, in *Charaxes*. The shape of the discal cell and arrangement of the median branches is *sui generis*. The object of my studies on the wings of the butterflies was really, however, attained with a demonstration that, in a linear arrangement, the swallow-tails cannot be intercalated between the "blues" and the "skippers," as proposed by Mr. Scudder and other authors. Also that the blues and skippers are, at whatever distance, connected groups. To show that the Lycænid wing was a natural development out of that of *Hesperia*, and that the wings of the Nymphalid and Pierid were both related and might have well proceeded out of the wings of ancestral forms of the Lycæni-Hesperid branch—this was the task set before me. If accomplished, it followed, without saying, that the Papilionides (which I also showed to be more specialized than commonly believed) should take the lead in our catalogues. But the matter has now gone further, and out of it has grown a question of diphyletism in the Lepidoptera, hitherto unbroached.

I do not recognize the relationship of the Papilionides to the Pieri-Nymphalidæ, as urged by Dr. Chapman or Mr. Quail, either on account of the retention of residuary characters, *i. e.* the cubital cross vein of primaries, or the first radial branch of secondaries closing outwardly the humeral cell, since these are common to the order; or on account of the retention of fourth anal of primaries in pupal wing of *Pieris* and *Nymphalis*, because this is also a common generalization, and in this case progresses by a disappearance in the imaginal state, not shared in by the Papilionides. The Nymphalids and Papilionides do not fit together; they appear disjointed, having attained diverse total stages of specialization. But all the groups of the Hesperiades seem to fit together.

The Papilionidæ and Nymphalidæ are in reality quite out of focus with each other. The specialization of the former is cubital, of the latter radial. The incongruity between the two should be felt by the naturalist. The correspondences are due, in my opinion, to convergence.

My general defence for my classification of the diurnals lies in the fact that we cannot interpolate the Papilionides at any point without breaking a continuous succession of forms having certain leading characters in common. My general defence for a diphyletism of the diurnals, not previously urged by any author, lies in the fact that the direction taken by the specialization of the anal veins in the Papilionides is unique. The families of the Hesperiaes appear to converge in an ancestral type to the exclusion of the Papilionides. The convergence of the butterflies is already assumed by Dr. Chapman.

In the following table of characters, by which I separate the diurnals into two series, I do not undertake to settle the homology of the retained anal veins, and Dr. Chapman will, I hope, help us here. As I have pointed out, there is a law of inequality in specialization, in one and the same organ, here the veining of the wings. The development of one system of veins does not keep pace with another, nor is the ratio of advance the same as between the front and hind pair of wings.

In the Pseudopontiadæ three anal veins are retained on the hind wings, otherwise the specializations conform to those of the Hesperiaes. Under the term Nymphalidæ I include the "brush-footed" butterflies, the Nymphalidæ proper, the Agapetidæ (Satyridæ), Morphidæ, Heliconidæ, and Limnadidæ (Danaidæ).

IMAGINAL WING.

A. PAPILIONIDES.

Fore wings with "Grote's vein" and second anal persistent; traces of first anal (submedian fold) as a scar seldom wanting.

Hind wings with one anal vein alone remaining.

Specialization of Media.

Cubital { Parnassiidæ
Teinopalpidæ

Central Papilionidæ

B. HESPERIAES.

Fore wings with second anal only persistent, with a fork at base vanishing through reduction; traces of first anal as a scar oftenest wanting.

Hind wings with at least two anal veins persisting.

Specialization of Media.

Radial { Pierididæ
Nymphalidæ
Libytheidæ
Riodinidæ

Cubital..... { Dismorphiadæ
Megathymidæ

Central..... { Lycænidæ
Hesperiadæ

It is hoped that the designations proposed by Prof. Comstock for the subcostal vein, the radius, cubitus, and anal veins will be permanently adopted.

The specialization of media is determined by the position of the second median branch. Its central position is the original, generalized state; it moves by being either drawn upwards and joining the radial, or downwards and then joining the cubital system of the wing. The specializations of the radius have been elsewhere fully discussed by me.

In the genealogical tree published by Sir George Hampson (1898) the Pierids are represented as having given rise to the Nymphalids and Satyrids. In their present condition the Pierids could not have done so, since the mass of forms have undergone a reduction of the radius, and are thus more specialized than the brush-footed butterflies, in which no such reduction has taken place. It is rather probable that the Pierids and Nymphalids are subparallel converging groups. The Pierids represent the main ascending six-footed stem, out of which the brush-footed butterflies proceeded probably as a side-issue, not as the culmination depicted by Sir George Hampson. The idea that the butterflies are represented by groups which run together, converge, we gather, with much other which is valuable, from Dr. Chapman. I adopt it to the exclusion of the Papilionides. I must also decline to accept the isolation of the skippers under a separate title, which would obscure their phyletic relationship to the Lycænids. There will probably be no other differences in our views, which must be, to me, a source of congratulation.

In shortest phrase: all classifications and phylogenies, except my own, embrace the diurnal Lepidoptera in a single major group, the Rhopalocera, or separate from the rest the Skippers, under some similar title, holding the two as of equal morphological value. Dr. Chapman calls these same two groups—Papilionides and Hesperides; Comstock calls them Butterflies and Skippers. The only variation from this course is offered by those writers who allow the families of the diurnals to succeed each other, in a linear arrangement, without dividing them off by any special term or terms from the rest of the Lepidoptera. I, alone, divide the diurnals by separating from them, not the skippers, but the swallow-tails and the related Parnassians, as representing a distinct and closed group, possessing exclusive classificational and phyletic value, and which I call the Papilionides, or butterflies proper. And I allow of no separation of the skippers from the rest of the diurnals, which, gathered together under the name Hesperides, or skippers in a wide sense, I regard as a group open to the moths, or Heterocera, and as not separable from these by any structural feature so strong as that which divides them from the Papilionides.

THE GENERA *CUPIDO* AND *LYCÆNA*.

BY A. G. BUTLER, Ph.D.

AMONGST Continental entomologists the genera *Cupido* and *Lycæna* are used indiscriminately, to indicate what are known popularly as blue butterflies, and particularly for the large untailed group.

When the typical "blues" are examined carefully, it will be found that they divide naturally into two genera—*Cupido* and *Lycæna*; the first with *C. arion* as type, the second with *L. meleager*. In neuration these two genera closely resemble each other; but, when examined with a platyscopic lens, it will be seen that, whereas *Cupido* is to all intents and purposes a naked-eyed genus, *Lycæna* has distinctly hairy eyes.

The importance of this character is vigorously insisted upon in the Heterocerous Lepidoptera, and doubtless should be equally valued among the Rhopalocera. I have therefore carefully examined the whole of the true "blues" in the Museum collection, with the following result:—

CUPIDO, Schr. (Eyes naked, or nearly so*).

C. arion, *C. euphemus*, *C. arcas*, *C. alcon*, *C. admetus*, *C. sebrus*, *C. lycea*, *C. pardalis*, *C. saportæ*, *C. celestina*, *C. nyctula*, *C. galatæa* (perhaps a form of the preceding), *C. metallica*, *C. omphisa*, *C. donzelii*, *C. sepiolus*, *C. anteros*, *C. eumedon*, *C. idas*, *C. astrarche*, *C. loewii*, *C. cleobis*, *C. zephyrus*, *C. triton*, *C. argus*, *C. scudderi*, *C. argyrotoxus*, *C. micrargus*, *C. melissa*, *C. eurypilus*, *C. optilete*, *C. acmon*, *C. hyrcana*, *C. shasta*, *C. alcedo*, *C. anna*, *C. christophi*, *C. sieversi*, *C. allardi*, *C. bracteata*, *C. staudingeri*, *C. psylorita*, *C. panagea*, *C. anisophthalma*, *C. cytis*, *C. dædalus*, *C. erius*, *C. heteronca*, *C. pheres*, *C. pheretes*, *C. asiatica*?, *C. pheretiades*, *C. podarce*, *C. franklini*, *C. orbitulus*, *C. ægagrus*.

LYCÆNA, Fabr. (Eyes distinctly hairy).

L. meleager, *L. corydon*, *L. bellargus*, *L. hylas*, *L. ariana*, *L. icarus*, *L. persica*, *L. kashgariensis* (the two preceding are representative forms of *L. icarus*), *L. sutleja*, *L. amanda*, *L. eros*, *L. bilucha*, *L. pseuderos*, *L. candalus*, *L. helena*, *L. cyllarus*, *L. lycormas*, *L. semiargus*, *L. argiades*, *L. lygdamus* (I cannot distinguish this from *L. antiacis* or *L. couperi*; all three forms being very variable in tint), *L. melanops*, *L. erschoffi*, *L. damon*, *L. dolus*, *L. menalcas*, *L. hopfferi*, *L. phyllis*, *L. dama*?, *L. admetus*, *L. posthumus*, *L. poseidon*, *L. damone*, *L. kindermanni*, *L. actis*.

* In the *C. celestina* and *C. argus* groups, when examined under a fairly high power, a fine scattered short pile is visible upon the front of the eyes, but this disappears under a lower power, leaving the eyes apparently smooth.

In the preceding lists of species I have not included the recognized named varieties, seasonal forms, or slight local modifications, many of which are in the collection: there are also several hitherto unidentified species which I have been obliged to omit.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

BY W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from p. 82.)

CATOPTRIA ALBERSANA, *Hb.*—Killarney.

C. ULICETANA, *Haw.*—Everywhere abundant.

C. HYPERICANA, *Hb.*—Wicklow Mts.; Belfast Hills, locally abundant (*W.*).

C. CANA, *Haw.*—Howth; Markree Castle, Sligo (*K.*); Black Mountain; Belfast (*W.*); Derry (*C.*); Coolmore, Co. Donegal; and Armagh (*J.*); Roches Pt., Cork (*K.*); near Sligo (*R.*); Letterfrack (*C. T. C.*).

C. FULVANA, *St.*—Armagh (*J.*); Sligo (*R.*).

C. SCOPOLIANA, *Haw.*—Howth, Killarney (*K.*); Bundoran, and near Belleek (*J.*); Sligo (*R.*); Westport, Mayo (*W.*); Ballinskelligs Bay, Kerry (*K.*); Favour Royal, Tyrone (*K.*).

TRYCHERIS AURANA, *Fb.*—Generally distributed.

PYRALOIDIDÆ.

CHOREUTES MYLLERANA, *Fb.*—Holywood, Co. Down.

SYMETHIS OXYACANTHELLA, *L.*—Abundant everywhere.

CONCHYLIDÆ.

EUPECILIA NANA, *Haw.*—Powerscourt (*B.*).

E. DUBITANA, *Hb.*—Belfast (*W.*).

E. ATRICAPITANA, *St.*—Howth, and elsewhere on the Dublin coast, both on cliffs and sandhills, from mid-June to mid-August, but scarce; Belfast (*W.*); Roches Pt., Cork (*K.*); Coolmore, Co. Donegal (*J.*); Sligo (*R.*).

E. PALLIDANA, *Zell.*—Howth, N. Cooke, June, 1857; Magilligan, Co. Derry (*Curzon.*)

E. MACULOSANA, *Haw.*—Howth, Sligo (*R.*).

E. ANGUSTANA, *Hb.*—Generally distributed.

E. MUSSEHLIANA, *Tr.*—Sligo (*R.*). Five specimens of this very rare species taken in a marshy field.

E. ROSEANA, *Haw.*—Sligo (*R.*).

E. IMPLICITANA, *H. S.*—Belfast (*W.*).

E. CILIELLA, *Hb.*—Sligo (*R.*); Belfast, abundant (*W.*); Enniskillen (*P.*); Favour Royal, Tyrone (*K.*).

XANTHOSSETIA ZOEGANA, *L.*—Generally distributed.

X. HAMANA, *L.*—Generally distributed.

ARGYROLEPIA HARTMANNIANA, *Clerck.*—Belfast Hills, locally abundant (*W.*); Clonbrock, Galway (*R. E. D.*); Sligo (*McC.*); Favour Royal, Tyrone (*K.*); Cromlyn, Westmeath (*Mrs. B.*); Coolmore, Donegal (*J.*).

A. CNICANA, *Dbl.*—Howth; Belfast (*W.*).

CONCHYLIS FRANCILLANA, *Fb.*—Howth, abundant.

C. STRAMINEA, *Haw.*—Howth, abundant; Belfast; Markree; Sligo (*K.*); Roches Pt., Cork (*K.*).

APHELIIDÆ, *Gn.*

APHELIA OSSEANA, *Scop.*—Howth and Wicklow Mts.; Armagh (*J.*); Sligo (*R.*); Belfast (*W.*); Portrush (*C.*); Connemara (*C. H.*).

TORTRICODES HYEMANA, *Hb.*—Lambay I., off the Dublin coast.

TINEA.

EPIGRAPHIIDÆ.

LEMNATOPHILA PHRYGANELLA, *Hb.*—Belfast, abundant (*W.*).

DIURNEA FAGELLA, *Fb.*—Wicklow Mts., common; also at Belfast; Favour Royal, Tyrone; Drumreaske, Monaghan; Killynon, Westmeath; Tullamore, King's Co.; Killarney, &c. (*K.*).

SEMIOSCOPIA AVELLANELLA, *Hb.*—Wicklow (*G. V. H.*).

PSYCHIDÆ.

Little is known of the Irish distribution of the members of this group, which has been neglected largely, no doubt on account of the difficulties attending their identification. That only two species are recorded should not be taken as a proof of the poverty of this section of our fauna.

FUMEA INTERMEDIELLA, *Brd.*—Howth, the cases on the rocks in profusion (*G. C. B.*). At Wicklow Head, Ballycottin, Galley Head, and elsewhere on the cliffs of Co. Cork, and the Saltee Is. I have found immense numbers of what I take to be the cases of this species (*K.*).

PSYCHOIDES VERHUELLELLA, *Heyd.*—Killarney.

TINEIDÆ.

DIPLODOMA MARGINEPUNCTELLA, *St.*—Wicklow Mts., Sligo (*R.*); Magilligan, Co. Derry (*Salvage*).

OCHSENHEIMERIA BIRDELLA, *Curt.*—Portmarnock, near Dublin; Dingle Bay, Kerry; Holywood, Co. Down; Sligo (*R.*); Belfast (*C. G. B.*).

SCARDIA GRANELLA, *L.*—Dublin and Belfast.

S. CLOACELLA, *Haw.*—Dublin and Belfast; Markree Castle, Sligo (*K.*); and near Sligo (*R.*).

(S. ARCELLA, *Fb.*—Belfast. Old doubtful record.)

BLABOPHANES FERRUGINELLA, *Hb.*—Howth, on the cliffs; Sligo (*R.*).

B. RUSTICELLA, *Hb.*—Howth and Dublin, Armagh (*J.*); Belfast (*W.*); Sligo (*R.*).

TINEA TAPETZELLA, *L.*—Common everywhere.

T. MISELLA, *Zell.*—Dublin, in cellars and vaults among the matted growth of fungus on the walls.

T. PELLIONELLA, *L.*—Common everywhere.

T. FUSCIPUNCTELLA, *Haw.*—Dublin, common.

T. PALLESCENTEELLA, *Sta.*—Dublin, Belfast (*W.*).

T. LAPELLA, *Hb.*—Belfast (*W.*); Rathowen, Westmeath (*Mrs. B.*).

T. MERDELLA, *Zell.*—Dublin, in houses; Belfast (*W.*).

T. CONFUSELLA, *H.-S.*—Howth, the only known British locality. It flits among and runs up the stems of the grass on cliffs, and possibly feeds on fungi in the same situations. It is somewhat remarkable that no other certain locality for this species should be known in the British Isles, and also that it has not for some years been taken here.

T. NIGRIPUNCTELLA, *Haw.*—Dublin, in houses.

T. SEMIFULVELLA, *Haw.*—Sligo (*R.*); Clonbrock, Galway (*R. E. D.*); Bray (*R. E. D.*).

TINEOLA BISELLIELLA, *Hml.*—Dublin, in houses.

LAMPRONIA QUADRIPUNCTELLA, *Fb.*—Howth.

L. LUZELLA, *Hb.*—Howth; Belfast, one (*W.*).

L. PRÆLATELLA, *Schiff.*—Killarney.

L. RUBIELLA, *Bjerk.*—Killarney and Holywood, Co. Down.

INCURVARIA MUSCALELLA, *Fb.*—Malahide, near Dublin; Wicklow Mts.; Belfast (*C. G. B. and W.*).

I. PECTINEA, *Haw.*—Killarney.

ERIOCEPHALA CALTHELLA, *L.*—Wicklow Mts.; Armagh (*J.*); Enniskillen (*P.*).

E. ARUNCCELLA, *Scop.*—Sugar Loaf Mountain, Wicklow (*K.*).

E. SEPELLA, *Fb.*—Generally distributed.

E. AUREATELLA, *Scop.*—L. Bray, Co. Wicklow; Blackstones and Killarney, Kerry; Enniskillen (*P.*).

(To be continued.)

NOTES AND OBSERVATIONS.

THE PUPAL HABITS OF *COSSUS LIGNIPERDA*.—*Cossus ligniperda* is so common a species that one would suppose that even the most superficial among entomologists would be well acquainted with its life-history. That this is not the case is only too apparent from the notes that have appeared from time to time in the entomological journals, and I fear that on one simple point alone—namely, the natural situation selected for pupation—our knowledge is by no means clear. The older authors were unanimous in telling us that the pupal cocoon was formed in the burrow in which the larva had fed, but I find no evidence to support this theory; the most modern authors are equally assertive that the pupa is subterranean. In this gloriously uncertain state of our information, I was well pleased at finding, in June and July last, a considerable number of imagines, so freshly emerged that their wings were but partially expanded, and in almost every case the pupæ-skins that they had just vacated were also found. The trees in which the larvæ had fed, and which I have known for some years to be infested, grow just within a low park paling that surrounds a small garden. The bottom of the paling having become rotten, an oak skirting some six inches in depth has been fixed along the fence from post to post. This skirting rests on an asphalt path which borders the paling on the outside, and its bottom is also on a level with a flower-bed that traverses the inner side of the paling. A narrow space between the skirting and the paling forms a sort of pocket, and this has in course of time become filled with dust and twigs and so forth, forming a compact mass of dry rubbish, and from the surface of this the pupæ-skins were protruding. Some years ago I found a number of pupæ in a very rotten willow-tree, not, however, in the mines in which the larvæ had fed. By way of experiment, I have on several occasions placed full-fed larvæ, found in the autumn, in holes bored for their reception in a poplar-tree. Those thus placed in the dry stump of a limb, the upper portion of which was cut off some years ago, have invariably produced imagines in the following summer, but one similarly treated in the growing wood died. These facts, coupled with such other precise evidence as I have been able to obtain, suggest to my mind that the pupa is not necessarily subterranean, at any rate in the sense that many of the Sphingidæ and Noctuæ are, but that the larva is guided in the selection of a suitable situation for pupation rather by the presence of light friable material, be it rotten wood, dry turf, or other fibrous earthy matter, that will enable it to form its large tough cocoon.—ROBERT ADKIN; Lewisham, February, 1900.

COSSUS LIGNIPERDA LARVA.—In the middle of February last a man brought to me two larvæ of *C. ligniperda*, each about $2\frac{3}{4}$ in. in length, which he had dug up in his garden that day. He told me that they were both contained in the same spadeful of earth; with the larva was brought one cocoon (broken), formed, as usual, of silk and earth. It contained fragments of a recently cast larval skin. One of the larvæ was of a uniform canary-yellow colour, the usual orange band on the dorsum being absent. This was apparently the larva which had

owned the cast skin. Is it not very unusual for *ligniperda* larvæ to moult within the cocoon sometime previous to pupation? Is the close propinquity of the two larvæ underground, each presumably occupying a separate cocoon—one not being observed by the gardener—merely a coincidence, or has that apparent display of sociability been noticed before?—Dr. MAY; Hayling Island.

DWARF RHOPALOCERA.—In the spring of 1896, during a stay in Guernsey, I captured a dwarf specimen of *Pieris napi*. It measured exactly 34 mm. in expanse. It was flying on low marshy land.

In a certain part of the woods overlooking Weston-super-Mare I have come across very small male specimens of *Euchloë cardamines*. The one I have in my collection measures 38 mm. in expanse. The whole form of the insect is different from ordinary specimens; in fact, except in colouring, the insect puts one in mind of *Leucophasia sinapis*, both in shape and in delicacy of construction. I have seen several flying about the same spot.—J. L. SAXBY; Larkfield, Kent.

Referring to Mr. Cardinal's capture of a couple of dwarf *V. atalanta* and the editorial note on same, appearing in your last issue, it may be of interest to state that, in August, 1899, I discovered in a solitary bed of nettles, situated in an exposed spot, a quantity of pupæ, in appearance those of *V. atalanta*, but in size resembling *V. urtica*. The fact that hosts of small ichneumons were emerging from one of the pupæ led me to believe that the whole of them were ichneumonated, assuming them to be *V. atalanta*. I determined, however, to test this theory, and took all the pupæ I could find—about three dozen. In the course of a week or ten days emergences commenced, and from all the pupæ but two ichneumons were bred. The two exceptions produced perfect imagines of *V. atalanta*, but of the size mentioned by Mr. Cardinal. Probably similar attacks by ichneumons result in the development of the dwarf specimens met with on the wing.—A. RUSSELL; The Limes, Southend, Catford, S.E.

NATURALIZED COCKROACHES.—*Phyllodromia germanica*, one of the four exotic cockroaches which have established themselves in the British Isles, swarms in an old house at Blackheath. This is yet another addition to the rather lengthy list of positions it has seized, which are usually hotels and restaurants. Another of the four, *Blatta americana*, is thoroughly established in a sugar refinery at Silvertown, a locality from which it does not seem to have been previously announced.—W. J. LUCAS; Kingston-on-Thames.

HUMMING SOUND OF MACROGLOSSA STELLATARUM.—I was rather interested in Mr. Anderson's note on the above (Entom. xxxii. 306), as I came across an instance of the same thing when at Wei-hai-wei in 1898. This, however, was out of doors, the moth being at the time poised over flowers on a hillside. The sound was very audible, reminding one of a *Bombus*, but louder and deeper.—T. B. FLETCHER; H.M.S. 'Centurion,' Jan. 31st, 1900.

A CORRECTION.—In view of the interest now taken in the insect fauna of the London district, it may be as well to correct the following error:—In the 'Entomologist,' vol. xxiv. p. 281, under *Gonoptera*

libatrix, for "larvæ on willow and balsam," read "larvæ on willow and balsam poplar."—ALFRED SICH; Brentwood, 65, Barrowgate Road, Chiswick, Feb. 21st, 1900.

CAPTURES AND FIELD REPORTS.

REMARKABLE APPEARANCE OF VANESSA IO DURING SNOW.—In the 'Field' of February 17th, Mr. E. J. P. Magor states that, while woodcock shooting in a small wooded valley at St. Tudy, Cornwall, on Feb. 14th, he came across a peacock butterfly (*V. io*). "It was of course one that had hibernated, but, considering the fact that there were four inches of snow on the ground at the time, its appearance was remarkable." In reply to my enquiries under what conditions the specimen was observed, the following reply from Mr. Magor appeared in the 'Field' of March 3rd:—"In answer to Mr. Frohawk's questions as to the peacock butterfly which I saw in the snow last month, I may say that the sun was shining brightly at the time, and the temperature was, I should think, comparatively high. The butterfly got up from a bush and flew along in front of me as I went up the valley. I saw it three times." I think such a very remarkable occurrence as this should be placed on record in the 'Entomologist.'—F. W. FROHAWK; March, 1900.

EARLY APPEARANCE OF PIERIS RAPE.—My sister, Miss I. Grant, writes to me from Weston-super-Mare, that at noon, on March 10th last, she observed a small white butterfly fly from under the coping of a wall in her garden; it flew close up to her. The sun was shining brightly at the time and very warm. The wall faces south, and is fully exposed to the sun. It had evidently just emerged from the pupa. Under the coping she states that there are many remains of pupæ-cases.—MARGARET FROHAWK; March, 1900.

COREMIA QUADRIFASCIARIA AT BEXLEY.—As the above insect is, I believe, a somewhat local species, I thought it might be of some interest to record a specimen taken by my father at Bexley, on July 16th, 1899. This was left out of my notes (*ante*, p. 48) by an oversight.—F. M. B. CARR; 46, Handen Road, Lee, S.E., March 15th, 1900.

CAPTURES AT LIGHT IN 1899.—According to custom I send a list of fresh records for light-trap during last year. The last season was an exceptionally bad one, only twelve *Asteroscopus sphinx* putting in an appearance, as against one hundred and fifty to two hundred in other years. The following are new:—*Lycæna astrarche*, *Acronycta psi*, *Axylia putris*, *Hecatera serena*, *Eupisteria obtiterata*, *Bupalus piniaria*, *Eupithecia oblongata*, *Eucosmia undulata*, *Aciptilia pentadactyla*, *Crambus pinellus*, *Hyponomeuta padellus*, *Depressaria badiella*, *Coleophora lutipennella*. The following were exceptionally common, viz.: *Notodonta dictæoides*, *Demas coryli*, *Hyponodes albistrigalis*, *Cheimatobia boreata*.—E. F. STUDD; Oxtou, Exeter, March 19th, 1900.

PLUSIA GAMMA.—A fact which much impressed itself upon me during last season was the absence here of *P. gamma*. During several years this moth has been so abundant in Hayling as to be a perfect nuisance to the

collectors. Last March I did not observe one specimen.—Dr. MAY; Hayling Island.

EUPLEXIA LUCIPARA IN FEBRUARY.—On Feb. 25th, about 6 p.m., I found a female of the above species at rest on a piano in our drawing-room. I think this is probably a hibernated specimen, although the species does not usually pass the winter in the perfect state. It is somewhat worn, but was quite lively when captured.—PHILIP J. BARRAUD Bushey; Heath, Herts, March 3rd, 1900

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*March 9th, 1900.*—Mr. G. H. Verrall, President, in the chair. Mr. H. Rowland-Brown, M.A., was elected into the Council, and as joint-Secretary in the place of Mr. J. J. Walker, R.N., who had resigned. Prof. Christopher Aurivillius, of Stockholm, and Prof. Frederick Moritz Brauer, of Vienna, were elected Honorary Fellows; and W. D. Drury, of Rocquaine, West Hill Park, Woking; the Rev. W. Westropp Flemyng, of Coolfin, Portlaw, Waterford; and Prof. Percy Groom, M.A., F.L.S., of the Royal Indian Engineering College, Coopers Hill, were elected ordinary Fellows of the Society. Mr. C. G. Barrett exhibited a series of varieties of *Spilosoma dorsalis* from South Africa, showing variation in some degree parallel with that of *S. lubricipeda* in Great Britain. Mr. G. W. Kirkaldy exhibited several Rhynchota of economic interest, from the United States, Ceylon, and British Central Africa, among them being the new *Ægaleus bechuana*, Kirk., from Africa, which attacks coffee, and *Pariatoria victrix*, Ckll., from Phoenix, Arizona, found on date-palms. The last-named Coccid was originally introduced from Egypt, and all attempts at eradication had hitherto failed. He also showed a series of thirteen colour-varieties of the oriental Scutellerine *Cantao ocellatus* (Thunb.), and examples of *Distantidea vedda* (a new genus and species of Lybantinae) from Ceylon, in which the rostrum was very long, extending as far as to the apex of the abdomen. Papers were communicated, by Mr. W. L. Distant on “Undescribed genera and species belonging to the Rhynchotal family Pentatomidæ,” and by Mr. G. J. Arrow “On Pleurostict Lamellicorns from Grenada and St. Vincent (West Indies).” Mr. C. J. Gahan read a paper on “Stridulating organs in Coleoptera,” in which he remarked that one of the best accounts of them was to be found in ‘The Descent of Man,’ but since that work was written several additional instances of their occurrence had been made known, showing that these organs were less uniform in structure and even more wonderfully diversified in position than Darwin considered them to be; while their discovery in the larvæ of certain forms would lead to some modification of the view that they have originated in connection with sex and primarily serve the purpose of attracting the sexes to one another. He gave a detailed account of their presence on the head, prothorax, mesothorax, legs, abdomen, and elytra, enumerating several genera of Tenebrionidæ, Endomychidæ, Hispidæ, &c., in which they had not previously been known to occur, and describing those of certain Hispidæ as being the most complex in

structure. He mentioned additional instances in which they occur in one sex only, or differ according to sex, and pointed out that, contrary to Landois' opinion, they are frequently present in both sexes of Curculionidæ; but in several species the striated area occupies a different position in each sex, being found on the elytra in the males and on the last dorsal segment in the females.—H. ROWLAND-BROWN and C. J. GAHAN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Annual Meeting, January 25th, 1900.*—Mr. A. Harrison, F.E.S., President, in the chair. The Council's Report showed that the Society was in a sound condition, both in membership and finances, as well as in usefulness. The following gentlemen were elected as Officers and Council for the ensuing year:—President: W. J. Lucas, B.A., F.E.S. Vice-Presidents: H. S. Fremlin, M.R.C.S., F.E.S., and A. Harrison, F.C.S., F.L.S. Treasurer: T. W. Hall, F.E.S. Librarian: H. A. Sauzè. Curator: W. West. Hon. Secretaries: Stanley Edwards, F.L.S., F.E.S., and H. J. Turner, F.E.S. Council: R. Adkin, F.E.S., W. J. Ashdown, F. Noad Clarke, Dr. T. A. Chapman, F.E.S., H. Moore, F.E.S., A. M. Montgomery, and J. W. Tutt, F.E.S. The retiring President read his Address, discussing at some length the subjects "Recent experiments in Telegony" and the "Inter-relation between the Mosquito and Malarial Fever." Mr. Blenkarn, of East Dulwich, and Mr. Day, of Carlisle, were elected members. Mr. Brooks exhibited several specimens of *Acherontia atropos*, bred by himself, and radiated varieties of both *Arctia lubricipeda* and *A. menthastri*.

February 8th.—Mr. W. J. Lucas, B.A., F.E.S., President, in the chair. Mr. Ashdown exhibited, and presented to the Society's collections, male and female examples of *Gomphus vulgatissimus* from the New Forest. Mr. Montgomery, long bred series of *Chrysophanus phlaeas*, and contributed notes on their life-history and variation. Mr. Moore, some one hundred and fifty species of Coleoptera collected by Prof. Blatchley in Indiana, including five species of *Culosoma*; an unnamed species taken at an altitude of 14,500 ft. on Mt. Orizaba, Mexico; and a Coccinellid, *Megilla maculata*, which congregates in thousands for the winter. Mr. Lucas, a specimen of *Gryllus campestris*, from Hastings last year, and a female dragonfly taken by Mr. Fremlin in the Hebrides, which was probably a variety of *Sympetrum striolatum*. Mr. Adkin, a series of *Melanippe fluctuata* taken at Lewisham in his garden and in a wood near. The latter were large and dark specimens. Dr. Chapman, a large number of microscopic slides of larval and imaginal lepidopterous legs to illustrate his paper entitled "On the Relation of the Larval to the Imaginal Legs in Lepidoptera."

February 22nd.—The President in the chair. Mr. J. W. Enock, of Charlton, and Mr. T. Kemp, of Notting Hill, were elected members. Mr. Tomlinson exhibited a specimen of *Fristalis tenua* and pupa from the Kingston sewage works, and suggested that the species may eventually take an important place in the purification of sewage. Mr. Lucas, several species of exotic Odonata, to show striking ornamentation of the wings. Mr. Adkin read a paper entitled, "Notes on the Pupation of *Cossus ligniperda*," and exhibited examples of the species taken at Lewisham in June and July last. Mr. Colthrup, a sawfly cocoon

tenated by a spider. Major Ficklin reported the capture of *Macroglossa stellatarum* early in February in the city.—HY. J. TURNER, *Hon. Report Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*February 19th, 1900.*—Mr. G. T. Bethune-Baker, President, in the chair. Messrs. F. A. Jackson, Edmund Street, Birmingham, and W. H. Wilkinson, F.L.S., Marchmound, Wylde Green, were elected members of the Society. Mr. R. C. Bradley showed the rare Chrysid *Cleptes pallipes*, which had been taken at a window of his house at Moseley, and the identification of which had been confirmed by Rev. F. D. Morice; also *Miltogramma conica*, a little Tachinid which he had found in abundance at Moseley last summer. Messrs. H. Willoughby Ellis and F. A. Jackson showed the following beetles from Knowle:—*Auchomenus viduus* and var. *mestus*, *Aleochara breripennis*, *Ptinus fur*, *Corymbites pectinicornis*, and *Sitones cambricus*. Mr. C. J. Wainwright, a box containing the genus *Syrphus* and allied Diptera. Mr. G. T. Bethune-Baker, a drawer of Palearctic Satyrids.—COLBRAN WAINWRIGHT, *Hon. Sec.*

RECENT LITERATURE.

CELLI, A. *Remarks on the Epidemiology and Prophylaxis of Malaria in the Light of Recent Researches.* ('British Medical Journal,' 1900, pp. 301-6.)

EVERYONE is doubtless aware of the investigations upon the causes of malaria which have been conducted by some of the most eminent specialists. The 'British Medical Journal' for Feb. 10th contains a number of articles upon the now proven relation of mosquitos (*Anopheles*) to malaria, the principal of which is that cited above, a summary of three works in Italian by the same author. There are also reports of the Malaria Conference in Rome, and a translation of Dr. Koch's Second Report upon the work of the Malaria Expedition in the Dutch East Indies. As no notice has lately occurred in any of the British entomological journals, some extracts and notes may be of interest.

"Man is the temporary host, and the mosquito the definitive host, of the malarial parasite. These parasites complete their asexual life and prepare their sexual forms in the human blood, while they complete the sexual cycle of life, that by which the species of the parasites external to man is assured, in the middle intestine of the mosquitos. It follows therefore that man and mosquitos are the sources of malarial infection which circulates, so to speak, from man to mosquito and from mosquito to man, and so on. In this circulation of the contagion the presence of malarial man is indispensable, inasmuch as down to the present time the hereditary transmission of malaria from mosquito to mosquito has not been demonstrated experimentally or morphologically, nor have resisting parasitic forms been found in the environment external to the body of the mosquito. Malaria is therefore a typical contagious disease. Where there is malaria mosquitos abound, but malaria does not exist in every place where mosquitos abound." The

malaria-infesting genus is *Anopheles*, which has four Italian species. It is improbable that *Culex* and other Diptera frequenting malarious places can transmit malaria.

The species of *Anopheles* lay their eggs in clear, slowly running or stagnant water, where the eggs and nymphs of *Culex* are rarely, if ever, found. Sea-water, very strong sulphurous water, continuous ice, or swiftly moving water is injurious to the immature forms.

The following parallel columns will succinctly show the theory and the facts relative to the mode of propagation:—

1. The infection is most rife at sunset and during the night.

2. Is limited in distance in horizontal, oblique, and vertical directions.

3. Is not transported by wind, which, on the contrary, tends to diminish it.

4. "Woods, instead of filtering the malarial agents, may be foci of this infection."

1. *Anopheles* issues forth in the evening and night to pierce man, but lies hidden during the day.

2. Does not fly far from native place, and does not fly high in the air.

3. Usually remains hidden when the wind blows.

4. "Shady or damp woods and trees in general are the homes of mosquitos."

Water, as proved by a long series of direct experiments, is not the vehicle of malarial infection, neither are alimentary substances. In fact, the malarial parasite *Proteosoma* is introduced in the human blood by the mouth-parts of the infected *Anopheles*. [Extracts, &c., from Celli's paper.] Dr. Grassi is of opinion that man cannot contract malaria without being "bitten" by *Anopheles*, and "No man, no malaria; no mosquito, no malaria." Grassi's work on the malaria parasite, at which he has been labouring for sixteen hours a day for eighteen months, will be published very shortly.

Dr. Koch considers that the proposal recently made to destroy *Anopheles* larvæ will meet with insuperable difficulties in Java, since the more rice fields there are in the neighbourhood of a place and the nearer they are, the greater the abundance of *Anopheles*; the occurrence of the mosquitos being connected with the extension of rice culture.

It has been possible only to give a very brief and disjointed notice, but the interested reader is referred to the journal quoted (which is published at 6*d.*).

G. W. K.

MONTANDON, A. L. *Hemiptera Cryptocerata*. *S. Fam. Mononychiniæ*. *Notes et Descriptions d'Espèces Nouvelles*. (Bull. Soc. Sci. Bucarest, part 1, 1899, viii. Nos. 4 and 5, pp. 1-18; part 2, 1900, viii. No. 6, pp. 1-10.)

IN this welcome revision of a difficult and neglected group, Dr. Montandon admits only three genera into the subfamily. The species are all extra-British, and of a more or less undistinguished appearance; but they merit a close examination, and should be of interest to the local student, inasmuch as they undoubtedly provide information as to some of the stages through which the completely aquatic Naucorinæ

have passed in their evolution from land-bugs, originally probably from some form similar in structure and appearance to *Acanthia*, Fabr., Latr. The genera admitted are :—

1. MONONYX, Lap. = *Phintius*, Stål, with 18 spp. (7 new).
2. MATINUS, Stål, with 5 spp. (3 new).
3. PELTOPTERUS, Guér. = *Scylaccus*, Stål, with 3 spp. (2 new).

Mononyx has a very wide distribution, seven species occurring in America, five each from the Oriental and Australian regions, and one from the Ethiopian; the other genera are much restricted, *Matinus* being entirely Australian, while *Peltopterus* is insular, having been recorded only from the Philippines, North Borneo, Salomons, Marianes, Mauritius, and a few smaller islands. The genus *Nerthra*, Say, from America, remains unknown.

The value of Dr. Montandon's precise and uniform descriptions is greatly enhanced by the synoptic tables, in which structural characters are employed for the preliminary differentiation of the species; but there are unfortunately no figures, a want which cannot always be supplied even by the most careful and detailed descriptions.

G. W. K.

SLATER, F. W. *The Egg-carrying Habit of Zaitha*. ('The American Naturalist,' 1899, xxxiii. pp. 931-3.)

It has been long known that certain American waterbugs of the family Belostomatidæ, particularly *Zaitha fluminea*, Say, and *Deinostoma* (= *Serphus*) *dilatatum*, Say, have the habit of carrying their eggs on their back until they are hatched, and it has always been taken for granted that the female is the egg-carrier. Miss Slater, however, has made a study of the sexual organs of *Zaitha*, and finds that everyone of the egg-carrying individuals which she has dissected is a male, and that the ovipositor of the female is so short that it would be impossible for her to reach her own back with it.

The ovipositing season lasts from June to the end of August, and the eggs, which are comparatively of large size, number from seventy-five to eighty-five, "placed in regular diagonal rows on the upper side of the wings of the male." The male is an unwilling porter, and is captured by the larger female and compelled to endure the indignity, after a series of well-contested combats. "That the male chafes under the burden is unmistakable; in fact, my suspicions as to the sex of the egg-carrier were first aroused by watching one in an aquarium, which was trying to free itself from its load of eggs, an exhibition of a lack of maternal interest not to be expected in a female carrying her own eggs. . . . For five hours I watched a silent unremitting struggle between the male and the female. Her desire was evidently to capture him uninjured. She crept quietly to within a few inches of him, and there remained immovable for half an hour. Suddenly she sprang towards him; but he was on the look-out, and fought so vigorously that she was obliged to retreat. After this repulse she swam about carelessly for a time, as if searching for food was her only thought. But in ten or fifteen minutes she was back in her first position in front of him. Again there was the attack, and again the repulse. The same tactics were continued until midnight, when, despairing of her

success, I left them. At six o'clock the next morning the entire abdomen of the male and half of the thorax were covered with eggs. Those nearest the head were quite yellow, showing that the struggle had just ended."

It is to be hoped that the fair American will continue her observations. The reason for this strange disposal of the eggs is problematical; it can scarcely be for their safety, since the male, if attacked, "meekly receives the blows, seemingly preferring death, which in several cases was the result, to the indignity of carrying and caring for the eggs."

G. W. K.

Second Annual Report of the Kentish Entomological Society. Session 1899.

The present Report of this enterprising and, we are pleased to say, flourishing Society, comprises twelve pages. The contents include the President's Address and a paper entitled "Directions for Setting Lepidoptera." The former is a review of the work done by the Society collectively and its members individually during the year; the latter, which is contributed by Mr. Frank Littlewood, is an instructive and practical article.

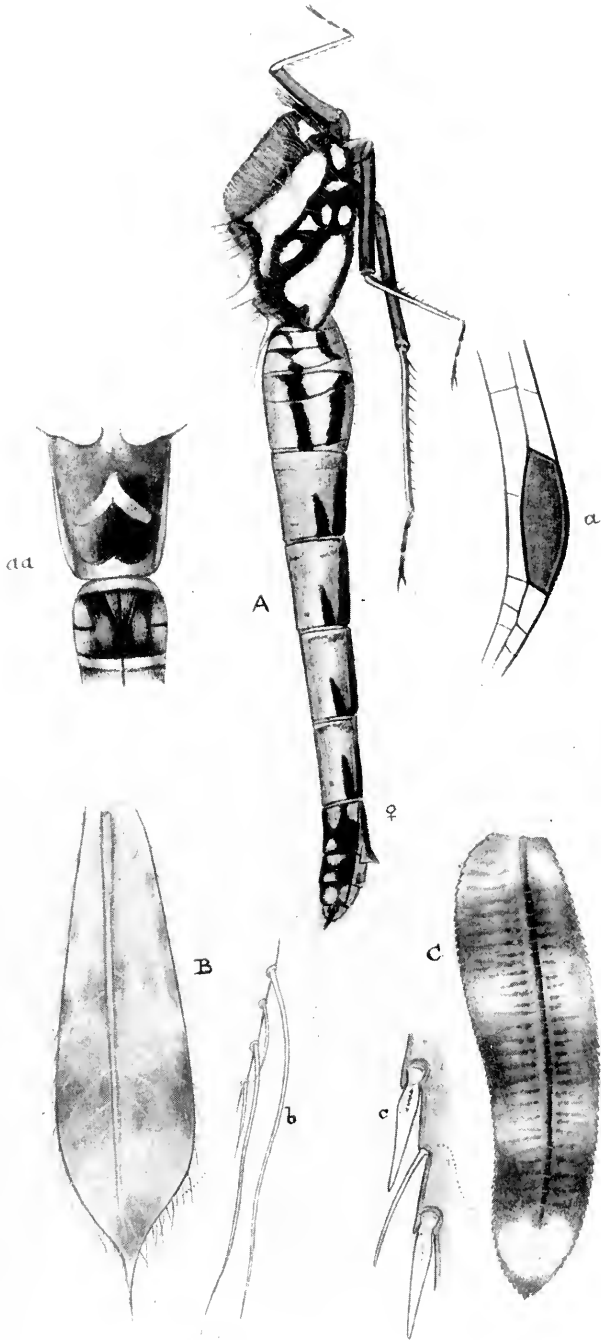
OBITUARY.

WE regret to announce that Mr. W. G. Blatch, of Knowle, near Birmingham, died on Feb. 24th last.

Mr. Blatch was born in London; we are unable to ascertain the exact date, but we believe that it was about 1840. His education as a boy was not framed on a very liberal scale, but he appears to have been a great lover of books, and quickly assimilated their contents; and he also instructed himself in, among other subjects, Latin and Greek. Having tried shoemaking, a business that proved not altogether to his liking, he became a pupil-teacher in a school at Colchester; subsequently, however, he relinquished this in favour of an appointment in the Essex Hall Idiot Asylum. We next hear of him as one of the first of the "Evangelists" sent out into the rural districts by the late Samuel Morley, M.P. Finally, he was appointed Secretary to the Midland Counties Idiot Asylum, on the foundation of that institution about thirty-two years ago; this office, combined with that of Superintendent, he retained until the date of his death.

Although it was as a coleopterist that Mr. Blatch was best known among entomologists, he was interested in all orders of insects, and a true lover of nature. Most of his published entomological writings will be found in the 'Entomological Monthly Magazine.' He also wrote an article on insects for the 'Guide to Birmingham,' which was published for the British Association Meeting in 1886. For many years he had been engaged on a list of the Coleoptera of the Midlands, but this, unfortunately, has not been published.

Mr. Blatch was elected a fellow of the London Entomological Society in 1890; he was one of the founders of the Birmingham Entomological Society (established in 1888), and occupied the chair for the first five years.



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DRAGONFLY SEASON OF 1899.

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

PLATE IV.

OWING to the ungenial weather in April and May the dragon-fly season, as in 1898, was late in commencing. In an early year several species would be on the wing in the South of England during the last week of April, but in normal years they might be expected to appear during the first week of May. On the 3rd of that month one or two nymph-skins of *Pyrrhosoma nymphula* were certainly found on Esher Common in Surrey, but no imagines were seen. At the same place, on May 7th, three that had but lately emerged were observed, one being on the wing. A single specimen of *Enallagma cyathigerum* was also found there on the 7th, which had so recently emerged that the abdomen had not attained its full length. This latter species was on the wing to some extent on Esher Common by May 13th. At the same place, on May 14th, a *Cordulia aenea* was captured in the teneral condition, and on May 21st four specimens of *Libellula quadrimaculata* were taken in the same immature state. On the 23rd *Ischnura elegans*, *Erythromma najas*, *Pyrrhosoma nymphula*, *Agrion puella*, *A. pulchellum*, and *Calopteryx splendens* were obtained at the Byfleet Canal, but most of them were in the teneral state. Indeed, though several species had been met with the season cannot be said to have well commenced previous to the summer weather that set in with the last few days of May.

After that a normal state of affairs was soon attained, and so favourable was the weather that by July some of the summer species were perhaps a little before their time. *Lestes sponsa* and *Sympetrum striolatum* were appearing on Ockham Common by July 8th, and *S. scoticum* and *Aeschna grandis* by the 15th; while Mr. Arkle found *Leucorrhinia dubia* over on July 21st at

the Delamere Forest localities in Cheshire, which he knows so well.

The fine autumn weather extended the season considerably at its latter end. On Esher Common *E. cyathigerum* was last seen on Sept. 17th, *Aeschna mixta* on Sept. 24th, *S. scoticum* on Oct. 15th, and *S. striolatum* on Nov. 12th; while Mr. W. H. Harwood saw *A. mixta* disporting over the river Colne, in Essex, a few days before Oct. 21st. *Aeschna cyanea* visited Mr. Briggs's garden at Lynmouth on Oct. 21st, and Mr. F. N. Clarke sent me a female, which was taken alive from a branch of ivy at Tetbury, in Gloucestershire, on Nov. 12th.

One of the most interesting events of the season was the visit of Messrs. King and C. A. Briggs to Strathglass, in Invernessshire, in search of *Somatochlora metallica*. On the death of Dr. Buchanan White, Mr. King was the sole entomologist who had taken the insect in that its only known British habitat—a distinction which is now shared with him by the ardent neuropterist, Mr. C. A. Briggs. *S. metallica* was met with for two months from June 15th in Strathglass and Glen Affrick. The majority seen were males, which were “not uncommon, but patience and devotion in the highest degree” were needed for their capture, and, laconically adds Mr. Briggs, “they got it.” *Somatochlora arctica* was taken in Strathglass in June, and in Glen Affrick early in August, in the latter locality at an altitude of 1400 ft.; but it was not common. *Aeschna cærulea* was observed in widely separated districts in Strathglass and Glen Affrick, at altitudes varying from 400 ft. to 1200 ft., the last taken being a male on Aug. 12th. It was rare and difficult to catch. Strathglass and Glen Affrick constitute a new British locality for the last species, making the third, all of which are in Scotland.

Other species of *Odonata* observed by Mr. Briggs in Strathglass in July were *E. cyathigerum* and *P. nymphula*, which were fairly common; *L. dubia*, scarce; *L. sponsa*, common, but immature, at one little pond at Invercannick; and *Cordulegaster annulatus*, which was not uncommon, and an easy capture.

Unfortunately neither Mr. King nor Mr. Briggs succeeded in obtaining nymphs of *S. metallica*, *S. arctica*, or *A. cærulea*, though the latter obtained eggs of *S. metallica*, which he removed from outside the vulvar scale of a worn female captured while apparently ovipositing. Each egg was about half a millimetre long, and from a quarter to a third of a millimetre wide. The colour was pale yellow, and shape elliptical. It possessed a rather long, slender, transparent pedicel at one end, which appeared to belong to a thin transparent outer envelope of the egg. The contents had a granular appearance.

Another interesting expedition was one undertaken by Mr. H. S. Fremlin to Stornoway, in the Outer Hebrides—a still more distant hunting-ground. Though more especially interested in

Lepidoptera, Mr. Fremlin brought home a few dragonflies, as samples of what the district was capable of producing in that direction. They were: *I. elegans*, *P. nymphula*, *E. cyathigerum*, *Aeschna juncea*, *L. quadrimaculata*, and *S. striolatum*. The first five call for no special notice, except that *L. quadrimaculata* was small and of the clearly marked but little suffused Scotch form; but the two specimens (both females) of *S. striolatum* crave somewhat closer attention. In size each is but little larger than a well-grown *S. scoticum*, and in general appearance, especially in the colouring of the sides of the thorax, closely resembles that insect. In the typical *S. striolatum* the sides of the thorax have two well-defined broad yellow oblique bands, separated by a duller somewhat interrupted third one. In the Stornoway specimen the middle band is reduced to a few spots (Plate IV., A) much as in *S. scoticum*. The amount of black colouring on the sides of the abdomen also point a little in the direction of *S. scoticum*, though the arrangement of those markings on the whole recall *S. striolatum*. The vulvar scale appears to be of a form intermediate between those of the two species, for, though not pointed as in *S. scoticum*, it does not appear to be at all notched as in *S. striolatum*. On the other hand, the pterostigma (Plate IV., a) is decidedly that of *S. striolatum*, and the yellow mark on the metasternum (Plate IV., aa), though rather sharply defined, resembles that of *S. striolatum* rather than of *S. scoticum*. Further, which is perhaps more important than all, the legs are clearly lined with yellow above, as in the division of the genus *Sympetrum*, to which *striolatum* belongs, whereas in the *scoticum* division they are black. The conclusion to which we must come, seeing that there are two specimens, thus precluding an aberration, appears to be that the insects belong to a form of *S. striolatum* somewhat resembling *S. scoticum* (possibly a local race), or else that both insects are hybrids between the two species; Mr. McLachlan, who has examined the insects, inclines to the latter opinion. Should any entomologist visit Stornoway during the coming season he may perhaps be able to throw some light upon the subject.

Sympetrum flaveolum was again present in good numbers on Ockham Common in August. The locality was visited during the month by Mr. H. J. Turner once, and by myself twice, but only males were taken; and we must conclude that the presence of the species was due to another migration. Rev. J. E. Tarbat took a male near Wokingham about July 6th, and I probably saw one near Christchurch. It should be stated that Mr. W. H. Harwood took a female at St. Osyth, in Essex, on a part of the coast where it would be hardly likely to breed. With *S. flaveolum*, on Ockham Common, several specimens of *Sympetrum sanguineum* were taken, one being a female. Mr. Turner also took a female at Cliffe Marshes, near Gravesend, and Mr. Harwood states that

the species breeds on a part of the Essex coast. Numbers of *S. scoticum* were met with by Mr. Briggs and myself at a large pond on Exmoor, where their large size was noticeable. The species is also reported from Chobham Common and Chertsey, in Surrey (E. Vincent). On Sept. 13th I for the first time noticed a dragonfly, which appeared to be *S. striolatum*, flying backwards; moreover, it was not so acting in order to back out of a corner, for no obstacle was near it.

On Aug. 15th Mr. A. H. Hamm took a male *Sympetrum vulgatum* at Torquay. It did not appear to be a solitary specimen, but Mr. Hamm unfortunately brought away but one, not recognising at the time the importance of his capture. This is the second authenticated British specimen.

Again *Orthetrum carulescens* was extremely common in the New Forest in August; it appeared to be just coming on the wing at the beginning of June. There has been a welcome increase in the number of known localities of its congener, *O. cancellatum*—a pair were taken in Sussex, near Liphook (H. J. Turner), and the species has been discovered on Chobham Common, Surrey (E. Vincent). Dr. F. A. Walker also describes an insect taken by him near Byfleet which is in all probability a female of this species.

Mr. C. A. Briggs reports *Cordulegaster annulatus* as present, but not common, and difficult to catch, along the East Lynn River in North Devon.

On July 29th a female *Anax imperator*, dull bluish in colour, was observed hawking, between seven and eight in the evening, very slowly over a stream in the New Forest, reduced by the drought to a string of pools. When the insect was held by the legs, after being knocked down by a stick, it vibrated its wings very rapidly, especially at the tip, the base not appearing to move at all. On the ear being brought near a deep hum was heard. When the finger touched the abdomen the vibration could be felt there. Mr. E. B. Bishop observed an insect on Crooksbury Common, Surrey, on June 28th, which by description must be a female of this species, so furnishing yet another Surrey locality for this handsome dragonfly. Mr. H. J. Turner captured a female in Sussex, near Liphook. Its near relative, *Brachytron pratense*, was taken (J. Prest) at the Broads near Lowestoft in the beginning of June.

Males of *Eschna mixta* were rather plentiful on Esher Common in September. They often flew low down amongst the tall reeds, whereas they usually fly quite high round the trees and tall bushes. Though no captures were made in either place, I almost certainly met with the species at Ockham Common and in the New Forest. In the neighbourhood of Colchester, Mr. Harwood found the species from August till October, and more generally distributed, though perhaps on the whole scarcer than

last year. Mr. C. W. Colthrup found one dead at Folkestone on Oct. 3rd. In addition to the discovery of *E. juncea* at Stornoway, in Lewis, by Mr. H. S. Fremlin, Mr. Briggs and myself found it rather common on Aug. 21st at a large pond on Exmoor, in Somerset.

Calopteryx splendens and *C. virgo* have been reported from Moor Park, near Farnham (E. B. Bishop); *C. virgo* from Puttenham Common, Surrey (E. B. Bishop), and North Devon (C. A. Briggs); *Lestes sponsa*, Chobham Common (E. Vincent); *E. naias*, Virginia Water and Chobham Common, Surrey (E. Vincent); *Ischnura elegans*, Exmoor (W. J. L.); *Agrion pulchellum*, Broads near Lowestoft (J. Prest); and *E. cyathigerum*, Keswick (E. B. Bishop), and Exmoor (W. J. L.).

Pyrrhosoma tenellum was captured in June in a new locality—in Sussex, near Liphook—and it occurred as usual in numerous localities in the New Forest, where also *Agrion mercuriale* was found in good numbers. In Richmond Park an aberration of *I. elegans* was taken with two small distal blue spots on the dorsal surface of the seventh segment of the abdomen.

Some nymphs of *C. splendens*,* dredged from the Byfleet Canal on March 12th, were so very small that they could not possibly have been ready to emerge at their proper time that season; and the same must be said of a tiny nymph of *Gomphus vulgatissimus*, taken from a stream in the New Forest on June 4th. We must therefore assume that these two species are, or may be, more than one year in reaching maturity. Empty nymph-cases of the latter dragonfly found in the New Forest were coated with mud, and in all cases were on the grassy bank of the stream, not on rushes. Possibly their legs, which are well adapted for burrowing, are not suitable for climbing.

On April 17th an emergence of a female *P. nymphula*, which commenced about 9.40 a.m., was watched. The "rest" before the extremity of the abdomen was withdrawn lasted about twenty minutes; the head was *not* thrown backwards. The wings were of full size about an hour before the body was. Another female that emerged on April 22nd rested in the same manner as did the former.

On May 11th two males of *E. cyathigerum* emerged from the nymph-case, and the identity of the nymph was by this means established.

About 7.35 a.m. on May 14th a *Cordulia cenea* was noticed partly out of its nymph-case, and then in its "resting position," with head and thorax thrown backwards. At 8 o'clock it bent itself upwards, and drew out the rest of its abdomen, showing that it was a female. An hour later its wings were of full size, and dull grey in colour. The lengthening of the body took place

* This and the other nymphs referred to are fully described in my 'British Dragonflies,' and in some cases figured.

almost entirely after the wings were full-grown. About 1.30 p.m. the insect had flown from its support, the abdomen was bronze-coloured, and the wings were transparent, though suffused with a yellowish tint.

By collecting nymph-skins while the species was emerging the identity of the nymph of *S. striolatum* was satisfactorily determined. It may be recognised by the long lateral spines on the hinder segments of the abdomen. Some of the skins were very dark in colour. *S. scoticum*, which somewhat resembles it, is smaller, and has very short lateral spines.

Nymph-cases of *Lestes sponsa* were found on Ockham Common on July 8th. This nymph is an extremely interesting one from the fact that it holds an intermediate position between the Calopteryginæ and the rest of the Agrionidæ. Its ladle-shaped mask bears considerable resemblance to that of *Calopteryx*, while its banded lamellæ (Plate IV., B) are rather thick, and are easily separated into two layers. The outer lamellæ are longer and straighter than the middle one, which is figured. The margin (Plate IV., b) is ornamented with stout spines two-thousandths of an inch long, separated in some parts by two or more slender ones.

Platynemis pennipes was bred on July 10th from a nymph obtained in the New Forest. In colour it was yellowish brown. The mask was of the usual *Agrion*-type, but the lamellæ (Plate IV., c) are again sufficiently distinct to serve as a means of identifying the species. They are long, and terminate in a very attenuated point. The margin (Plate IV., c) is clothed with hairs, many of which towards the distal extremity are very long, about one-fiftieth of an inch. The lamellæ are slightly mottled with brown, and the middle one is a little broader than the outer ones.

Amongst the nymphs of *P. pennipes* was one of *A. mercuriale*, which, however, was not recognised till it emerged, when there was little in the body of the nymph-case to distinguish it from other Agrions. The two lamellæ which it possessed were extremely small, and, if they did not represent two renewed ones partly grown, would easily serve to distinguish the species.

I must not conclude without referring to some interesting observations that Rev. F. East has been making on the nymphs of *Æschna cyanea*. He found that out of sixty-one emergences, thirty-one were females and thirty males. Though some emerged in the daytime, the majority came out at night—by night I conclude we are to understand the very early morning. The nymphs were taken from a pond in his garden, and as the perfect insects emerged most—fifty-six—were set free. None remained at the time near the pond, but later in the summer some returned and hawked round the pond and the garden as usual.

As a result of experiments made by Mr. East with *Æ. cyanea*

and one of the Agrioninæ, it seems that dragonflies, so long as they are kept in damp air, are able to live for many days out of water. They appear to remain in good health, and, when put into water for a time, seem perfectly happy, and feed as if nothing had happened. It will be interesting to see if this change in their manner of life has any effect on their final development.

EXPLANATION OF PLATE IV.—A. *Sympetrum striolatum* var. ($\times 3$); *a*, pterostigma ($\times 6$); *aa*, metasternum and first and second segments of abdomen ($\times 6$). B. *Platycnemis pennipes*, middle caudal lamella ($\times 7$); *b*, portion of margin (highly magnified). C. *Lestes sponsa*, middle caudal lamella ($\times 10$); *c*, portion of margin (highly magnified).

LEPIDOPTERA OCCURRING IN COUNTY CORK.

BY R. J. F. DONOVAN.

As I have seen so few records of Irish Lepidoptera in the 'Entomologist,' I thought the following list, enumerating captures since the autumn of 1896, might be of interest. Except where otherwise stated, all the species referred to were taken in or about the Ummera Woods. These woods, which are not very extensive, consist mostly of larch, Scotch fir, and oak, intermixed with elm, birch, ash, and beech, and lie within two miles of the village of Timoleague. All doubtful captures, comprising nearly all the Eupitheciæ and Acidaliæ, were very kindly named for me by Mr. Kane. As will be seen on consulting Mr. Kane's 'Catalogue of Irish Lepidoptera,' my best captures were *Leucania extranea* (second record for Ireland), *Sterrha sacraria* (also second record for Ireland), and *Laphygma exigua* (first record for Ireland), with *Hadena dissimilis*, *Eupithecia virguareata*, *E. valerianata*, &c.

Pieris brassicæ, *P. rapæ*, *P. napi*, and *Euchloë cardamines*. All more or less common.

Colias edusa. One or two seen each year. Plentiful in 1899.

Argynnis aglaia. A few specimens seen each year. — *A. paphia*. Plentiful about the woods.

Melitæa aurinia. A colony near Inchy Bridge.

Vanessa urticæ. Common.—*V. io* and *V. atalanta*. Not so common as *V. urticæ*.—*V. cardui*. A few in 1897; plentiful in 1899.

Pararge egeria. Common.—*P. megæra*. Somewhat scarcer.

Satyrus semele. Not uncommon along the railway.

Epinephele ianira, *E. hyperanthus*, and *E. tithonus*. Common.

Cænonympha pamphilus. Fairly common.

Thecla quercus. Not common.—*T. rubi*. One specimen on May 19th, 1898.

Polyommatus phlæas. Common.

Lycæna icarus. Common.—*L. minima*. Two specimens near Coolmaine Castle, Harbour View, June 26th, 1897.

Acherontia atropos. One larva, in 1896, dried up in pupal state. One dead imago from Butterstown on Sept. 20th, 1899.

Chærocampa porcellus. Two specimens at Harbour View in 1897.—

C. elpenor. Two specimens in 1898; one in 1899. Larvæ were obtained in both years, but they were unfortunately ichneumonated.

Smerinthus ocellatus. A few larvæ. One imago in 1898.—*S. populi*. Larvæ rather common.

Macroglossa stellatarum. A few most years, common in 1899.—*M. bombyliiformis*. Scarce; rather plentiful in one field in 1897.

Ino statices. Not common.

Zygæna filipendulæ. Common.

Halias prasinana. Pupæ common under moss on oak trees.

Nudaria mundana. Common.

Gnophria quadra. Seven specimens altogether at light.—*G. rubricollis*. Pupæ common, but almost all ichneumonated; imagines not uncommon on road passing through woods.

Euchelia jacobææ. Common.

Arctia caia. Larvæ fairly common.

Spilosoma fuliginosa. One specimen on June 24th, 1899.—*S. mendica*. Five specimens, all referable to var. *rustica*.—*S. tubricipeda* and *S. menthastri*. Common.

Hepialus humuli and *H. lupulinus*. Common.—*H. velleda*. Four specimens.

Dasychira pudibunda. Common.

Orgyia antiqua. Larvæ not uncommon; imagines very plentiful in 1899.

Pæcilocampa populi. Two specimens in 1897, one in 1899; a few pupæ on tree trunks.

Bombyx rubi. Common.—*B. quercus*. Larvæ common.

Dicranura vinula. Larvæ common.

Notodonta camelina. Larvæ rather common.—*N. ziczac*. Two larvæ in 1899.

Phalera bucephala. Larvæ common.

Thyatira derasa. Common.—*T. batis*. Not so common.

Demas coryli. Three specimens.

Acronycta psi. Five pupæ in rotten branches of alder.—*A. leporina*. One specimen on June 20th, 1898.—*A. rumicis*. Common.

Leucania conigera. Not uncommon.—*L. lithargyria*. Commoner than the preceding.—*L. extranea*. One specimen (see Entom. xxx. p. 80).—*L. comma*, *L. impura*, *L. pallens*. More or less common.

Tapinostola fulva. One specimen on Sept. 29th, 1897. Larvæ of perhaps this species at roots of bog-cotton—discovered by pulling the reeds separately, and those that come up easily mostly contain a larva at the root.

Nonagria arundinis. Plentiful at Grange Bog, about one and a half mile from Timoleague.

Hydræcia nictitans and *H. micææ*. Common.

Axylia putris. Scarce.

Xylophasia rurea. Rather scarce.—*X. lithoxylea* and *X. monoglyphæ*. Common.

Laphygma exigua. One specimen on Sept. 8th, 1899.

Neuronia popularis. Common.

Charæas graminis. Fairly common.

Luperina testacea. Rather common.—*L. cespitis*. Ten specimens.

Mamestra furva. Scarce, more plentiful than usual in 1899.—*M. brassicæ*. Common.—*M. persicariæ*. Two larvæ low down on birch trees. Two pupæ.

Apamea basilinea. Four specimens.—*A. gemina*. A few in 1899.—*A. didyma*. Common.

Miana strigilis. Common.—*M. literosa* and *M. bicoloria*. Not uncommon, the latter very variable.

Grammesia trigrammica. Common.

Stilbia anomala. About five specimens altogether.

Caradrina taraxaci. Not very common.—*C. quadripunctata*. Common.

Rusina tenebrosa. Fairly common.

Agrotis suffusa. Common.—*A. saucia*. Scarce; plentiful in 1899.—*A. segetum* and *A. exclamationis*. Common.—*A. corticea*. One or two each year.—*A. strigula*. Four specimens.

Noctua glareosa. Four specimens.—*N. plecta*. Common.—*N. c-nigrum*. Not uncommon.—*N. triangulum*. Four specimens.—*N. brunnea?* One specimen.—*N. rubi*. Fairly common.—*N. umbrosa*. Four specimens.—*N. baia*. One specimen.—*N. xanthographa*. Common.

Triphæna ianthina. Fairly common.—*T. fimbria*. Larvæ common in spring.—*T. interjecta*. Three specimens.—*T. comes* and *T. pronuba*. Common.

Amphipyra pyramidea? A dried-up pupa at root of an elm.—*A. tragopogonis*. Common.

Mania typica. One specimen on Aug. 11th, 1897.

Panolis piniperda. Three specimens.

Pachnobia rubricosa. Not uncommon.

Tæniocampa gothica, *T. incerta*, *T. stabilis*, and *T. pulverulenta*. Common.—*T. gracilis*. Scarce.

Orthosia lota. Two specimens.—*O. macilenta*. Several specimens in 1898; one larva in 1899.

Anchocelis pistacina. Common.—*A. lunosa*. Rather scarce.

Cerastis vaccinii. Common at willow.

Scopelosoma satellitia. At willow.

Xanthia flavago. A few specimens.—*X. circellaris*. Common.

Calymnia trapezina. Rather plentiful.

Dianthæcia capsicola. Common.—*D. cucubali*. A few specimens.—

D. capsophila. Common.

Hecatera serena. Scarce.

Miselia oxyacanthæ. Not common.

Agriopis aprilina. One specimen on Nov. 1st, 1897.

Euplexia lucipara. A few specimens.

Phlogophora meticulosa. Common.

Aplecta prasina. About four specimens.—*A. nebulosa*. Common.

Hadena dentina and *H. oleracea*. Common.—*H. dissimilis*. About six specimens.—*H. pisi*. Two specimens in 1899.—*H. thalassina*. Four or five specimens.

Xylocampa areola. Common.

Calocampa vetusta. Fairly common.—*C. exoleta*. Three specimens.

Xylina ornithopus. Scarce at willow.—*X. socia*. Fairly common at willow and ivy.

Cucullia umbratica. Common.

Gonoptera libatrix. Larvæ common.

Habrostola tripartita. One specimen on June 7th, 1899.—*H. triplasia*. Common.

Plusia chrysitis. Rather common.—*P. bractea*. One specimen on July 17th, 1898.—*P. festuæ*. Two specimens, one on October 8th, 1897, and the other on July 11th, 1898.—*P. pulchrina*. Not uncommon.—*P. gamma*. Common.

Chariclea umbra. A few specimens.

Phytometra viridaria. Common.

Euclidia mi. Common.

Zanclognatha grisealis. Not uncommon.—*Z. tarsipennalis*. One specimen on July 5th, 1898.

Hypena proboscidalis. Common.

Uropteryx sambucaria. Common.

Epione apiciaria. Four specimens.

Rumia luteolata. Common.

Venilia macularia. Not uncommon.

Metrocampa margaritaria. Fairly common.

Ellopija prosapiaria. Three specimens.

Eurymene dolobraria. Seven specimens.

Selenia bilunaria. Common, with a few examples of var. *juliaria*.

Odontopera bidentata. Pupæ and imagines common.

Crocallis elinguaris. Rather scarce.

Eugonia albiaria. One specimen on Aug. 22nd, 1898.—*E. quercinaria*. Common.

Himera pennaria. Rather common.

Phigalia pedaria. A few pupæ. One imago on March 7th, 1898.

Amphidasys strataria. Three specimens in 1899.—*A. betularia*. Larvæ and pupæ fairly common.

Cleora lichenaria. Rather common.

Boarmia repandata. Common.—*B. cinctaria*. One specimen in moth-trap on April 21st, 1898.

Gnophos obscuraria. A few specimens.

Pseudoterpna pruinata. Common.

Geometra papilionaria. Two larvæ on birch; one imago on July 9th, 1898.

Iodis lactearia. Common.

Acidalia dimidiata, *A. subsericeata*, and *A. aversata*. Common.—*A. trigeminata*. Not uncommon; named by Mr. Kane, which is perhaps a slip, as he does not include this species in his 'Catalogue.'—*A. marginipunctata* and *A. imitaria*. Not uncommon.

Cabera pusaria. Common.—*C. exanthemaria*. Not uncommon.

Macaria liturata. One specimen at light on July 11th, 1898. A pupa in 1899.

Panagra petraria. One specimen on May 29th, 1899.

Selidosoma ericetaria. One specimen on Aug. 5th, 1897.

Ematurga atomaria. Four specimens.

Sterrrha sacraria. One specimen on Aug. 27th, 1898.

Abraxas grossulariata. Common.

Lomaspilis marginata. Common.

Hybernia marginaria. A few at sallow.—*H. defoliaria*. Three specimens and one pupa in 1899.

Anisopteryx ascularia. Two specimens in 1899; one in 1900.

Cheimatobia brunata. Common.

Oporabia dilutata. Common.

Larentia didymata. Three specimens in 1897.—*L. multistrigaria*. Not uncommon at sallow.—*L. viridaria*. Fairly common.

Emmelesia alchemillata? One specimen on Aug. 10th, 1898.—*E. albulata*. Plentiful in one spot.—*E. unifasciata*. Four specimens.

Eupithecia venosata. Not uncommon.—*E. pulchellata*. Four specimens in 1898; not uncommon in 1899.—*E. oblongata*. A few examples. Plentiful at Coolim Cliffs, about three miles beyond Courtmacsherry.—*E. subfulvata*. Five specimens; also two specimens of var. *oxydata*.—*E. plumbeolata*. Six specimens.—*E. satyrata*. Four specimens. Larvæ rather plentiful on flowers of *Scabiosa succisa*.—*E. scabiosata*. Rather plentiful over a heath in 1899.—*E. castigata*. A few of a peculiar variety resembling *E. pusillata*.—*E. virgaureata*. Larvæ and imagines plentiful.—*E. valerianata*. One imago. Larvæ on almost every flower-head of *Valeriana officinalis*.—*E. nanata*. Three specimens. Larvæ common on *Calluna vulgaris*.—*E. vulgata*. Rather common.—*E. absinthiata*. Common.—*E. assimilata*. Two specimens. A few larvæ.—*E. lariciata*. Three specimens.—*E. abbreviata*. Not uncommon.—*E. pumilata*. Common.—*E. coronata*. Three examples of the first and one of the second brood.—*E. rectangulata*. One specimen in 1898. Larvæ common in 1899.—*E. debiliata*. Larvæ plentiful in one part of the woods. Two specimens of a peculiar unicolorous variety.

Lobophora viretata. A few in 1899.

Thera variata. Summer brood common in 1899; three examples of the autumn brood in 1898.

Hypsipetes trifasciata. Sixteen pupæ in rotten stumps and branches of alder.—*H. sordidata*. Rather common.

Melanthia ocellata and *M. albicillata*. Not common.

Melanippe sociata, *M. montanata*, and *M. fluctuata*. Common.

Coremia unidentaria. Common.

Camptogramma bilineata. Common.—*C. fluviala*. A few specimens.

Phibalapteryx vittata. Plentiful over a marsh in 1898.

Eucosmia undulata. One imago. Larvæ not uncommon on small willow bushes.

Cidaria siderata. Common.—*C. miata*. A few specimens.—*C. truncata*. Common.—*C. suffumata*. A few specimens.—*C. prunata*. Two specimens.—*C. testata* and *C. populata*. A few of each.

Pelurgia comitata. A few specimens.

Eubolia limitata and *E. plumbaria*. Common.

Anaitis plagiata. Common.

Platyptilia ochrodactyla. One specimen.

Mimæseoptilus bipunctidactyla. Common.—*M. pterodactylus*. One specimen.

Pterophorus monodactylus. Common.

Aciptilia pentadactyla. Fairly common.

Alucita hexadactyla. Common.

Ummerra House, Timoleague.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

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

(Continued from vol. xxxii. p. 300.)

THE true "waterbugs"—*i.e.* those which pass the greater portion of their existence actually beneath the surface of water—whether it be running stream, stagnant pond, or brine pool—and which are considerably modified in their structure in accordance with their environment—have been usually placed in a single division by modern authors, partly for convenience, and partly from a mistaken idea of the taxonomic importance of one or two characters, *e.g.* the great alteration in the magnitude and situation of the antennæ, which in the majority of the forms are concealed when at rest in grooves on the under side of the head, whence the group is usually termed Cryptocerata (or Kryptokerata).* This modification is, however, evidently not a test of relationship, but connected with the nature of their habitat. In the same way that coleopterists perceived at length that the Dytiscidæ, Gyrinidæ, Hydrophilidæ, &c., were really not closely allied, despite their common habitat and their superficial resemblance, so have many rhynchotists now realised that there are two heterophyletic divisions—probably very distantly related—of aquatic bugs.

The first of these—the NAUCOROIDEA—embraces the British families Naucoridæ, Corixidæ, and Notonectidæ, and the exotic Mononychidæ (which should perhaps be included in the Naucoridæ) and Belostomatidæ. The second—the NEPOIDEA—contains a single family, the Nepidæ, with two British genera, viz. *Nepa*, Linn., and *Ranatra*, Fabr. The Gerridæ, which have previously been discussed, are related more nearly to the Nepoidea than to the Naucoroidea, but have in any case arisen quite separately, probably from a proto-Reduvioid stock, from which indeed the Nepoidea also probably originated.

The first step towards an aquatic life to which *Notonecta* has become so admirably adapted would be represented by a bug not unlike *Acanthia*, Fabr. Latr. [*Salda*, Saund.], a genus of which we have eighteen species in our islands. These are most diverse in their habits, most of them frequenting the margins of streams, ponds, salt marshes, often under stones: one species is to be found in *Sphagnum*; while another occurs far away from moisture on sandy commons or moors, under heather or in sand-pits. Two species at least move about from plant to plant

* Greek κρυπτός (*kruptos*), hidden; κέρα (*keras*), a horn.

under water,* although no special modifications have apparently arisen in the structure of these bugs in relation to an incipient aquatic life. The next link is indicated by a curious and somewhat isolated family, the Ochteridæ,† which is distinguished from *Acanthia* at first sight by the greater continuity of curve from head to abdomen in the lateral margins. The rostrum is very similar to that of *Acanthia*, and the legs are simple, but the antennæ are very short, being concealed under the head. Nevertheless they are not strictly aquatic, but frequent the banks of rivers, feeding upon small insects, after the manner of some of the species of *Acanthia*. The nymph lives beneath moist sand. There are unfortunately no British species of the family, but *Ochterus* (= *Pelagonus*) *marginatus*, Latr., is found so near as France, Spain, and Italy.‡

With the Naucoridæ we enter upon the true aquatic forms. Comparatively little adaptation to an aquatic life has been effected even here, but in the higher forms the posterior legs are more natatorial, and the antennæ more greatly modified. The exotic Belostomatidæ are superficially much like the Naucoridæ, but may be at once separated by the peculiarly shaped antennæ and more natatorial posterior legs. The Corixidæ have undoubtedly originated from a Naucoroid ancestor, and are all strictly aquatic. The Notonectidæ are also Naucoroid, and are perhaps the most specialised of all aquatic insects; they certainly ought not—as in the arrangements of most authors—to be interpolated between the Naucoridæ and Corixidæ, but should be placed immediately after the latter.

The Nepidæ are—apart from some profound structural differences—readily distinguished by the fact that they respire by means of long filamentary tubes at the anal end of the body,§ and, while the Naucoroidea move the opposite legs together, the Nepoidea move them alternately. The following table will separate the three families into which the Naucoroidea are divided:—

- | | | |
|---|-----------|---------------|
| 1. Somewhat flat and rounded; anterior legs inserted on the anterior margin of the prosternum (fig. 29) | | 1. Naucoridæ. |
| 1a. Oval or elongate oval; anterior legs inserted on the posterior margin of the prosternum (fig. 30) | | 2. |

* J. E. Mason, E. M. M. xxv. p. 236.

† Pelagonidæ, auctt.

‡ The extra-British Mononychidæ (*Mononyx*, Spin., *Gelastocoris*, Kirk., &c.) need not be considered here, as, although they are intermediate between the true landbugs and true waterbugs—being riparian and kryptokeratous—they do not indicate any of the intermediate stages of evolution.

§ The strap-like processes in the Belostomatidæ are sexual.

2. Somewhat flat, but elongate; rostrum short, apparently not jointed; anterior tarsi more or less spoon- or knife-shaped 2. Corixidæ.
- 2a. Very convex; rostrum long, with three to four segments; anterior tarsi simple, raptorial . 3. Notonectidæ.

NAUCORIDÆ.

Of this family, the British species of which are characterised by the somewhat flat broad oval form, we have perhaps three genera, viz. *Aphelocheirus*, Westwood, *Ilyocoris*, Stål, and *Naucoris*, Geoffroy; but the presence of the third is doubtful.

The following table will separate the three genera:—

- | | |
|---|----------------------------------|
| 1. Rostrum long, reaching base of mesosternum; head above produced in front of the eyes, and sensibly narrowed, subhorizontal; antennæ reaching a little beyond the sides of the head. Tarsi 2-segmentate, with two long curved claws each; posterior legs scarcely natatorial. [Always practically apterous.] Figs. 31-34 | 1. <i>Aphelocheirus</i> , Westw. |
| 1a. Rostrum short, not reaching beyond base of prosternum; head not produced in front of eyes, but deflected shortly downwards; antennæ thickened, not reaching beyond sides of head. Anterior tarsi unsegmented, destitute of claws; intermediate and posterior tarsi 2-segmentate, with claws; posterior legs natatorial. [Macropterous or brachypterous] | 2. |
| 2. Anterior femora very greatly incrassate (beneath with a small pad of hair near the base), suddenly amplified in a right angle at the base beneath, then narrowed. Figs. 35-39 | 3. <i>Naucoris</i> , Geoffr. |
| 2a. Anterior femora greatly incrassate (beneath with broad pad of hair the whole length), not suddenly amplified beneath in a right angle. Figs. 40-45 | 2. <i>Ilyocoris</i> , Stål. |

APHELOCHEIRUS* is, in many respects, a link between the Acanthiidæ and the Naucorinæ, and was indeed placed in the former by its founder. Although the subhorizontal face and long rostrum separate it from the other genera, it clearly belongs to the family. The head above is elongate and horizontal (or nearly so); the rostrum long, slender, narrowing towards the apex (fig. 31); the antennæ consist of four segments, and are apparently destitute of sensory organs, the antennal groove is slight (figs. 32 and 33). The pronotum is deeply excavate anteriorly, greatly expanded laterally, prosternum carinate,

* ἀφελῆς (*aphêlês*), slender or simple; χεῖρ (*kheir*), a hand.

mesosternum elevated; femora all incrassate; tarsi 2-segmentate, not pilose, second segment longer than the first, terminated by two long stout curved claws (fig. 34). The connexivum, which is not very clearly marked off, is spinosely produced posteriorly.

Until recently only a single species of the genus—known as *A. æstivalis* (Fabr.)—was included in the British lists. Dr. Horváth, in his recent monograph of the genus,* has added another, which he names *A. montandoni*. These two species seem to be sufficiently distinct, but I think the learned Doctor has fallen into error in maintaining *A. æstivalis* as British. It is true that the figures given by Westwood and by Douglas and Scott refer to the latter species, but they were both drawn from one of the original specimens of Fabricius† captured in France; and I am not aware of macropterous examples having been obtained in the British Isles. All the apterous individuals I have seen—including those in my own collection—belong to *A. montandoni*, and we must therefore apparently erase *æstivalis* from our lists.

The synonymy of the two species should be amended to:—

1. *Aphelocheirus æstivalis* (Fabr.).

Westwood (pp.), 1833, Ann. Nat. Hist. vi. p. 228; 1839, Modern Class. Ins. i. frontispiece, fig. 7, and 1840, ii. p. 466, fig. 120; Douglas and Scott, 1865, Brit. Hem. pl. 19, f. 5.

Habitat. France, Germany, and Hungary (not England).

2. *A. montandoni*, Horv.

= *A. æstivalis*, Dougl. and Scott, *l.c.* p. 578. Saunders, 1876, Trans. Ent. Soc. Lond. p. 643, and 1892, Hem.-Heter. Brit. Isl. p. 326, pl. 30, fig. 9 (*nec* Fabr.).

Habitat. England, France, Germany, Switzerland, Russia, and Rumania.

A. montandoni is rather smaller, wider, and flatter than *æstivalis*, narrower anteriorly in proportion, and the head paler and longer. The terminal segments in both sexes are somewhat different in shape. Only the apterous form is known so far. It has been recorded in England from Bagley Wood, Oxford (years ago—Mr. Burr has not been able to find it recently); the Evenlode, near Eynsham, Oxford; Sutton Park, Warwickshire; Avon, near Bath; Costessey, near Norwich; and Worcester.

* 1899, Termész. füzet., xxii. pp. 256-67.

† "My British specimens have but short rudimentary oval hemelytra, like those of the bed-bug; but I possess one of Bosc's original specimens, described by Fabricius, not quite so large as the others, in which the wings are fully developed."—Westwood, 1840, Mod. Classif. Ins. ii. p. 466. Douglas and Scott borrowed Westwood's French specimen to figure the macropterous form (which they did not possess) in the 'British Hemiptera.'

The genital segments of these two species are figured by Horváth in the work quoted above.

In my own collection I have, besides British examples, a good series from the Seine, near Rouen, collected by my kind friend M. Henri Gadeau de Kerville.

I have never had the good fortune to see this remarkable bug alive, but Westwood states that it "swims very fast, using its hind legs chiefly, but crawls very slowly, using its four fore feet." Gadeau de Kerville has captured it in great numbers in the Seine, and notes its extreme agility in the water. He has observed it feeding upon the larvæ of the coleopteron *Hæmonia*, and believes that it also preys upon the mollusks *Vivipara vivipara* [*Paludina*] and *Bythinia tentaculata*. The last named species deposits its transparent gelatinous ova upon the back of *Aphelocheirus*, and this habit led at first to the supposition that *Aphelocheirus* carries its ova in the same way as is known to occur in *Zaitha* and *Deinostoma*.*

J. L. Brown found it in great numbers years ago at Costessey † from June to September among a broad-leaved species of *Potamogeton* in a running stream.

The nymphs in the ultimate instar differ from the practically apterous adults by the non-spinosely produced connexiva, and by the unsegmented tarsi, the posterior pair being very long.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

BY W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from p. 127.)

MICROPTERYX SEMIPURPURELLA, *St.*—Wicklow Mts.; Clonbrock, Galway (*R. E. D.*).

M. UNIMACULELLA, *Zett.*—Wicklow Mts.

M. SPARMANNELLA, *Bosc.*—Enniskillen (*P.*).

M. SUBPURPURELLA, *Haw.*—Wicklow Mts.; Clonbrock, Galway (*R. E. D.*).

NEMOPHORA SWAMMERDAMMELLA, *L.*—Wicklow Mts.; Clonbrock, Galway (*R. E. D.*); Sligo (*R.*).

N. SCHWARZIELLA, *Zell.*—Enniskillen (*P.*); do.; L. Bray, Co. Wicklow; Belfast (*W.*).

(*N. METAXELLA*, *Hb.*—Belfast. Doubtful record.)

* Gadeau de Kerville, 1887, 'Le Naturaliste,' pp. 199–201. See also Bull. Soc. Ent. France, 1884, pp. 83, 96, 112, and 128 (various communications by de Kerville and Bellevoÿe).

† See E. M. M. xi. pp. 16, 92, and 117.

ADELIDÆ.

ADELA RUFIMITRELLA, *Scop.*—Enniskillen (*P.*).

A. DEGEERELLA, *L.*—Killarney; Belfast (*W.*).

A. VIRIDELLA, *L.*—Sligo (*R.*).

A. CUPRELLA, *Thunb.*—Cromlyn, Westmeath (*Mrs. B.*).

HYPONOMEUTIDÆ.

SWAMMERDAMIA COMBINELLA, *Hb.*—Cork; Wicklow Mts.; Galway; Armagh (*J.*); Favour Royal, Tyrone (*K.*).

S. GRISEOCAPITELLA, *Sta.*—Armagh (*J.*); Derry (*C.*); Belfast (*W.*).

S. PYRELLA, *Vill.*—Howth; and about Dublin, common; Belfast (*W.*); Sligo (*R.*).

S. SPINIELLA, *Hb.*—Armagh (*J.*); Belfast (*W.*); Sligo (*R.*); Dublin coast, common.

HYPONOMEUTA PADELLA, *L.*—Belfast; Inishowen (*W. E. H.*); Enniskillen (*P.*); Connemara (*C. T. C.*).

H. COGNATELLA, *Hb.*—Dublin; Holywood, Co. Down; Blarney, Co. Cork; Armagh (*J.*); Sligo (*McC.*).

H. EVONYMELLA, *L.*—Belfast; Crom Castle, Fermanagh (*W.*); Carlow (*K.*); Clonony, Kings Co.; and Drumreask, Monaghan (*K.*); and elsewhere throughout Ireland, occasionally very common.

PRAYS CURTISELLA, *Don.*—Belfast; Howth; Armagh (*J.*)

PLUTELLIDÆ.

PLUTELLA CRUCIFERARUM, *Zell.*—Belfast, abundant (*W.*); Sligo (*R.*); Derry (*C.*); and generally distributed.

P. PORRECTELLA, *L.*—Dublin, in gardens; Armagh (*J.*); Sligo (*R.*).

P. ANNULATELLA, *Curt.*—Howth, on the cliffs; much more brightly coloured than English specimens. Belfast, local; and Bundoran, Co. Donegal (*W.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

P. DALELLA, *Sta.*—Western shore of L. Swilly, Co. Donegal (*G. V. H.*); Sligo (*R.*).

CEROSTOMA VITTELLA, *L.*—Rockabill Lighthouse, off Skerries, Co. Dublin (*K.*); Sligo (*R.*).

C. RADIATELLA, *Don.*—Wicklow Mts.; Mayo (*R.*); Sligo (*R.*); Markree, Co. Sligo (*K.*); Belfast (*W.*); Enniskillen (*P.*).

B. COSTELLA, *Fb.*—Killarney; Sligo (*R.*); Enniskillen (*P.*).

HARPIPTERYX NEMORELLA, *L.*—Sligo (*R.*).

H. XYLOSTELLA, *L.*—Sligo (*R.*); Inishowen (*K.*); Derry (*C.*); Belfast (*W.*); Howth (*G. V. H.*); Avoca, Co. Wicklow (*K.*).

GELECHIIDÆ.

ORTHOTELIA SPARGANELLA, *Thnb.*—Sligo (*R.*); Enniskillen (*P.*).

PHIBALOCERA QUERCANA, *Fb.* Generally common.

DEPRESSARIA COSTOSELLA, *Haw.*—Howth, abundant; Bunrana, Co. Donegal (*K.*); Belfast, abundant (*W.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

D. FLAVELLA, *Hb.*—Sligo (*R.*); Howth and Kerry; Belfast (*W.*).

D. PALLORELLA, *Zell.*—Belfast (*W.*).

D. UMBELLANA *St.*—Howth; Killynon, Westmeath (*K.*); Belfast (*W.*); Letterfrack (*C. T. C.*).

D. ASSIMILELLA, *Tr.*—Howth.

D. SCOPARIELLA, *Zell.*—Letterfrack (*C. T. C.*).

D. ARENELLA, *Schiff.*—Armagh (*J.*); Belfast, abundant (*W.*); Sligo (*R.*); Clonbrock, Galway (*R. E. D.*).

D. PROPINQUELLA, *Tr.*—Sligo (*R.*); Clonbrock, Galway (*R. E. D.*).

D. SUBPROPINQUELLA, *Sta.*—Raheny, near Dublin; Letterfrack (*C. T. C.*).

D. RHODOCHRELLA, *H.-S.*—Howth; Letterfrack (*C. T. C.*).

D. ALSTRÆMERIANA, *Clerck.*—Dublin coast; Roches Point, Co. Cork; and Dunmore, Co. Waterford (*K.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

D. PURPUREA, *Haw.*—Wicklow Mts., Clonmel.

D. CAPREOLELLA, *Zell.*—Armagh (*J.*).

D. CONTERMINELLA, *Zell.*—Enniskillen (*P.*); Sligo (*R.*); Derry (*N. H. C.*); Letterfrack (*C. T. C.*).

D. ANGELICELLA, *Hb.*—Enniskillen (*P.*).

D. OCELLANA, *Fb.*—Belfast; Clonbrock, Galway (*R. E. D.*); Sligo (*R.*); near Derry (*W. E. H.*); Enniskillen (*P.*); Mayo (*K.*).

D. YEATIANA, *Fb.*—Howth; Belfast (*W.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

D. APPLANELLA, *Fb.*—Abundant everywhere.

D. CILIELLA, *Sta.*—Markree Castle (*K.*); Sligo (*R.*); Enniskillen (*P.*); Derry (*W. H. C.*); Letterfrack (*C. T. C.*).

D. ROTUNDELLA, *Dougl.*—Howth, at the foot of the cliffs.

D. DISCIPUNCTELLA, *H.-S.*—Minehead, Waterford (*K.*).

D. DOUGLASELLA *Sta.*—Howth.

D. NERVOSELLA, *D. L.*—Cork (*MeA.*); Derry (*W. H. C.*).

D. BADIELLA, *Hb.*—Dingle, Co. Kerry; Howth; Letterfrack (*C. T. C.*).

D. HERACLEANA, *De Geer*.—Common everywhere.

GELECHIA ERICETELLA, *Hb.*—Howth; Belfast, abundant (*W.*); Clonbrock, Galway (*R. E. D.*); Sligo (*R.*).

G. MULINELLA, *Zell.*—Howth, abundant; Sligo (*R.*); Letterfrack (*C. T. C.*).

G. SORORCULELLA, *Hb.*—Crookhaven, Co. Cork (*K.*).

G. DIFFINIS, *Haw.*—Howth, abundant.

BRACHMIA MOUFFETELLA, *Schiff.*—Killarney.

BRYOTROPHA TERRELLA, *Hb.*—Abundant everywhere.

B. DESERTELLA, *Dougl.*—Sandhills of Dublin coast; Derry (*C.*); Newcastle, Co. Down, abundant (*W.*); Sligo (*R.*).

(To be continued.)

NOTES AND OBSERVATIONS.

THE STEVENS COLLECTION.—The first portion of this very interesting collection of British Lepidoptera, gathered together during a period of over sixty years, was dispersed at the well-known auction rooms in King Street, Covent Garden, on March 27th and 28th last. The bulk of the material produced about usual prices per lot, but some of the choicer species and aberrations were keenly contested for by the bidders. The following are some of the more important items among the Rhopalocera:—

Pieris daplidice. Of this species there were four specimens, and the prices obtained for them ranged from 7s. to £1; the higher sum being paid for an example which the late Mr. Samuel Stevens himself captured at Dover in 1872.

Argynnis latona. Twelve specimens, six of which, taken by Mr. Stevens in 1872, sold at from 5s. 6d. to 17s. 6d.; the other examples averaged about 6s. each. One of the specimens was lotted with two examples of *A. niobe* taken by Parry in 1874, and the entire parcel only realized 16s.

There were nine specimens of *Vanessa antiopa*, all with data, and these sold at from 6s. to £1 5s.; the top price was given for an example taken at Worksop, Notts, in 1829; the lowest figure was for lots 41 and 42 combined—one ancient example dating from 1803, and formerly in Donovan's collection; the other taken at Hammersmith in 1849—12s. the couple.

Fourteen specimens of *Chrysophanus dispar* were offered, one example at a time, and these realized altogether £71 15s., which amount works out an average of £5 2s. 6d. apiece. The lowest price was £2 for a dwarf male, while a grand example of the same sex brought £8.

Lycana acis was represented by seventeen specimens, and these fetched £6, or at the rate of about 7s. each; the first lot of six examples, however, went for £2 10s., which gives an average price per specimen of about 8s. 3d.

Lycæna arion, of which species there were eighteen examples, found purchasers at about 2s. 3d. each; but the first lot of four specimens, two of which were taken at Bude in 1895, sold for 14s.

Varieties.

A lot containing eighteen *Euchloë cardamines*, including a male specimen without central spot and black tips to fore wings, and one female example with the central spots much larger than usual, realized £2 7s. 6d.

An exceptionally fine rayed and suffused variety of *Argynnis paphia* was sold for £3; another aberrant example of this species, with large elongated submarginal spots, found a purchaser at £4 10s.; a female with large discal blotches, together with a colourless spotted male and three other examples, brought £2 10s.

A pair of dark specimens of *Argynnis aglaia*: the male, with rays on the margin of hind wings, was secured for an outlay of £2 10s.; whilst an example of var. *charlotta*, taken in the New Forest in 1870, by the Rev. J. Watson, went for five guineas.

A silvery variety of *Argynnis adippe*, from Dr. Harper's sale, was evidently a desideratum, and the price given for it was £6 16s. 6d.; another specimen of this species, with the fore wings, except spot in the cell, densely irrorated with black, brought £3 10s.; a third example, a female, with large confluent blotches on disc of the fore wings sold for £3 5s.; a fourth specimen, with the silver spots absent, realized £3.

An aberration of *Argynnis euphrosyne*, taken at Darenth, described as having "under side of fore wings with disc black and margin orange with yellow rays, hind wings with silver spots elongated, central one reaching margin," induced the bidding to mount up to the respectable sum of £6; an example with under surface of hind wings as in the specimen last referred to, and the upper surface of all the wings nearly black, brought £1 10s. less; a third variety, with almost black upper surface and dark under surface, silver spots normal, sold for £2 5s.

Lot 37, comprising thirteen specimens of *Melitea cinxia*, including one pale and other vars.; the same number of *M. athalia*, "one with light fore wings and dark hind wings (*eos*, Haw.)," was knocked down at £6 10s.

A variety of *Vanessa io*, with the hind wings devoid of ocelli, brought in £5; the aberration of *V. atalanta* figured in the 'Entomologist' for 1878 realized 10s. more; the bidding for a variety of *V. cardui*, figured Entom. vi. 345, did not cease until the sum of £6 10s. had been offered; but the price for another example of the last-named species, similar to that figured in Newman's 'British Butterflies' (p. 64) went up £1 10s. higher.

A black example of *Limenitis sibylla* was disposed of at £1 17s. 6d.; whilst another example, with the upper surface almost black and the under surface dark, fetched 3 guineas. One dark variety of *L. sibylla*, one example of *Apatura iris* with white markings almost absent, and other specimens of each species, were cleared at £1 10s.; and the same price was given for one very dark specimen of *A. iris* and three females of the same species.

Two examples of *Melanargia galatea*, both figured in the 'Entomologist' for 1876 (p. 193, 2nd and 3rd figs.), were sold for 2 guineas;

but the next lot, which comprised another aberration (1st fig., *l. c.*), one very dark example and four other *M. galatea*, with some *Erebia blandina*, commanded £7.

An almost unicolorous orange variety of *Pararge megera* sold for £5; whilst a lot containing five *Epinephele ianira*, "with curious colourless patches," and an example of *E. tithonus* without ocelli, went for £1 5s. A unicolorous light brown variety of *E. ianira* realized £2 10s. A cream-coloured aberration of the same species brought £4. A variety of *E. tithonus* with costa and margins of fore wings lighter than the disc (Ashburton, 1864), ran the bidding up to £5 10s.; whilst an "exceptionally fine white" aberration of the same species went for £1 12s. 6d.

Three varieties of *Chrysophanus phleas*, which were put up separately, produced a total of £10 15s.; the prices were £1 15s. for an exceptionally fine dark example, £4 for a fine silver specimen (var. *schmidtii*), and £5 for a "magnificent golden variety."

An aberration of *Lycæna icarus*, described as a "remarkable under-side var.," sold for £2 10s. A double lot of fifty-three *L. icarus* and *L. adonis*, including a "curious buff var." and four under-side vars. of the latter species, was disposed of for £2 10s.

A lot of "skippers," including a silvery variety of *Hesperia comma*, brought £1 10s.

Gyandromorphous Specimens.

Colias edusa: male on the left side, female on the right, £3 10s.

Thecla quercus: male on the right side, female on the left, £3 15s.

Lycæna icarus (ulevis): male on the right side, female on the left, £3.

(To be continued.)

DRAGONFLIES CONGREGATING AT SEASIDE. — On the first Monday in October last, a warm sunny morning, I was on the new pier at Brighton, and noticed a number of dragonflies—possibly two or three hundred—basking in the sun on the shelters and elsewhere. The distance from fresh water, two or three miles, seemed strange to me. I had no means of securing a specimen to be certain which species it was, but think it would most probably be *Sympetrum striolatum*. I may add that the insects did not appear to be *coming* or *going*. Just as I say—basking in the sun on the band-stand, &c.—(Mrs.) ALICE TROLLOPE; Hawthorndene, Tunbridge Wells, March 19th.

LYCÆNA CORYDON VAR. FOWLERI.—It may be worth noting that a male specimen of this variety, which my brother and I possess, is without the black dots on the outer margin of the hind wings, which are depicted in the plate and also mentioned in Mr. South's description (*vide* p. 104); the insect thus having a white border interrupted only by the black nervules.—FRED. G. BELLAMY; Ringwood, April 6th, 1900.

ALIEN EARWIGS ESTABLISHED AT BOW.—At the end of March, while searching for beetles amongst a store of boxes in some soap-works at Bow, in the east end of London, Mr. E. C. Bedwell found two species of earwig. Although not particularly interested in the order to which they belong, he secured a few specimens. They turn out to belong to

the same two species that Mr. J. J. Walker found established under somewhat similar conditions at Queenborough, in Sheppey—viz. *Anisolabis annulipes*, Luc. (Entom. xxx. 125), and *Apterygida arachidis*, Yers. (Burr, Brit. Orthop. 17). — W. J. LUCAS; Kingston-on-Thames, April 5th, 1900.

THE PUPAL HABITS OF *COSSUS LIGNIPERDA*. — Mr. Adkin's note upon this subject (*ante*, p. 128) appears to me to somewhat understate the case. While admitting that I have found pupa-cases, both on the ground and even at some considerable distance from any possible feeding-place for the larva, my experience shows that for the most part the cases have been found protruding from the burrow in which the larva has fed. *C. ligniperda* is so plentiful in this district as to be a pest, and five years ago a large willow-tree was killed outright by the devastation of this insect. One evening I took seventeen specimens (apparently just emerged) from the trunk of that tree, and at least twice as many pupa-cases were to be seen projecting from holes in which the larvæ had wrought their deadly work. Moreover, I was fortunate enough to witness in one case the emergence of the imago: the pupa projected about three-quarters of an inch from the trunk, and was about three feet from the root; it split laterally, and the anterior portion fell to the ground, leaving the posterior part sticking in the hole. In those days my entomological knowledge was very superficial, but the circumstances of that occasion are particularly impressed upon me, as my companion was unfortunate enough to discover a nest of wasps, but, unluckily for him, not until after they had discovered him. Our studies of the habits of *Cossus ligniperda* cost him three weeks in bed.—WILLIAM A. CARTER; Burr Villas, Bexley Heath, Kent, April 9th.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*March 21st, 1900.*—Mr. C. O. Waterhouse, Vice-President, in the chair. Mr. R. T. Cassal, of Ashby, near Doncaster; Mr. Neville Chamberlain, of Highbury, Moor Green, near Birmingham; Mr. E. A. Elliott, of 41, Holland Park, W.; Mr. H. Willoughby Ellis, of Knowle, Warwickshire; Mr. J. H. Keys, of 6, Seymour Terrace, Lipson, Plymouth; the Rev. W. J. Leigh Phillips, M.A., of The Cottage, Parkwood Road, Tavistock, Devon; Mr. H. W. Sheppard-Walwyn, M.A., of Glensyde, Bidborough, near Tunbridge Wells; and Mr. C. J. Watkins, of Kings Mill House, Painswick, Gloucestershire, were elected Fellows of the Society. Mr. R. McLachlan exhibited an extraordinary aberration of *Enallagma cyathigerum*, Charp., taken by Mr. Morton at Glen Lochay, Scotland; the remarkable feature consisted in the predominance of black over blue in the coloration of the abdomen. Mr. M. Burr exhibited a macropterous variety of *Xiphidium dorsale*, Latr., captured by Mr. Harwood near Clacton, remarking that the fact of this species presenting a macropterous form was apparently unrecorded hitherto. Mr. W. J. Kaye exhibited *Nyssia hispidaria*, an asymmetrical specimen taken on Wimbledon Common, the left fore wing of which was perfectly

developed, but extremely small, and the left hind wing slightly more elongated than the right hind wing. Mr. C. O. Waterhouse exhibited a tube which formed the entrance to a nest of a *Trigona*, sent from Singapore by Mr. H. N. Ridley. It was about fifteen inches in length, of a resinous substance, but more waxy towards the end, which was spoon-shaped. He also exhibited a portion of the resinous mass formed within the trees by these bees, and stated that one of these masses sent from Penang by Mr. Ridley weighed fifteen pounds. The true nest of the *Trigona* consists of an irregular mass of cells filled with honey, quite distinct from the resinous formation. A paper was communicated by Mr. W. H. Ashmead, Assistant-Curator of the United States Natural History Museum, on "The Aculeate Hymenoptera of the Islands of St. Vincent and Grenada, with additions to the Parasitic Hymenoptera, and a List of the described Hymenoptera of the West Indies."

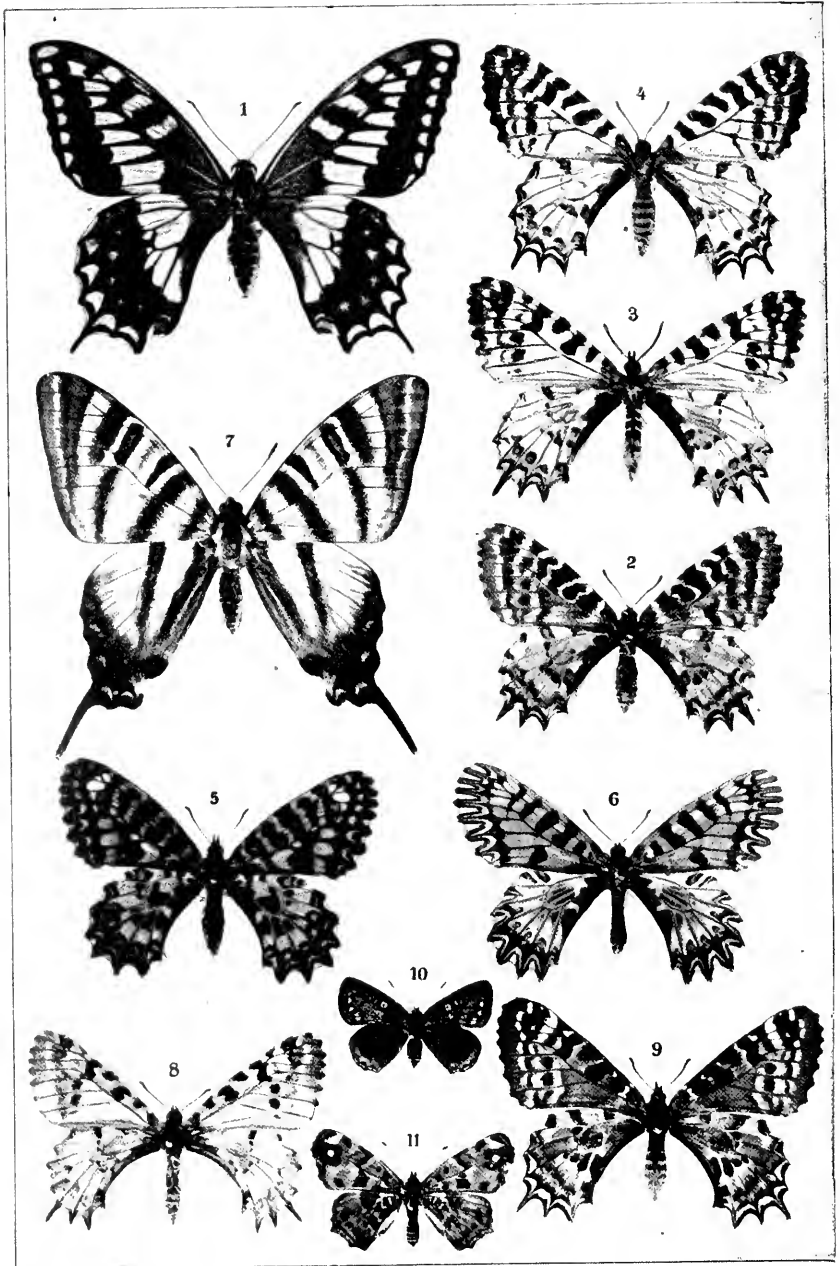
April 4th.—Mr. G. H. Verrall, President, in the chair. Mr. J. W. Carter, of 25, Glenholme Road, Manningham, Bradford; Mr. L. L. Feltham, of Johannesburg, South Africa; and Mr. H. Fortescue Fryer, of the Priory, Chatteris, Cambs, were elected Fellows of the Society. Mr. M. Jacoby exhibited specimens of the genus *Sagra* from Eastern Asia. Mr. M. Burr exhibited three species of Pseudophyllidæ, two new species of *Cynoptera* (females), and *C. quadrimaculata*, Westw. (female), collected in the Siamese Malay States by Mr. M. Annandale. One of the specimens illustrated the peculiar methods of offence adopted by the insect when alarmed. Between the head and the pronotum a scarlet hood was visible, the inflation of which bladder-like organ always indicates fear or anger. The other specimens showed the natural position of the head and pronotum. Mr. H. J. Elwes communicated a paper on "Bulgarian Lepidoptera," and made some remarks on the more notable species which he had taken in the Balkan Peninsula during the months of June and July, 1899. The number of species of *Rhopalocera* captured was 120, which, with a further twenty recorded by Haberhauer and Lederer, brings up the total to 140. The mountains visited were an extension of the Rhodope range, where the climate was particularly rainy, a great number of ferns flourishing everywhere, in contrast to the drier Balkans, where the number of species of *Rhopalocera* is not less than 200. Some interesting forms, but no new species, were encountered. A variety of *Colias myrmidone* occurred much larger and brighter than the Austrian, and more nearly agreeing with the Ural form; and whereas in Austria the white aberration is exceedingly rare, in this locality it predominated. Meanwhile the orange forms clearly resembled *C. heldreichi*. The form of *Cano-nympha davus* met with showed an affinity with the Asiatic and not the European form, being almost precisely similar to specimens taken in the mountains of Armenia by Haberhauer. The form of *Argynnis pales* was intermediate between that found in Greece and the Central European Alps, while a form of *Erebia* var. *gorgone* was taken similar to that in the Pyrenees—a curious instance of interrupted distribution.—C. J. GAHAN & H. ROWLAND BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 8th, 1900.*—Mr. W. J. Lucas, President, in the chair. Mr.

Harwood exhibited a species of *Blatta* from the Eastern Counties, which was apparently new to Britain. Mr. Adkin, a bred series of *Eugonia autumnaria* from Bournemouth. Mr. Colthrup, a specimen of *Euchelia jacobae* with the red areas unusually pale, a very beautifully marked variety of *Eurrrhypara urticata*, and very small examples of *Pieris rapae*, including a yellow variety. Mr. Lucas, living specimens of the immature stage of *Blatta australasiae* from Kew, and a case containing examples of the whole of the British cockroaches, with drawings of several species. Mr. Main, living specimens of *Blatta americana* from Silvertown. Mr. Edwards, living specimens of *Phyllodromia germanica*, male, female, and immature. Mr. Moore, numerous exotic species of cockroaches. Mr. Tutt, a long and varied series of *Epunda lutulenta*, taken at Mucking, Essex, by the Rev. E. Burroughs in 1898-9, and contributed notes as to the occurrence and variation of the species. Mr. Lucas read a paper entitled "Cockroaches: Natives and Aliens," illustrating it with numerous lantern-slides.

March 22nd.—The President in the chair. Mr. MacGee, of Lillie Road, S.W., and Mr. J. Platt-Barrett, of Margate, were elected members. Mr. Montgomery exhibited specimens of a second generation and a partial third brood of *Coremia designata*, and gave notes on their life-history and variation. Mr. F. N. B. Carr, a varied series of *Hybernia leucophaearia* from Lee.—HY. J. TURNER, *Hon. Report Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—March 21st, 1900.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. Charles Carey Woods was elected a member of the Society. The President referred to the death of Mr. W. G. Blatch, who, he said, was the first President of the Society, from 1888 to 1893. Mr. P. W. Abbott showed long series of several species of Lycænids, particularly a very fine lot of *Lycæna alexis*, including blue forms of the female from Ireland; also some of the white-bordered forms of *L. corydon* taken by Mr. T. H. Fowler on the Dorset coast. Mr. G. T. Bethune-Baker also showed many fine Lycænids; very small *L. alexis* from Algeria, almost as small as *minima*, and blue females from various localities; also ab. *ceronus* of *L. bellargus*, &c. Mr. C. J. Wainwright showed a boxful of Syrphids, chiefly containing the genus *Eristalis*. Mr. A. H. Martineau showed some Aculeates collected by Mr. Wainwright, including the very rare *Crabro pubescens* (male), one specimen, from the New Forest; he said that less than a dozen specimens of the species had at present been taken in the country. Mr. R. C. Bradley read a paper upon mosquitoes, in which he described the life-history of the common Culexidæ, and gave some account of the connection between *Anopheles* and malaria, exhibiting in connection with the paper various British species of the family. A discussion followed, in which various members gave their experiences of the biting habits of these insects at home and abroad, and also discussed the origin of the habit, &c. Mr. G. H. Kenrick believed the habit had begun through sucking juices of plants; Mr. Neville Chamberlain said that he believed people in time became quite inoculated against the effects of the bites; when he first went to the Bahamas he suffered very much, but after a time they did not seem to hurt him at all.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*



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SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND TEMPERATURE MADE WITH LEPIDOPTERA UP TO THE END OF 1898.*

BY PROF. DR. MAX STANDFUSS.

PLATE I. (Entom. Plate V.).

Synopsis of temperature and hybridization experiments hitherto undertaken, supplementary to the work.

“Experimental Zoological Studies with Lepidoptera,” and with additions containing the principal results obtained during the year 1898, in continuation of these experiments.

The studies in question are in two directions, of which to the one, Temperature Experiments, I have given my attention for twelve years; and to the other, Hybridization Experiments, for twenty-five years.

For the first, 42,000 specimens of about sixty different species have been used, and for the second, more than 38,000 specimens of over thirty species.†

The Lepidoptera are for many reasons the best suited for such experiments. Firstly, the material can be taken directly from nature; and, secondly, many species can be used in large numbers. At the same time the life-history of the creatures is very short, many species even in our latitude having two generations in the course of a year; and, finally, the different phases of their varying metamorphoses give an opportunity and possibility of making many observations of a biological, physiological, and physiological nature, owing to their generally highly characteristic features.

* Translated from the German by Edward Martin Dadd.

† During the year 1898, 4800 specimens were used for temperature, and 3200 specimens for hybridization experiments.

Firstly, the Temperature Experiments.—The temperature experiments which concern us here (searching temperature experiments in other directions are mentioned in my 'Handbuch der palaearktischen Gross-schmetterlinge,' pages 137-153) have been chiefly devoted to the pupal stage, and may therefore be considered as a continuation and supplement of the methodical experiments first made by G. Dorfmeister, Aug. Weismann, and W. H. Edwards in the sixties and seventies.

To the experiments begun by others must be added experiments made by me in quite another direction, relating to inheritance of the new characters acquired by these experiments.

The studies of the three gentlemen in question related chiefly to the appearance in nature of Wallace's so-called "Seasonal Dimorphism." What is seasonal dimorphism? The fact that species which attain the imago stage twice or more during the course of a year generally exhibit marked differences in the size, shape, or colour of the imagines of these two generations.

The most noteworthy example is to be found in our smallest *Vanessa*, the so-called map-butterfly, *V. levana*, L., in which the difference between the imagines from hibernated pupæ and those of the summer brood are so great that the two forms were for a long time considered to be two different species. This insect was therefore one of the first to be experimented with by Dorfmeister and Weismann. Weismann, to whom we owe the best work on this subject, which appeared in 1875, placed the summer pupæ of *V. levana* for twenty-four weeks in an ice safe or ice cellar, and winter pupæ in a conservatory with a temperature of $+15^{\circ}$ to $+30^{\circ}$ C. By this means the summer form was changed directly to the winter form; but, on the other hand, it was found to be very much more difficult to change the winter form by warmth to the summer, and in most cases it was an entire failure. Weismann concluded therefore that the species was a northern one, and that the winter form *V. levana* was the oldest and most constant, and the summer form—var. *prorsa*—a later innovation, that is to say, only recently introduced into the life-history of the species.

This supposition is probably correct, as the species no doubt emanates from Northern Asia, where there are to be found four nearly related species, the only living relatives of this insect on the earth; and, moreover, *V. levana* itself is found there, in some places actually with only one generation in the year from hibernated pupæ—for example, at Nicolajefsk and Chabarofka. Var. *prorsa* is therefore a recent introduction, which, by lowering the temperature of the pupal stage, can be immediately made to resume its ancient characters. The "phylogenetic"—or, we may well say, the younger—form can be directly changed to the older. Further experiments with *Papilio ajax*, L., *Pieris napi*,

L., *Polyommatus phloea*s, L., *Pararge egeria*, L.—all species which exhibit seasonal dimorphism—led to analogous results.

As far as Dorfmeister, Weismann, and Edwards are concerned up to the year 1875, all three of them dealt with a species *by and for itself*, as an isolated type relative to the action of various degrees of temperature, during the pupal stage on the resulting changes in character of the species, within its own limits, without considering their relationship to those of other species. As a matter of fact, the species experimented with up till that time were not especially suited to open up further phylogenetic research.

Exactly ten years later I commenced analogous experiments, although not to any great extent until 1893, as my hybridization experiments, which were commenced in 1873, and carried on later in conjunction with the temperature experiments, took up a good deal of my time until then.

Ever since the year 1888 the English entomologist Merrifield has been making experiments in the same direction, and since that time has published a number of papers on this question in the 'Transactions' of the Entomological Society of London. Weismann has also continued his experiments lately, and numerous other younger entomologists are now making similar experiments.

The temperature experiments made by me can be naturally divided into two groups. On the one hand, by using constant high temperatures of $+37^{\circ}$ to $+39^{\circ}$ C., in which the pupæ were placed three or more days; or by constant low ones of $+4^{\circ}$ to $+6^{\circ}$ C., which lasted four to eight weeks. We will call these, shortly, warmth and cold experiments.

The first were made in the developing apparatus of the Polytechnic Seed Culture Station, Zurich, whose Director, Dr. G. Stebler, has assisted me in the kindest and most willing manner. For the second, I have used an ordinary ice safe, as is used for keeping food in many households.

After the treatment with cold the pupæ remained for some time in an ordinary temperature till the imagines emerged. This was also usually the case with the warmth experiments, very few pupæ remaining in the forcing apparatus until they were fully developed.

On the other hand, I made experiments which could be termed heat and frost experiments, the temperature being only intermittently applied—two to seven hours at a time—because only capable of being endured for short intervals.

The heat experiments were carried out with the help of the forcing apparatus at from $+40^{\circ}$ to $+45^{\circ}$ C.

The degrees of cold, 0° to -18° , exceptionally to -20° C., were procured at the freezing apparatus of the Institute for

Testing Building Material, whose Director, Prof. L. Tetmayer, has assisted me in these experiments in the kindest manner.

Firstly, warmth and cold experiments. The principal results of these are dealt with in the 'Handbuch der palaearktischen Gross-schmetterlinge,' and are summarised as follows:—

Species from northern sources—that is to say, species which themselves, as well as the majority of their relatives, live in northern regions, and would therefore probably emanate from there—give retrogressive forms by the application of cold, but progressive forms by the application of warmth.

On the other hand, species of southern origin, mostly species which have penetrated from the south in a northerly direction, and whose relatives are entirely, or nearly so, denizens of tropical and subtropical regions, produce retrogressive forms by the application of warmth, and progressive forms by the application of cold.

In all cases as yet dealt with the retrogressive and progressive forms indicate:—

1. That seasonal forms are obtained, that is, forms whose appearance is constant at certain seasons of the year. Apart from the well-known case of *V. levana*, L., and its var. *prorsa*, L., of Dorfmeister and Weismann; *Vanessa c-album*, L., can be changed by cold from the first or summer generation to the second or autumn generation, and the second generation partly to the first by the application of warmth. We have good grounds for the belief that *V. c-album* is a northern insect, and that its autumn form is the more ancient, the summer form being a recent introduction—that is to say, the younger. This would explain the fact why the first generation retrogressed, and the second generation progressed by this experiment. Large numbers of the summer generations of *Papilio podalirius*, L. (Wallis), *Pieris daplidice*, L. (Berlin), and *Polyommatus amphidamas*, Esp.* (Leipzig) produced by the application of cold the forms from hibernated pupæ only.

2. Local forms can be obtained—that is, forms which in certain localities are found as local races. I succeeded in obtaining *Vanessa urticae*, L., var. *polaris*, Stgr., of Lapland, direct from Zurich pupæ by submitting them to low temperatures, and forms approaching var. *ichnusa*, Bon., of Corsica and Sardinia, with high temperatures. As *V. urticae* is also probably a northern species, var. *polaris* would be the older, and var. *ichnusa* the newer form.

The change effected in the swallow-tail, *P. machaon*, through the influence of warmth, were especially noteworthy. By special

* The contrary was also successful with *P. amphidamas*, Esp., a direct change of the winter generation to the summer generation being obtained in the majority of cases by placing the pupæ at the end of March and beginning of April for eleven to fourteen days in a temperature of + 37° C.

manipulation imagines were obtained from pupæ of the summer form from Zurich, which approached in a marked degree those found in July and August in Syria and sometimes at Antioch and Jerusalem. Further, the second generation of *P. podalirius* from Wallis can be changed by warmth to the more characteristic summer form of southern localities—that is, the typical var. *zanclus*, L., of Sicily, and so forth.

3. Changes in the direction of sexual colour dimorphism. By warmth the female of *Parnassius apollo*, L., from Wallis, was entirely changed to the male type of coloration, and the male had the dark spots on the outer margin of the fore wings replaced by white. Sexual colour dimorphism must certainly only be regarded as a link in the chain of the normal development of the species, and in the case before us—as, indeed, it seems to be the rule—the male is the newer type, and the female the older. Therefore in our experiment the older female type was changed to the newer male type, and the male evolved still further in a progressive direction.

It is also noteworthy that the dead whitish colour of the female *Rhodocera rhamni*, L., is changed by warmth to the intense yellow male coloration, either totally or partially. This important change in the coloration of the female is not so much a phylogenetic as a physiological matter, as is shown by the correlation between the colour and the genital organs. In some of these warmth experiments, and especially in the case before us, certain female specimens underwent a certain amount of damage and malformation to the sexual organs, and this malformation seemed to be directly connected with the change of the female colour.

4. Phylogenetic forms* in their truer sense—that is, forms which at present do not occur on the earth, or only very rarely.

* In February, 1898, a large number of *P. hospiton*, G \acute{e} n \acute{e} (pupæ from Sardinia), were made to approach *P. machaon* in wing-outline and markings by warmth. The fore wings were much more extended, the tail of the hind wings lengthened, the yellow half-moon spots on the outer margins of the upper sides of the fore and hind wings, and the red eye-spot at the anal angle of the hind wings were noticeably increased in size, and in some specimens yellow scales were sprinkled thickly on the black base of the fore wings on the upper side, and on the broad black bands near the outer margin; all of these changes are approaches to the type of *P. machaon*, L. Pl. I. fig. 1 shows a female specimen which shows the change in the shape of the wing very plainly.

It appears therefore as if *P. hospiton*, which, as is well known, inhabits exclusively the mountain regions of Corsica and Sardinia, and whose claim to the title of a separate species, as well as *Argynnis elisa*, God., and *Satyrus neomiris*, God. (also species indigenous to Corsica and Sardinia), are chiefly owing to its insular isolation, obtained certain changes in colour and wing-structure, both with a correlative relationship to each other, from the nearly related *P. machaon*, during some past epoch of low temperature. It is a fact that *P. hospiton* is inclined to converge with *P. machaon* in several directions by a slight increase of temperature.

(a) Forms which belong to the former history of the species—that is, true retrogressive forms. They can be recognised at once by their approaching in markings to related species or forms which are recognised as nearer the original type of the genus.

V. polychloros, L., for example, by the application of cold, obtained a row of blue spots on the outer margin of the upper side of the fore wings, which are usually wanting, but which are still present in the nearly related *V. urticae*, L.; and *V. io* also approached *V. urticae* both on the upper and under sides. *V. antiopa* obtained quite noticeably two spots on the upper side of

Another fact which shows the effect that low temperature has had on *P. hospiton* is that it has only one generation during the year, whereas *P. machaon* in nearly the whole of its widely extended area has two generations yearly.

Up till now I have bred 583 specimens of *P. hospiton*, but only during the abnormally hot year 1892 did I obtain a few specimens during the month of August from fresh pupæ from Sardinia before hibernation. These are intermediate between the ordinary form and the forms obtained by the experiment.

The results obtained by warmth in changing the three *Thais* species and their local forms—*cerisyi*, B., var. *deyrollei*, Obthr., *rumina*, L., *polyxena*, Schiff.—are worth noting.

One hundred and fifty pupæ of the local form of *T. cerisyi*, B., from Amasia, var. *deyrollei*, Obthr., were subjected in February for nine to fifteen days to a constant temperature of $+37^{\circ}$ C. until emergence. About one-third of the female specimens obtained a brownish coloration of the ground colour of both wings on the upper sides in place of the white tone and a weak discoloration of the under sides, mostly accompanied by an increase in size of the black markings. This form is rarely obtained in ordinary circumstances. The most extreme forms reached on the upper side, the brown-yellow of typical *rumina* ab. *canteneri*, Stgr., from Malaga. Pl. I. fig. 2 shows one of these dark brown female specimens obtained by this experiment, but the black markings are only increased somewhat on the fore wings.

In the male specimens obtained by the same treatment a noticeable darkening of the light ground colour was only exceptionally present, but nearly always, though not to any extent, there was a slight increase in the size and number of the black markings, at times accompanied by an enlargement of the red spots of the hind wings.

The male (Pl. I. fig. 3) shows these characters. Its markings thus attain a growing resemblance to the light female forms of *Thais* var. *deyrollei*, Obthr., which occur regularly at Aintab, north-east of Antioch (Syria). We concluded (Standfuss, Handb. d. palæarct. Gross-schm. 1896, pp. 226, 227) that these female types from Aintab were the most progressive, because they were the nearest approach to the male type of coloration; and those retrogressive males procured from the Amasia pupæ by warmth are a still nearer link to the above-mentioned female Aintab types. A female from Aintab is shown (Pl. I. fig. 4) whose pupa has not been experimented with.

A few male specimens obtained by the experiment a very curious addition to their wing-structure, a portion of the hind wings with the three long tails being lengthened: so that there was a certain resemblance to the type of hind wings of certain *Papilio* species—*P. podalirius*, L., for example.

Ninety-three pupæ of *Thais rumina* from Portugal produced, under a temperature of $+37^{\circ}$ C. after hibernation during January and February in six to fifteen days, a similarly dark brown type, mostly with an increase of

the fore wings, in the exact position that they still occupy in *V. urticae* and *V. c-album*, and other related species.

(b) Forms which possibly indicate the future line of development of the species. These would then be true progressive forms. They are characterised by their departing still further from the ancient genetic type, and from related species. In most of the species of *Vanessa* from northern sources hitherto experimented with, these forms are usually obtained by warmth, especially with *V. antiopa*. Only the species of southern source, *V. cardui*, L., and *V. atalanta*, L., produced them with cold.

(To be continued.)

size of the black markings, as well as intermediate forms, altogether thirty-four specimens. This form was much rarer in the males (seven specimens), and not nearly so extreme as the females (twenty-seven specimens). One of the females is shown Pl. I. fig. 5. This type, Staudinger's ab. *canteneri*, is of rare occurrence in South Spain (Andalusia) and North Africa. The ab. *canteneri* was not at all rare in pupæ from Malaga, but I never had them in anything like the numbers that I obtained from the pupæ from Portugal, with which I made this experiment, and then mostly when the insects emerged without any treatment during the autumn (September and commencement of October) before hybernation.

No ab. *canteneri* were obtained from the Portugal pupæ treated in the usual manner.

Four hundred specimens of *Thais polyxena*, Schiff., from Vienna, treated for this warmth experiment, produced under +37° C., in eight to twelve days, twenty-six specimens of ab. *ochracea*, Stgr., the analogous form to ab. *canteneri*, and a fair number of intermediates. A collateral tendency to an increase in the dark markings was not manifested, but a preponderance in numbers and extremity of variation in the females (sixteen specimens) to males (ten specimens); Pl. I. fig. 6, shows us one of these experimentally browned males. I have never yet seen or bred specimens from Vienna, which are as dark as the most extreme form obtained in the experiment, and occasionally, under ordinary treatment in large numbers, forms nearly approaching in density of marking, from Budapest pupæ and from the neighbourhood of Mehadia.

The most extreme form obtained by the experiment approaches very nearly *Thais polyxena* var. *polymnia*, Mill. aberratio (cf. Millière, Lepidoptérologie, septième fascicule, 1881, pp. 2-4, pl. x. fig. 5) which comes from the island of Eubœa, and is perhaps the most extreme form of ab. *ochracea*, Stgr., as yet known.

The results obtained by these warmth experiments with these three *Thais* species are that under similar treatment more or less similar developments are obtained, to which the female sex, both in number of specimens and intensity of variation, are almost exclusively subject, leads one to the supposition that this is a case of retrogression.

As to the fact that a lighter or darker tone of brown as ground colour is common to many families as well as Rhopalocera, refer to the work of Alf. G. Mayer, "On the Color and Color Patterns of Moths and Butterflies" ('Proceedings' of the Boston Society of Natural History, Boston, vol. xxvii. 1879).

THE TYPE OF *THECLA*, FABR.

BY A. G. BUTLER, Ph.D.

IN Marshall and De Niceville's 'Butterflies of India,' vol. iii. p. 298, Mr. de Niceville observes:—"In taking *T. spini*, Wiener Verzeichniss, which occurs in Europe and Northern and Eastern Asia, as the type of the genus *Thecla*, I follow Mr. S. H. Scudder, Mr. W. F. Kirby, and Messrs. Godman and Salvin, rather than Mr. A. G. Butler, the last adopting *betulæ*, Linnæus, a European and North Asiatic species. The latter is, however, the type of Dalman's genus *Zephyrus*."

In Dr. Scudder's "Historical Sketch," the plan adopted for deciding what the type of a genus is, to either take the omission of species (noted under the original description) by subsequent authors as restrictive, and applying the generic name to the residuum; or, where no reduction has been made, to accept the dictum of the first subsequent author who indicates a type. If neither action has been taken by a previous author, Scudder himself fixes the type, selecting one of the original species.

If Dr. Scudder had followed his own rule consistently, there would have been no reason why his decisions should not have been accepted as final; but in one case he ignores a genus because he says it consists of heterogeneous material, whereas, in another case, he extracts a heterogeneous species from the middle of a crowd in order to upset a properly constituted genus based upon that insect (vide *Cytherias*, which is absolutely synonymous with *Hetera*), cf. *Graphium*, *Pterourus*, &c.

On Scudder's own showing, Leach, in 1815, included *betulæ*, *pruni*, and *quercus* under *Thecla* (omitting *spini*); therefore the subsequent action of Dalman in taking *betulæ* as type of his new genus *Zephyrus* was valueless, unless it could be shown that *T. betulæ* and *T. quercus* represented different genera. To resuscitate *spini* as type of *Thecla* is to ignore the restrictive plan by which Scudder himself was generally guided, and thus reduce the firm basis upon which the type question was being settled, to the quaking bog of earlier times. We want no autocratic authority to step in and assert that "in this case the restriction of a genus may be conveniently ignored," but a definite rule, without exceptions, which all may be able to follow.

Under the circumstances, there is not the slightest question that the type of *Thecla* must be either *betulæ* or *quercus*, and, until some structural character is discovered by which these two species can be generically separated, *Zephyrus* must be regarded as a synonym of *Thecla*, the general opinion and decision of entomologists up to 1872, that *betulæ* was the type, being accepted.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE
AUCHENORRHYNCHOUS HOMOPTERA.

BY DR. H. J. HANSEN.

(Continued from p. 120.)

4. *Fulgoridæ*.

✓ In this family I have closely examined the antennal structure in *Fulgora ocellata*, Westw. (or a very nearly related species), *Dictyophara europæa*, L., *Calyptoproctus stigma*, F., *Cirius nervosus*, L., *Eurybrachys* sp., *Calliscelis bonellii*, Latr., *Issus coleoptratus* Geoffr., *Ricania* sp., *Pæcilopectera phalænoides*, L., *Tettigometra costulata*, Fieb., *Aræopus crassicornis*, Fabr., *Megamelus notula*, Germ., *Stenocarenum minutus*, F., and *Liburnia limbata*, Boh. I also examined a large amount of material with a lens.

The antennæ are situated beneath the eyes, generally far behind under the hindermost part of the eyes, or even behind that (*Fulgora*), sometimes under the front part of the eyes in an excavation in them (*Bothriocera*). They are not sunk into antennal pits, but the basal segment of the peduncle is connected with the chitin of the genæ (cheeks) by a broad—sometimes extraordinarily broad—segment-membrane (pl. i. f. 11). They are entirely different in structure from the other families, and, indeed, from what is known, apparently, in other insects.

The essential points in the antennæ of the Fulgoridæ are, briefly: the second segment of the peduncle—which is never very much smaller, but generally both longer and thicker than the first—is provided with numerous large peculiarly formed (compound) sensory organs; the flagellum consists of a moderately small, nearly pear-shaped basal segment, which bears a single sensory pit with a single spike, and of a thinner, segmented or unsegmented bristle, without trace of sensory organs.

Viewed through a lens, the surface of the second segment of the peduncle in a large Fulgorid of the typical subfamily (e. g. *Fulgora*, *Calyptoproctus*) is seen to be strewn with numbers of dark small “nodes” (pl. i. f. 11); examined in an alkaline preparation more closely through a microscope, each of the “nodes” is readily seen to consist of a circle of conical dark chitinous pegs, which protrude and converge somewhat towards the centre of the ring; the area within the ring is filled with numerous conspicuous thin generally irregularly bent rounded-above lobes (f. 11, a, g, b, and 12), which are probably the seat of a sense. Each of these nodes I have named a “compound sensory organ.” In *Fulgora* the nodes are strewn very closely

over the whole of the surface of the second segment; in *Calypto-[✓]proctus* a part of the surface is smooth; in *Dictyophara* and *Cixius* the nodes are far fewer in number, but very similar in structure, though the sensory-lobes are fewer also in number. In *Eurybrachys*, *Calliscelis bonellii*, and *Issus coleoptratus*, the surface of the second segment of the peduncles is strewn with numerous small pointed nodes and a number of bristles; the sensory organs are fewer in number in the two last-named genera (pl. i. f. 14 and 13), and in all three genera they lack the protecting ring of chitinous pegs, while the lobes in each organ are numerous in *Eurybrachys*, far fewer in the two other genera (f. 13 a). In a *Ricania* sp. the second segment of the peduncle is of scarcely greater magnitude than the first; the sensory organs are situated only on the terminal face, are few in number and small in proportion (pl. i. f. 15). They are distinguished by each one possessing only one or two lobes, while their margins are bent up in peculiar ear-shaped processes, outside each of which there is a conical spike. In *Paciloptera phalenooides* (pl. i. f. 16, 16 a) the sensory organs are still smaller in size, but are very similar in appearance to *Ricania*, though not so clean cut. The sensory lobes number only one or two. In *Tettigometra costulata* (pl. f. 17) the second segment of the peduncle is proportionately very large, and so oblique that the flagellum is articulated far from the apex on one of the sides. The sensory organs are proportionately very numerous and large; the protecting circlets of chitinous pegs are (as in *Issus*) wanting; but the rest of their structure is very obscure. Apparently all of the almost circular sensory areas are each covered (f. 17 a) with a thin membrane, which is extremely finely punctured, and on which there are usually one to four irregular elongate shallow keels, which thus agree with the lobes in the previously described Fulgoridæ. In the *Delphax* group (of which I have examined *Areopus crassicornis*, *Megamelus notula*, *Stenocaremus minutus*, and *Liburnia limbata*), one meets with a structure singularly characteristically distinguishing it from the other Fulgoridæ. The second segment (pl. ii. f. 1) is strewn with isolated large bristles and numerous small bristles, and the sensory organs are, in proportion to the size of the insect, rather numerous and very conspicuous. The chitinous pegs in the circles surrounding each organ are strikingly few in number, and of a considerable size (pl. ii. f. 1a); instead of sensory lobes there are on the membrane within the circles only bristles, which in *Stenocaremus* and *Megamelus* differ but little either in form or size from the small bristles strewn on the remainder of the surface of the segment, except that those lying within the circles are noticeably thicker than those without, while in *Liburnia* they are far thicker, somewhat shorter and coarser, and far more curved than the normal small bristles;

and, finally, in *Araeopus* they are notably shorter and coarser, and also far more closely set than the other small bristles of the segment; at the same time they have preserved entirely the character of bristles.

The bristle-shaped part of the flagellum is sometimes relatively long (*Calliscelis*), sometimes short (*Fulgora*, *Tettigometra*); sometimes with very distinct segmentation throughout the whole, or in great part of its length (*Tettigometra*, *Araeopus*, *Megamelus*), sometimes without segmentation (*Fulgora*, *Issus*, *Calliscelis*).

While the condition of the flagellum does not appear to have any wider systematic significance, on the other hand the detailed structure of the sensory organs on the second segment of the peduncle appears to possess such a value to a pre-eminent degree. I must lament that I have not been in a position—from want of material—to examine a far greater series of special genera. The *Delphax* group, so sharply characterized in other ways, appears also admirably defined by its antennal structure; on the other hand, I am not in a position to say that *Tettigometra* is clearly so distinguished, since I am without the forms which Stål places in their neighbourhood; moreover, I cannot define sharply marked boundaries for the *Ricania-Flata* groups, and I have not been able to examine microscopically any examples of the Stålian groups *Achilida*, *Tropiduchida* and *Derbida*. There thus remains a considerable gap in my researches.

B. Tegulae and Wings.

Tegulae are found only in the Fulgoridæ. In this family they are, moreover, almost universally present, generally readily enough seen, but sometimes covered over by the lateral margins of the prothorax. Stål says (Hemipt. Afr. 128) that they are absent rarely, but does not mention the precise genera in which this is the case. The only genus examined by me, in which I have not been able to see them, is *Calliscelis*, a genus characterized, among other things, by the strongly reduced wings. Their presence is thus typical of, and peculiar to, the Fulgorid family, but at the same time they can be absent or reduced almost to the vanishing point (which is certainly concomitant with a great reduction in the flight organs), so that their absence is not an absolute character.

I have but little to add on the subject of *Wing-Neuration*.

In the *Cercopidæ* a part of the anterior margin of the posterior wings (in *Cercopinae* and *Aphrophorinae* near the base itself, in *Macharota* in the middle between the retinaculum and the base) is expanded into a triangular projection (pl. ii. f. 2 a), whose upper and outer margin bears a few posteriorly directed hooks, which are fixed on a thicker, firmly chitinized base (f. 2 a). On the under side of the tegmina, a little behind the

anterior margin and near the base (*Machærota* not examined) there is an elevated longitudinal keel (pl. ii. f. 3 and 4 c), which varies somewhat in height and shape. These structures on the anterior and posterior wings certainly stand in relation to one another and contribute to the steadiness of the latter in repose. As I have not met such a peculiar formation in any of the other families, this may afford a good family character.

In *Ledra aurita* the slightly convex anterior margins are strewn, on a space from the base to the retinaculum, with about twenty hooks of a similar structure to those in *Cercopidæ*, but I have not been able to find a trace of any keel on the tegmina. Similar arrangements of hooks may be found in other Jassid genera (in *Typhlocyba roseæ*, for example, I have observed them); but as a rule they occur neither in *Jassinæ* nor *Membracinae*.

In the *Fulgoridæ* the anterior margin of the posterior wings generally presents the shape of a moderately flat arch; at the summit of the arch it is sometimes (*Pæciloptera phalenoides*) furnished with some sharp thorns, but the arch never assumes the triangular form characteristic of the *Cercopidæ*, and hooks are never found. On the under side of the tegmina one finds, a little from the base in relation to the convex part of the lower wings, a small triangular plate (f. ex. in *Fulgora* and *Pæciloptera*) standing out perpendicularly from the wings, which certainly has the same function as, though such a different form from, the longitudinal keel of the *Cercopidæ*.

In several forms, where the convex portion of the anterior margin of the posterior wings is very feebly marked (*Tettigometra*, *Aræopus*, and *Stenocarenum*), I have not been able to find the plates on the under side of the tegmina; nevertheless, in some instances (*Calypso proctus stigma*, for ex.), the convex portion may be feeble and the tegminal plate extremely well developed. Though one cannot in this obtain family characters for the *Fulgoridæ*, it is probable that the above-mentioned differences will afford them for groups or subgroups.

In the *Stridulantiæ* no trace is found of the structures mentioned in the *Fulgoridæ* or *Cercopidæ*; the hind wings are held in position during rest by their feebly arched anterior margin resting for some distance close to the strongly salient thick costal area on the fore wings.

(To be continued.)

A NEW GENUS OF *COCCIDÆ*, INJURING THE ROOTS
OF THE GRAPE-VINE IN SOUTH AFRICA.

BY T. D. A. COCKERELL, N.M. Agr. Exp. Sta.

Cryptinglisia, nov. gen.

A Lecanine coccid having a glassy covering containing air-spaces, and retaining the legs and antennæ (7 or 8 joints) in the adult. Living in galls on the roots of *Vitis*. Differs from *Inglisia* in its mode of life; in the glassy scale not being divided, tortoise-like, into plates; and in the air-cells running together, forming long air-spaces. Larva ordinary, with six large bristles on the cephalic margin. Male unknown.

Cryptinglisia lounsburyi, n. sp.

♀. Adult about $2\frac{1}{2}$ mm. long, soft, shiny, very dark brown, covered with a semitransparent, brittle, glassy scale. Skin transparent and colourless on boiling in KHO; mouth-parts moderate, rostral loop not very long; margin with a row of simple spines, brownish, about $24\ \mu$ long, placed close together; anal lobes ordinary, about $160\ \mu$ long, yellowish brown, surrounded basally by a large thick dark-brown chitinous plate, more or less semilunar in form, with the ends produced; a row of small round glands in the middle line from one end of the body to the other, but best developed posteriorly; antennæ and legs pale; legs ordinary, femur + trochanter about 120, tibia about 96, tarsus about 78, claw about $20\ \mu$; claw-digitules about as long as claw, with large knobs; tarsal digitules long, with distinct knobs: antennæ 7 or 8 jointed, having three types, thus: (1.) 7-jointed with a short 3, all the joints subequal, 21 to $30\ \mu$. (2.) 7-jointed with a long 3, which is about $41\ \mu$ long. (3.) 8-jointed, with 2 quite short, and 3 and 4 each about $30\ \mu$ long. The terminal joint is always short, 21 to $26\ \mu$.

These insects occur underground on the roots of grape-vines, living in galls which are more or less globular, 4 to 5 mm. diameter, dark, rough and often nodulose on the outside, often aggregated together in numbers, or even coalescing, so that the root presents a nodulose thickening 6 or 7 mm. in diameter and over 20 mm. long. On breaking open the galls, which are quite hard, one finds a cavity containing the coccid. Small stones are frequently embedded in the sides of the galls.

Hab. Constantia, Cape Colony, at the roots of Stein and Reisling grapes (*Vitis vinifera*). Mr. Chas. P. Lounsbury, sending the specimens, says: "None were observed more than eight or nine inches from the surface, and all were on fibrous roots. As you will observe from the specimens, they are somewhat gregarious; oftentimes one or two rootlets will be quite covered, while all the others are free. Most of the infested vines

were backward in growth,—some almost dead ; but their condition is, I think, due to other causes than the attack of the insect. Some apparently healthy vines were noticed to be affected.’

Mesilla Park, New Mexico : March 17th, 1900.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH
AUTHORS.

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

(Continued from p. 75.)

3. *W. E. Leach* : ‘*The Edinburgh Encyclopedia*,’ conducted by D. Brewster, LL.D., vol. ix. pp. 136 and 137. 1815.*

In his article, “Entomology,” in this work, W. E. Leach makes the first attempt to give some kind of a list of the British Dragonflies, as follows :—

Genus 479. LIBELLULA.

- Sp. 1. **depressa** = *Libellula depressa*.
2. **conspurcata** = *Libellula fulva*.
3. **quadrimaculata** = *Libellula quadrimaculata*.
4. **cancellata** = *Orthetrum cancellatum*.
5. **vulgata** = *Sympetrum striolatum*.
6. **donovanni** = *Orthetrum carulescens*.
7. **scotica** = *Sympetrum scoticum*.

Genus 480. CORDULIA.

- Sp. 1. **ænea** = *Cordulia ænea*.

Genus 481. CORDULEGASTER.

- Sp. 1. **annulatus** = *Cordulegaster annulatus*.

Genus 482. GOMPHUS.

- Sp. 1. **vulgatissimus** = *Gomphus vulgatissimus*.

Genus 483. ÆSHNA.

- Sp. 1. **grandis** = *Æshna grandis*, and no doubt other species.

Genus 484. ANAX.

- Sp. 1. **imperator** = *Anax imperator*. This is the first reference to the species.

Genus 485. AGRION.

“Several indigenous species not accurately determined” (*Leach*).

Genus 486. LESTES.

“Three indigenous species” (*Leach*).

Genus 487. CALEPTERYX = CALOPTERYX. “Those Agrionida with coloured wings” (*Leach*).

4. *G. Samouelle* : ‘*The Entomologist’s Useful Compendium ; or, An Introduction to the Knowledge of British Insects*.’ 1819.

In this work the systematic portion was in a great measure due to W. E. Leach, who in each genus gives but one species, apparently as a type. They are as follow :—

* A re-issue in 1830 was made use of for the compilation of this note.

Genus 380. LIBELLULA.

Sp. 1. **depressa** = *Libellula depressa*.

Genus 381. CORDULIA.

Sp. 1. **ænea** = *Cordulia ænea*.

Genus 382. CORDULEGASTER.

Sp. 1. **annulatus** = *Cordulegaster annulatus*.

Genus 383. GOMPHUS.

Sp. 1 **vulgatissimus** = *Gomphus vulgatissimus*.

Genus 384. ÆSCHNA.

Sp. 1. **grandis** = *Æschna grandis*.

Genus 385. ANAX.

Sp. 1. **imperator** = *Anax imperator*.

Genus 386. AGRION.

Sp. 1. **sanguineus** = *Pyrrhosoma nymphula*.

Genus 387. LESTES.

Sp. 1. **autumnalis** = *Lestes sponsa*.

Genus 388. CALOPTERYX.

Sp. 1. **virgo** = *Calopteryx virgo*.

As the species are not described, it is quite possible that Leach may have had before him other species of some of the genera, than those to which we have referred them, in the case of *grandis*, *sanguineus*, *autumnalis*, and *virgo*.

RECENT NOTES ON *HYDROMETRA MARTINI*, KIRK.
= *LINEATA*, SAY.

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

IN the 'Canadian Entomologist' for March, 1900, an interesting "Study of *Hydrometra lineata*" (pp. 70-76) has been presented by Mr. J. O. Martin. Since nothing detailed has been related of the life-history and habits of this genus, I quote freely from Mr. Martin's paper, as the account he has given of the American species refers very probably in great part to our British species also.

"The insect hibernates in the adult stage, and during the first warm days of spring crawls stiffly out from under the rubbish along the banks, where it has passed the winter. When the weather becomes warm enough (the 1st to 10th of May at Ithaca), egg-laying begins; the female becomes restless, and stalks about in search of a place to deposit an egg. . . . Backing up to a grass-stem or almost any firm object which rises above the water, she exudes from the genital opening a drop of a gummy gelatinous substance, which she then presses against the object which has been chosen to support the egg. This sticky mass is the base of the egg-stalk, and, hardening very soon, fastens the egg in place before it has left the body." The

egg—which is quite different in appearance from that of *Gerris*, or indeed any other Rhynchoton known to me—is long and spindle-shaped, about two millimeters long, that is to say, about one-half the length of the abdomen. The young nymph emerges seventeen days after oviposition, and is light green in colour. *Hydrometra lineata*, Say, is carnivorous, its food consisting of insects that fall into the water.* “When such a hapless insect falls into the water, it is at once pounced upon by one or several voracious *Hydrometras*, who insert their beaks and proceed to suck the juices from their still struggling victim. I have seen no less than ten thus surround their prey, all with their heads in the direction of common interest, and their bodies radiating outwards.”

“The peculiar habitat of *Hydrometra*, combined with its elongate form, has given rise to a secondary sexual character, which occurs in both *H. lineata* and *H. stagnorum*. This consists of two notched projections on the inner side of the sixth abdominal segment, close to the incisure between the sixth and seventh segments. The object of these notched elevations of the abdominal walls is to fit over the lateral keels of the female abdomen, thus steadying the abdomen of the male during copulation.” Some useful structural details of *H. lineata* and *H. stagnorum* are figured.

Some final remarks upon the genus have, however, to be slightly remedied. The “Siberian *Hydrometra*” *jankowskii*, Jakovlev, does not belong to the genus *Hydrometra*, Latr., but to *Hydrometra*, Fabr.—that is to say, to *Gerris*, Fabr., Latr.† The name “*lineata*,” moreover, cannot stand, as it is preoccupied by *H. lineata*, Eschsch. (1822, Entomogr. p. 110), from Manilla [? = *vittata*, Stål, 1870], and I therefore rename Say’s species after the entomologist who has first given some account of its habits :

HYDROMETRA MARTINI, Kirk., 1900

= *H. lineata*, Say, 1832 [*nec* Eschsch., 1822].

As Mr. Martin has omitted any mention of the species, it may be well to call attention again ‡ to the fact that *Hydrometra caraïba*, Guér., from the Antilles and Central America, is a true *Hydrometra*, and not a *Gerris* as catalogued by Lethierry and Severin.

* See Entom., 1899, p. 112.

† *H. stagnorum* (Linn.) is also recorded from Siberia. See J. Sahlberg, 1878, Svensk. Akad. Handl. xvi. no. 4, p. 38.

‡ See Revue d’Entom., 1898, p. 73.

NOTES AND OBSERVATIONS.

THE PUPAL HABITS OF *COSSUS LIGNIPERDA*.—In the autumn of 1896, the larvæ of *C. ligniperda* were very plentiful near Lewes, Sussex. I saw many full-fed examples crawling about much in the same way as *Phalacrotophaga* does; evidently, therefore, these larvæ did not remain in their larval quarters, but sought others for pupating. I placed one enormous larva in a small cage, where it soon established itself in a corner, gnawed a considerable hole in the hard deal, and spun its cocoon. It emerged in due time, and is now in my collection. The larva cage shows a deep hole where the wood was gnawed away.—F. M. A. MACKINNON; Binfield Lodge, Walton-on-Thames, April 24th.

RHYNCHOTA GENERA, &c.—I shall be greatly indebted to anyone possessing the following works who will furnish me with a list of the genera, &c., of Rhynchota contained therein: Hahn's *Icon. Mon. Cimic.* 1825 (?), and Fieber's paper in *Weitenweber's Beyträge*, 1836.—G. W. KIRKALDY; Wimbledon.

OVIPOSITION OF *GONOPTERYX RHAMNI*.—This morning I have been watching a specimen of *Gonopteryx rhamni* while she was busily engaged in laying eggs on the young leaves of a shrub of buckthorn. Newman, I see, says "the eggs are laid singly," but this specimen on one occasion laid eight close together, though three seemed to be the favourite number; she also laid a few isolated ones. The plant on which she deposited them seemed to be the only buckthorn in the neighbourhood; every now and then she would leave it and flit up and down the lane, apparently in search of another bush, but each time she returned and renewed operations on the same plant. How many eggs she laid altogether I do not know, but the number must have been something very considerable.—D. P. TURNER; Sutton, Surrey, May 5th, 1900.

ABERRATION OF *VANESSA URTICÆ*.—I have in my cabinet an exactly similar aberration to the beautifully coloured figure of a specimen from Mr. Farn's collection, given in the 'Entomologist' for April last (pl. iii., fig. 1). My own insect was taken on the ceiling of a public-house at Midhurst, Hants, on July 12th, 1896.—JOSEPH ANDERSON; Chichester.

"PHOTO-MICROGRAPHY FOR ENTOMOLOGY."—We have been favoured with a reprint of an article bearing the foregoing title. It is by Mr. F. N. Clark, and was originally published in the 'Annual of Microscopy' for 1899. A finely executed plate and two figures in the text, representing lepidopterous ova and structural details of insects, afford proof of the excellent results that can be obtained by a careful manipulator. The instructions are lucid and thoroughly practical. In his opening remarks Mr. Clark says:—"I am frequently at a loss to understand why photography is not utilized to a greater extent than at present in the illustration of works on natural history. This applies particularly to entomology, a subject that lends itself so admirably to the reproduction and enlargement of minute objects by aid of the camera. Some years ago, when photo-process work was in its infancy, the low standard of quality was no doubt responsible for a good deal of short-

coming in this respect. This, however, can hardly be the case now that process-work has been brought to such a high state of perfection."

THE STEVENS COLLECTION (concluded from p. 157).—Among the Heterocera, the lots that realized noteworthy prices were the following:—

Deilephila galii. Five specimens bred from larvæ found at Deal, £1; three examples of the same species, with one *D. lineata*, taken at Lewes in 1849, 18s.; three *D. galii* and one *D. lineata*, the latter taken in 1847 at Hammersmith, £1. Four other examples of *D. lineata* ranged in price from 8s. to 16s. Three specimens of *D. euphorbiæ* made 10s., 16s., and 18s. respectively. *Charocampa celerio*, of which there were eight specimens, ranged in price from 6s. to £1 4s.

One example of *Sesia andreniformis*, with two specimens of *S. spheniformis* added as a kind of makeweight, fetched 12s. Of *S. tabaniformis* (*respiriformis*) there were four specimens; two of these sold for 7s., whilst the other couple went up to £1.

There was nothing very special among the Zygænidæ or, as some prefer to term them, the "Anthrocerides," but a lot of some thirty *Z. trifolii* and *Z. loniceræ*, including six or seven decent aberrations of the former species, realized £2 10s.; between 3s. and 4s. appeared to be the value of yellow varieties of *Z. jilpendulæ*, of which there were five examples. Two lots of twenty-four Nolas, each with six examples of *N. centonalis*, including the white var., made £1 10s. the lot. Considering the species that were included in the two lots containing *Lithosia sericea*, the auction value of this species would seem to be about 3s. or 4s.

Nine specimens of *Deiopeia pulchella* were put up separately, and produced a total of £4 14s., or, roughly, half a guinea apiece. One example was dated 1848, one 1871, one 1873, four 1874, and one 1876.

A fine black aberration of *Callimorpha dominula*, bred in 1872, sold for £5 10s. Two nearly black varieties of *Nemeophila plantaginis*, together with a female with red hind wings, and two examples of var. *hospita*, fetched £4.

There were about thirty more or less interesting varieties of *Arctia caia*, and the best of these were disposed of at fairly good prices, ranging from 12s. to £4; the latter sum was given for a specimen somewhat similar to that figured in the 'Entomologist' last month, together with a dark variety. The best of the six or seven aberrations of *A. villica* sold for £4 10s.; this was a light variety with the spots on fore wings confluent, and the hind wings almost devoid of spots.

Laelia canosa was represented by ten perfect specimens, and these realized from £1 10s. to £2 per pair.

Lasiocampa ilicifolia made 2 guineas per pair, for two pairs, and a third pair was sold for £3.

One example of *Notodonta bicolor*, taken by Mr. P. Bouchard at Killarney in 1864, brought in £2 10s.

One example of *Bryophila alga*, bought at the sale of the Burney Collection, together with some varieties of *B. glandifera*, including four specimens of the form known as *impar*, was cleared for 11s.

Of *Synia musculosa* there were three specimens, all from Brighton; one of these, with a Tiverton *Leucania vitellina* and some other things, only fetched 10s.—a fine specimen; and two *L. vitellina* from Tiverton

brought £2; whilst the third example, with two *L. vitellina* from Freshwater, only realized 16s.

The price of *Tapinostola concolor* ranged at about 4s. per specimen; there were a dozen examples in the collection.

The ten specimens (6 male, 4 female) of *Noctua subrosea*, £37 9s., which gives an average of nearly £3 8s. each. The highest price given for a specimen was £4 15s., and the lowest £2.

Cerastis erythrocephala, of which four lots each comprising four examples were offered, realized from 16s. to £1 1s. per lot.

A specimen of *Xylina zinckenii*, taken in 1873, sold for 14s.; while another example, taken in 1865, went up to £1 10s.

Cucullia gnaphalii made £1 2s. and £1 8s. per couple; a fifth specimen, with six *C. absinthii*, produced £1 7s. 6d.

One example of *Thalpochores ostrina*, taken in 1873, realized £1 4s., and two specimens of *T. parva* were knocked down at 2s. less.

An example of *Ophiodes lunaris*, catalogued as taken near Ramsgate in 1874, fetched £1 8s.

No less than five specimens of *Catocala fraxini* were in the collection; one of these, taken in 1842, at Hammersmith, went for 13s.; another example, taken in Hants (1892), made 15s.; the others sold at from 6s. to 8s. each.

Five aberrations of *Venilia macularia*, including three specimens approaching var. *quadrifasciata* were bought for £1 15s.

The eleven specimens of *Cleora viduaria* yielded a total of over £8, and the ten examples of *Boletobia fuliginaria* cleared 6 guineas.

Of the varieties of *Abraeus grossulariata*, the most striking aberrations sold at from £1 15s. to £2 10s. each.

Fourteen specimens of *Phibalapteryx polygrammata* were put up in lots of four and five, and brought about 5s. per specimen.

Six of eight examples of *Cidaria reticulata* made 15s. each, and the others 6s. apiece; whilst a ninth specimen ("asymmetrical var."), with a suffused aberration of *C. prunata*, went up to £3 10s.

Three pairs of *Drepana sicula* (*harpagula*) sold at £1 12s. 6d., £1 15s., and £1 17s. 6d. per pair.

DESCRIPTION OF CERTAIN VARIETIES OF *PERONEA CRISTANA*.—Some varieties of *Peronea cristana* are described in the 'Annals and Magazine of Natural History' for 1842 (vol. x. p. 366); but, as this work is not readily accessible to many entomologists of the present day, I thought it might be worth while to transcribe the description of some interesting forms of this very variable moth which were written by "Capucina," alias the Rev. W. Johnson. The specimens referred to were captured in the New Forest in September, 1841:—

"The first I have named *Capucina*; the ground of the upper wings dark brown, with a shade of burnt umber, and an elevated white tuft or button in the centre of each wing; the head and palpi white; and the corslet and anterior part of the wings as far as the tuft nearly covered with an incrustation of pure white, with two blotches of the same, and several snow-white dots towards the extremity of the wings; the under wings shining pale brown, not unlike those of its congeners. The second is also a white button; the upper part of the upper wings a bright chestnut, besprinkled with a profusion of powdery white dust-like particles, the blending of the two colours

producing a beautiful roan. I propose to call this insect *Gumpiana*; and, although I am not connected with the family of Gumps, the name is not without its charms, and therefore I hope it will not be unacceptable to the public. The third is so nearly allied to *ruficostana*, which is so well described by Mr. Curtis (*vide* 'British Entomology,' second edition, where all the species are described), that it is unnecessary to particularize respecting it; the shape of the wings and the colour throughout are precisely the same, with the addition of a well-formed red tuft or button on each of the upper wings; I have therefore ventured to name it *ruficristana*."

The beautiful *tolana*, *curtisana*, *subcapucina*, and a few others, are described by Mr. Desvignes in the third volume of the 'Zoologist,' p. 842.—C. W. DALE; Glanvilles Wootton.

SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.—The fifth annual Congress of the Union will be held at Brighton and Hove on June 7th, 8th, and 9th. An exhibition of photographs and apparatus will be given on Thursday afternoon at 3.30, and in the evening of the same day the Mayor of Brighton will receive members of the Congress at the Pavilion, and the President-Elect will deliver an address. On Friday papers will be read from 11 a.m. to 1 p.m., and from 3 to 5 p.m. Two of these are by Mr. F. Merrifield, and on entomological subjects. On Friday evening members are invited by the Mayor of Hove to a reception at the Hove Town Hall. Mr. F. Enock will lecture on "Wonders and Romance of Insect Life," with lantern illustrations. At 12 a.m. on Saturday there will be another illustrated lecture, and in the afternoon the museums and aquarium will be visited.

Members of a natural history or other scientific society in the South-East district, affiliated to the Union, are admitted to the Annual Congress, Excursions, &c., on payment of 2s. 6d. Associates—persons unattached to any affiliated society—are admitted to the same privileges on payment of 3s. 6d. Tickets or further particulars may be obtained by application to the local secretary, M. E. Alloway Pankhurst, 3, Clifton Road, Brighton.

LOCAL LISTS.—**HYMENOPTERA OF NOTTINGHAMSHIRE.**—With the additional seventy-five species of Aculeates enumerated in this list—compiled by Rev. A. Thornley and J. W. Carr, and published in 'The Naturalist' for February last—the total number of Hymenoptera Aculeata recorded as occurring in the county is one hundred and thirty-seven, but thirteen of these are doubtfully included. Of Hymenoptera Tubulifera, five species of *Chrysis* and *Elampus auratus* are mentioned.

DIPTERA OF NOTTINGHAMSHIRE.—In the Annual Report of the Nottingham Naturalists' Society for 1898-9, a list of Nottinghamshire Diptera is given by the Rev. A. Thornley. The number of species mentioned is two hundred and ninety, most of which were obtained by the compiler himself, and these chiefly at South Leverton. He is of opinion that the species referred to represent but a small portion of the Diptera occurring in the county. Some remarks by Mr. Percy H. Grimshaw are appended to the list. There are one or two other short papers dealing with entomology in the Report.

CAPTURES AND FIELD REPORTS.

AROMIA MOSCHATA AND RHAGIUM BIFASCIATUM NEAR CHESTER.—A specimen of *A. moschata* (the musk beetle) was taken by Mr. Thompson, of Chester, about the end of last July, off some nettles in the Sealand district. On Aug. 4th, when he and I were out together, he captured another in the same locality, resting on an old sallow. The first specimen, especially, gave out a strong musk scent, which clung to the cotton wool in the cyanide bottle for days after. Wallasey is the only other Cheshire locality I know for this handsome and interesting beetle, the larvæ of which burrow in old sallows.

Ten examples—two males and eight females—of *Rhagium bifasciatum* were taken by Messrs. Thompson and son, March 12th, this year, out of rotten alder-trunks near “the eleven arches,” which carry the Birkenhead railway over the canal, about a couple of miles from Chester. Mr. Thompson, junr., and I, went to the spot on the 24th of the same month, but we only secured four—one male and three females. The trunks infested were well tunnelled—chiefly longitudinally—by larvæ of the species in all stages of growth, and the burrows contained, not only what looked like pupæ, but the living imagines we captured as well. The larvæ were white, with reddish jaws. The two well-defined oblique marks on each wing-case are certainly not “yellow,” but pale grey. I found a screwdriver of great use in breaking up the rotten wood.—J. ARKLE; Chester.

RANATRA LINEARIS.—A well-grown, mature (that is, winged) specimen of this interesting water-bug was brought to me alive by Mr. E. Vincent, who took it from the canal near Byfleet on March 11th last. It is not a common insect in Britain, and is thought by some to be getting rarer, but it has been taken in this locality on two or three occasions, when search was being made for other things. It was also taken last year in one of the ponds in Bushey Park near Kingston-on-Thames. Its habitat is on the mud at the bottom.—W. J. LUCAS; Kingston-on-Thames.

The following are three localities in which I have obtained *Ranatra linearis* this year:—Epping Forest, April 26th: found in all ponds, but commonest in the gravel-pit ponds near Loughton. Rickmansworth, May 2nd: two specimens only. Oxshott, May 19th: Black Pond, one specimen only.—S. K. KEMP; 80, Oxford Gardens, Notting Hill, W., May 20th, 1900.

LARVÆ OF ARCTIA CAIA AND ODONESTIS POTATORIA AT CHESTER.—These larvæ were unusually common on certain hedge-banks at the beginning of May.—J. ARKLE; Chester.

SPRING CAPTURES—On Saturday, April 21st, about 3.30 p.m. (the sun shining brightly at the time), I saw a specimen of *M. stellatarum* actively engaged at clumps of white arabis in the garden. Is not this a very early and unusual occurrence? The same day I saw several specimens of *Vanessa urticae* on the wing. I may also mention that, on March 9th and 10th respectively, I saw single freshly-emerged specimens of *Pieris rapæ*.—THOS. B. BLAKEBOROUGH: Ashlea, Brighouse.

[Last year *M. stellatarum* was taken at Hereford on Jan. 3rd, and on Feb. 18th at Winchester. Both these captures are recorded in the ‘Entomologist’ for 1899 (vol. xxxii.), where also will be found reports of the occurrence of the species in many parts of the British Islands.—ED.]

VANESSA POLYCHLOROS.—On Feb. 24th of this year my brother found this butterfly hibernating in a tool-house in the garden. The capture is interesting, for since 1877–8, when the larvæ were abundant on the elms in front of the house—I counted forty on one small twig, which I cut off—not a single larva, pupa, or imago has been discovered, the insect having completely disappeared.—JOSEPH ANDERSON; Chichester.

MACROGLOSSA STELLATARUM.—A specimen of this species was seen flying over flowers, by my friend Mrs. Fogden, in her garden at Apuldram, Chichester, on April 12th.—JOSEPH ANDERSON.

NOTES FROM CHESTER AND DELAMERE FOREST—

March 10th.—Delamere Forest. A sunny day; south-west breeze. Warmer. A late season, and a great scarcity of insects. Took, or saw, six late male *Hybernia leucophaæaria* on oak-trunks—all very unlike each other; also a male and female *Asphalia flavicornis*. The latter were pale grey forms, with, of course, the usual markings. Large numbers of oaks have now been cut down, the clearings being planted with larch and Scotch fir. I saw no *Phigalia pедaria* (*pilosaria*), *Nyssia hispidaria*, *Amphidasys strataria* (*prodromaria*), *Brephos parthenias*, *H. marginaria* (*progemmaria*), or *Anisopteryx ascularia*. Sallow catkins were just showing themselves—small, white, and silvery.

April 16th (Easter Monday).—Four of us went to Delamere Forest. Strong north-west gale all day. Sharp showers of rain after 10 a.m., but fair in the afternoon, although cloudy and sunny alternately, as well as colder. I took one *P. pilosaria* and one *A. strataria*, off oaks, after three hours of patient search. One of my friends, who was without the last named species in his collection, continued the search, as did all of us, for another couple of hours. Just when he had practically given the matter up, he found three fine specimens—two males and a female—all on the same oak—a most unusual find. Another couple of hours resulted in the capture of a fifth—average number per collector, one; total hours spent, seven. *Diurnea fagella* was fairly plentiful. Three reddish, hibernated Tortrix larvæ were got out of dead thistle-stems.

April 19th.—A burst of warm weather; sudden and complete change. The following were taken at willow bloom in Delamere Forest:—*Panolis piniperda*, ten specimens, including pale grey and red varieties with intermediate forms—this species appeared to be very local, though plentiful where found—one place only; *Taniocampa stabilis*, *T. instabilis* (from light to almost black forms), *T. pulverulenta* (*cruda*), *T. gothica*, *Pachnobia rubricosa*, *Cerastis vaccinii*, and *Larentia multistrigaria*.

April 28th.—Delamere Forest. At willow the previous species repeated themselves. *P. piniperda* abundant, but only in the one spot. Specimens of *Tephrosia crepuscularia* were taken off oaks by day. Many hibernated larvæ, chiefly *Triphæna orbona*, were found, as night feeders, on the low willows.

May 1st.—Night. Lane bordered with briar, bramble, willow, &c., near Chester. *Anticlea badiata* was still on the wing, and a couple of *A. derivata* were netted. Other moths were *Cidaria suffumata*, and one each of *Selenia illuminaria* and *Hypsipetes impluviata*. Larvæ were found on the willows, the bloom on the bushes being all but over. A warm, still night.

May 4th.—The same lane; night. Rather strong south-west wind, with showers. Sky usually clear, with crescent moon. Altogether a bad night, and we took nothing but a few *T. orbona* larvæ, certainly not worth a walk of some six or eight miles.

The great matter of interest with me was how many of these species came to our electric lamps. Only three, as far as my observation went: *T. gothica*, *H. progemmaria*, and *S. illunaria*. This evidence may be useful in the future.—J. ARKLE; Chester.

RECENT LITERATURE.

MALCOLM BURR. *Essai sur les Eumastacides, tribu des Acridiodes*, 1899, Anal. Soc. Esp. Hist. Nat. xxviii. pp. 75–112 and 253–308 (sep. pag. 1–94), plates viii.–x. [Orthoptera.]

The Eumastacides (formerly “Mastacides”) are a tribe of “short-horned Grasshoppers,” remarkable for their bizarre forms and curious colours, displaying great superficial resemblance to certain other insects, viz. *Tipula*, *Mantispa*, *Sirex*, *Agrion*, &c. They are diagnosed by Mr. Burr as follows:—

“Statura minore vel mediocri; ungues tarsorum arolio instructi; antennæ brevissimæ, femoribus anticis breviores, genere unico Gomphomastace excepto, quo antennæ longiores, interdum corpore superantes, apice clavatæ; caput breve, ab antico compressum; prosternum muticum; corpus normale, haud inflatum, nec valde elongatum, tympano nullo primi segmenti abdominis.”

They are divided into eight groups, embracing thirty genera (of which nine are new, viz.: *Bennia*, *Mastacides*,* *China*, *Eumastax* [n. n.], *Paramastax*, *Pseudothericles*, *Symbellia*, *Parathericles*, and *Phaulotypus*) and ninety-four species (of which twenty-eight are new).

The Eumastacides are confined to the warmer parts of the globe, and it is remarkable that no genus occurs in more than one of the principal “regions.” The Oriental claims twelve genera, the Ethiopian eleven, the Neotropical five, Nearctic and Australian one each, while the Palearctic is not represented; the Oriental and Ethiopian regions therefore contain nearly seventy-seven per cent. of the total number of genera.

The Essay is evidently the product of laborious and practical research, and a thorough knowledge of the previous literature upon the group. The analytical tables of genera and species and the descriptions have been drawn up with great care, and are elucidated by the three plates of figures prepared by Mr. E. H. J. Shuster. It is to be hoped that in due course this at present indispensable revision will be superseded by a detailed monograph by the same author.

G. W. K.

* Inadvertently ascribed, with its two species, to Bolivar, by Mr. Burr.

PAUL NOEL. *La Chasse aux Insectes aquatiques* (Journ. de l'Agriculture, 1897), 2 pp. and full-page illustration.

THE neighbourhood of electric light has been long a happy hunting ground for insects of all kinds, but we do not recollect having previously heard of the ingenious arrangement devised for the capture of aquatic forms by the enthusiastic director of the regional laboratory of agricultural entomology at Rouen.

A previously charged electrical accumulator (of the kind used for lighting bicycles, or some similar apparatus furnishing, say, twelve hours of light of about four candle-power at a time) is placed at the edge of the water which one wishes to work. It is sufficient simply to fix to the lamp attached to this accumulator two wires longer than those ordinarily provided with it—say, four metres—and carefully to cover over the juncture of lamp and wires with sealing-wax, to prevent leakage of the current.

As this little lamp does not sink in the water, it must be made fast to the centre of a semicircle of iron of about half a metre radius, to which is fastened, below the lamp, a large trap, constructed on the same principle as the bird traps which children make. On carefully lowering the trap into a not too weedy spot, the strong light attracts numerous insects and other animals; it can then be switched off, the trap closed and brought to the surface for the examination of its contents.

G. W. K.

Report of Injurious Insects and Common Farm Pests during the year 1899, with Methods of Prevention and Remedy. By ELEANOR A. ORMEROD. Pp. 152. London: Simpkin, Marshall & Co. 1900.

This is the twenty-third Report presented by Miss Ormerod, and No. 1 of the second series; the general index to the first series was published last year. Although larvæ of *Pieris brassicæ* appear to have caused some destruction here and there, and some trouble experienced with "wireworm" during the summer, the only insect pest that was mentioned as "seriously prevalent" was the turnip flea-beetle. *Ephestia kühniella* seems to have become more widely distributed in England and Scotland, and to have effected a lodgment in Ireland. *Dicranura vinula* is referred to, but is said not cause any great injury, except when its larva happens to attack young and tender trees, as, for instance, those in nursery plantations. *Cidaria dotata*, Newm. = *associata*, Bork., the larva of which feeds on the foliage of currant bushes, has been reported to Miss Ormerod as attacking red currant trees to a considerable extent. This moth is sometimes confused with *C. pyraliata*, Fb., which is generally considered to be the true *dotata*, Linn., the larva of which feeds on *Galium*. There are several illustrations in the text, and two plates; the figures in the latter represent a foot of *Hippobosca equina* and one of *Ornithomyia aricularia*, both highly magnified.

We may mention here that, in recognition of her many and valuable services to agriculturists and horticulturists, the Edinburgh University, on April 14th last, conferred upon Miss Ormerod the honour of LL.D.

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[No. 446.

COLLECTIVE INQUIRY AS TO PROGRESSIVE MELANISM IN MOTHS.

THE following "Memorandum from the Evolution Committee of the Royal Society" has been recently issued:—

1. The Committee appointed by the Council of the Royal Society to promote investigation of facts relating to Variation, Heredity, Selection, and other phenomena connected with Evolution are desirous of instituting a collective investigation into the progressive melanism of certain moths, particularly Geometridæ.

2. It is well known that in certain districts, especially within the British area, dark forms of several species of moths have recently appeared and become increasingly abundant. There is reason to believe that these dark forms are in some cases extending into other districts and even to the European Continent.

3. It is to be regretted that no systematic or statistical records of these phenomena have been kept, and it appears to the Committee that if such a record be now instituted and continued for a period of years it cannot fail to have considerable scientific importance.

4. The matter is one that may conveniently be made the subject of collective investigation, and the Committee will be glad to hear from any entomologist who may be willing to contribute now, or hereafter, particulars as to the condition of these species in the district or districts with which he is personally familiar. The returns should relate as far as possible to specimens *found in a wild state*, whether as imagines, or pupæ, larvæ, or eggs. Information respecting specimens bred from wild parents must be kept distinct.

5. It is thought desirable that the enquiry should for the present be confined to the following species:—*Acidalia aversata*, *Amphidasys betularia*, *Boarmia repandata*, *Camptogramma bilineata*,

Gnophos obscurata, *Hemerophila abruptaria*, *Hybernia progemmaria*, *Phigulia pilosaria*, *Acronycta psi*, *Agrotis corticea*, *Aplecta nebulosa*, *Polia chi*, *Venusia cambrica*, *Xylophasia polyodon*.

6. The Schedule in which it is suggested that the returns should be made is enclosed (Schedule A). It is desired that the return for each species be made on a separate Schedule, and the Secretary will be glad to furnish a supply of these schedules to any one who may be willing to assist.

7. Since confirmatory evidence is of especial value, the Committee are desirous of receiving returns made independently by different persons for the same district. It is of course hoped that returns may be obtained for districts in which the dark forms are still unknown.

8. The Secretary will be glad to examine and prepare descriptions of any illustrative specimens lent to him for that purpose, and in suitable cases arrangements will be made for photographing such specimens.

9. HISTORICAL EVIDENCE. As the changes in question have largely taken place within living memory, it is hoped that those who have personal knowledge of the facts may be induced to put them on record in such detail as is still possible. Much information of an historical character is of course already printed in the scientific journals, but a more detailed account of the facts would be of great value. With this object a special Schedule (B) marked "Historical" will be issued to those who will fill it up.

10. On publication full acknowledgment will be made of all help received. All communications should be addressed to the Secretary of the Evolution Committee, W. Bateson, Esq., F.R.S., Merton House, Grantchester, Cambridge.

May, 1900.

"ENTOMOLOGY IN NEW ZEALAND."

By G. V. HUDSON, F.E.S.

UNDER the above somewhat comprehensive title Mr. Ambrose Quail has (*ante*, p. 5) really given the readers of your valuable magazine a criticism of my recently published book on New Zealand Macro-Lepidoptera. To call an essay, however learned, which deals with only a portion of one of the orders of the great class Insecta, a paper on "entomology" is, to my mind, somewhat misleading, and I think that it would have been more straightforward and accurate on Mr. Quail's part had he openly named his article as a criticism on my book. This would also have given me a better chance of replying to his strictures.

The opening passages in Mr. Quail's paper do not, I think, tend to show that he is specially qualified to criticise even such

inferior work as he would wish to represent my book to be. He states that he has only been in New Zealand three years, and that the localities at which he has been stationed have not been favourable to the pursuit of entomology; also "that there is little or no literary work at least get-at-able." Subsequently he ascertained, I may remark, through the aid of local naturalists, myself included, that some entomological work had been done in New Zealand, and forthwith he proceeds on this basis to demonstrate the defective nature of the work done by his predecessors.

Mr. Quail alleges that I am unacquainted with the work of certain lepidopterists for whose methods he apparently entertains a certain amount of respect, but in his criticism of the system of classification followed in my book he is simply condemning the system of Meyrick, with which he does not appear to be fully acquainted himself. This system, it may be pointed out, is being largely followed by the British Museum authorities in their great work on the Heterocera of the world, so that apparently I am not singular in placing a certain amount of dependence on the work of the "one man" he alludes to. I expressly explained my reasons for following Meyrick in my introduction thus:—"Although adopting Mr. Meyrick's system in the present work, I do not agree unreservedly with all his conclusions; but I have not attempted to alter his system in accordance with my own views, as I conceive that the conclusions of a naturalist who has only had the opportunity of studying a restricted fauna would necessarily be liable to considerable error." This passage, I think, disclaims any individual responsibility on my part.

I shall not occupy your valuable space with detailed remarks on all the points raised by Mr. Quail in regard to my work, but trust I may be permitted to refer to one or two as examples of the class of criticism to which I have been subjected in the article under review.

Mr. Quail states that he captured one specimen of *S. convulvi* in Auckland in February, 1897. From an examination of this single specimen he concludes that my figure of the insect is incorrect. Again, Mr. Quail remarks that my figures of the Caradrinina (Noctuidæ, &c.) are poor. He can have had but very little experience in the figuring of species belonging to this very obscurely marked group not to know that, whilst it is possible to obtain faithful and striking representations of the sharply and brightly marked species belonging to other groups, many species of the Caradrinina baffle all attempts at description or delineation. This point is specially referred to on page 15 of my book, where I describe the difficulties encountered in discriminating between the species of the genus *Melanchra*, as well as the doubtful nature of many of the species included in that genus.

It is gratifying to find that Mr. Quail approves of my treatment of the butterflies, and even goes so far as to quote from my account of my transformations of *Vanessa gonerilla*. These remarks will no doubt be read with amusement by those of your readers who perused my paper on the metamorphosis of this butterfly in the 'Entomologist' for October, 1883, written from the very town where my critic now resides.

Mr. Quail protests against "commencing a book with specialized groups (most recent), and finishing with the most generalized groups (most ancient)." This protest really refers to Mr. Meyrick's system, and I have explained, as already stated, my reasons for following that system. In connection with the genus *Porina*, Mr. Quail again asserts that my figures are bad, because they do not exactly agree with the specimens he has in his possession. Here again we have to deal with obscurely marked and variable species which offer great difficulties in the way of representation, and this fact explains why Mr. Quail finds the figures of the *Porinas* bad, whilst those of the brightly coloured and conspicuous *Hepialus virescens* he pronounces as "excellent." I have never given any "hint as to the time occupied in the transformations of *H. virescens*," simply because I have never had a specimen under observation from the egg state to the imago. In fact, when Mr. Quail has become more intimately acquainted with this insect he will find that the duration of its larva life is probably considerably longer than two years—probably longer, in fact, than Mr. Quail's residence in New Zealand. As the insect inhabits the stem of a growing tree, the exact duration of its transformation could only be ascertained by completely isolating several of the trees which had not been attacked by the larva, and inducing a fertile female moth to deposit her eggs in the enclosure. It would then be necessary to observe the larvæ in the trees until their final transformation. This would be a most difficult and extensive experiment, but one of considerable interest, and I trust Mr. Quail will undertake it, and succeed in carrying it out to a successful termination.

Mr. Quail's description of the tubercles of the larva of *Hepialus virescens* is no doubt extremely learned and exact, but I hardly think that it would be suited to most of those who are likely to employ my book in New Zealand. There is so much work to be done here, and so few workers to do it, that these extreme niceties of description might well be left to our successors. The fauna is rapidly changing, and in many localities it is vanishing at an alarming rate from a naturalist's point of view; so that field workers are what we urgently require in New Zealand, who will collect specimens and observe facts before the opportunities for doing so disappear for ever.

Although adverse to personal controversy in scientific matters,

I cannot help directing attention to one of Mr. Quail's concluding remarks. After stating that the number of segments of a larva should be stated as fourteen and not thirteen, as described by Meyrick and many other authors, he quotes from my description of the larva of *H. virescens*, thus:—"The head is large, dark brown, very irregularly striated, and covered with a few short bristles. The first segment is hard and shining, meaning thereby the first thoracic, otherwise the prothorax, or, consistently, the second segment. Errors in colour may be the lithographer's, but errors in letterpress must be the author's, and by a man's writings so we must judge his capacity as a student." Of course, strictly speaking, I should have referred to the segment in question as the second segment; but in reading the entire clause the segment indicated is clearly that immediately following the head, and I do not think that there could be any misunderstanding on that point. To dwell on slight figures of speech in this way shows, to my mind, a spirit of ungenerous criticism, and not merely a laudable desire for scientific accuracy.

Karori, Wellington, New Zealand: March 30th, 1900.

ON A SMALL COLLECTION OF INSECTS, CHIEFLY LEPIDOPTERA, FROM NICARAGUA.

By A. G. BUTLER, Ph.D.

A SMALL consignment of insects in envelopes was recently forwarded to the Museum by Señor M. Deoclesians Chaves, of Managua, who was anxious to obtain their names; it included several species of value to the Museum, notably *Myscelia pattenia*, sexes of *Papilio panares*, Cr.; but, as might be expected in the case of a Central American collection, nothing new to science was received. The following is a list of the species:—

NYPHALIDÆ.

LYMNAINÆ.

1. *Tasitia eresimus* (♂), Cramer.
2. *Lycorea atergatis*, Doubleday and Hewitson (worn).

ITHOMINÆ

3. *Dircenna euchytna*, Felder.
4. *Hymenitis oto*, Hewitson.

MORPHINÆ.

5. *Morpho hyacinthus*, Butler. This may perhaps be a variety of *M. montezuma*; it is characterized by the dark, acutely zigzag discal line, bounded on both sides by a pale stripe on

under surface of primaries, and the more or less green suffusion of the under surface.

6. *Caligo prometheus*, Kollar.

HELICONINÆ.

7. *Heliconius charitonia* Godart.
 8. *H. zuleika*, Hewitson.
 9. *H. petiverana*, Doubleday.
 10. *Eucides dynastes*, Felder.

NYMPHALINÆ.

11. *Smyrna blomfieldia* (♂, ♀), Fabricius.
 12. *Gynæcia dirce* (♂), Boisduval.
 13. *Lipoeta epaphrus*, Latreille.
 14. *Protogonius cecrops*, Doubleday.
 15. *Zaretas isidora* (♀) var., Cramer.
 16. *Dione vanillæ*, Linnæus.
 17. *D. juno*, Cramer.
 18. *Chlosyne hyperia*, Fabricius.
 19. *C. melanarge*, Bates. This seems not a common species ; at any rate we previously possessed only one example.
 20. *C. saundersi* var., Boisduval.
 21. *Anartia iatrophæ*, Linnæus.
 22. *A. fatima*, Fabricius.
 23. *Phyciodes ptolyca*, Bates.
 24. *P. theona*, Ménétriés.
 25. *Microtia elva*, Bates.
 26. *Myseelia pattenia*, Butler and Druce. This species was new to our collection ; the type collected by Van Patten is in the Godman and Salvin Collection.
 27. *Victorina stencles*, Linnæus.
 28. *Timetes chirou*, Fabricius.
 29. *Callicore pitheas*, Latreille.
 30. *Eubagis mylitta*, Cramer.
 31. *Adelpha iphiela*, Linnæus.
 32. *Chlorippe laure*, Drury.
 33. *C. callianira*, Ménétriés. This also was new to our collection.
 34. *Ageræonia glauconome*, Bates.
 35. *Peridromia guatemalena*, Bates.
 36. *Didonis aganissa*, Boisduval.
 37. *Precis genoveva*, Cramer.

ERYCINIDÆ.

38. *Mesosemia lamachus*, Hewitson.
 39. *Charis argyrodiues*, Bates.
 40. *Lymnas pixe*, Boisduval.
 41. *I. cephise*, Ménétriés

LYCÆNIDÆ.

42. *Cycnus aufidena*, Hewitson. I have not yet carefully studied the characters of the genus *Cycnus*, which may prove to be only a group of *Panthiades* or some other Thecline genus. I use the name tentatively, *Thecla* being absolutely untenable for the tropical American forms.

PAPILIONIDÆ.

43. *Papilio belesis*, Bates.
 44. *P. thymbræus*, Boisduval.
 45. *P. numitor*, Cramer.
 46. *P. alcamedes*, Felder.
 47. *P. panares* (♂, ♀), G. R. Gray.
 48. *P. epidaus*, Boisduval.
 49. *P. thoas*, Linnæus.
 50. *Pyrisitia proterpia*, Fabricius.
 51. *Sphænogona boisduvaliana*, Felder.
 52. *Amyntia clorinde*, Godart.
 53. *Meganostoma cesonia*, Stoll.
 54. *Callidryas philea* (♂, ♀), Linnæus.
 55. *C. sennæ* (♂), Linnæus.
 56. *Phæbis argante* (♂), Fabricius. This will probably prove to be the dry form of *P. cipris*, Cramer.
 57. *Kricogonia lyside* (♂), Godart.
 58. *Pieris calydonia* (♂), Boisduval.
 59. *P. phileta* var. *feronia* (♂), Stephens.
 60. *P. josepha* (♂), Godman and Salvin.
 61. *Glutophrissa ilaire* var. *neumægenii*, Skinner.

HESPERIIDÆ.

62. *Mysoria venezuelæ*, Scudder.
 63. *Camptopleura thrasybulus*, Fabricius.
 64. *Calpodus nyctelius*, Latreille.

CASTNIIDÆ.

65. *Castnia futilis*, Walker.

HYPSIDÆ.

66. *Phaloesia saucia*, Walker.

NEUROPTERA.

Only one species was sent, represented by one tolerably perfect and one shattered example, viz. *Mecistogaster ornatus*, Rambur.

I have to thank my colleague, Mr. F. A. Heron, for assistance in naming the butterflies, which saved me considerable time.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Concluded from p. 155.)

- B. POLITELLA, *Dougl.*—Belfast, two (*W.*).
- B. MUNDELLA, *Dougl.*—Sandhills of Dublin coast ; Sligo (*R.*).
- B. AFFINIS, *Dougl.*—Sligo (*R.*).
- B. UMBROSELLA, *Zell.*—Sandhills of Dublin coast ; Sligo (*R.*).
- B. DOMESTICA, *Haw.*—Wicklow Mts. ; Magilligan, Derry (*Curzon*).
- LITA ARTEMISIELLA, *Tr.*—Dublin coast sandhills ; Newcastle, Co. Down, abundant (*W.*) ; Sligo (*R.*).
- L. MACULELLA, *St.*—Howth.
- L. TRICOLORELLA, *Haw.*—Howth.
- L. FRATERNELLA, *Dougl.*—Howth and Malahide ; Co. Dublin.
- L. LEUCOMELANELLA, *Zell.*—Among *Silene maritima* on the cliffs of Howth ; Magilligan, Co. Derry (*Curzon*).
- L. MARMOREA, *Haw.*—Abundant on the coast sandhills, Bundoran (*W.*) ; Derry (*C.*) ; Letterfrack, Co. Galway.
- L. INSTABILELLA, *Dougl.*—Howth ; Sligo (*R.*).
- L. PLANTAGINELLA, *Sta.*—Howth ; Sligo (*R.*).
- TELEIA PROXIMELLA, *Hub.*—Galway ; Belfast.
- T. HUMERALIS *Zell.*—Wicklow Mts. ; Belfast.
- T. VULGELLA, *Hb.*—Belfast (*W.*).
- T. DODECELLA, *L.*—Belfast (*W.*).
- T. TRIPARELLA, *Zell.*—Killarney.
- RECURVARIA LEUCATELLA, *Clerck.*—Clonbrock ; Galway (*R.E.D.*).
- ARGYRITIS TARQUINIELLA, *Sta.*—Sandhills at Howth. This species, or probably variety of *A. pictella*, has also been taken in Scotland, on the coast, and among ordinary *A. pictella*, in Suffolk. It hides among the short herbage, and under the edges of the sandhills. It was described as a species distinct from *A. pictella*, by the late Mr. H. T. Stainton, from Irish examples ; and its history is not yet fully worked out.
- NANNODIA STIPELLA, *Hb.*—Howth.
- LAMPROTES ATRELLA, *Haw.*—Dingle, Co. Kerry.
- ANACAMPSIS TENIOLELLA, *Tr.*—Dublin coast ; Blarney, Co. Cork.
- A. ANTHYLLIDELLA, *Hb.*—Dublin coast, common ; Sligo (*R.*).
- TACHYPTILIA POPULELLA, *Clerck.*—Killarney.
- T. TEMERELLA, *Zell.*—Sligo (*R.*).

BRACHYGLOSSATA CINERELLA, *Clerck.*—Sligo (*R.*); Howth; Wicklow Mts. (*B.*); Limerick (*Talbot.*)

PARASIA METZNERIELLA, *Sta.*—Sligo (*R.*).

P. CARLINELLA, *Dougl.*—Sligo (*R.*).

CLEODORA CYTISELLA, *Curt.*—Killarney.

CHELARIA HÜBNERELLA, *Don.*—Killarney; Belfast (*W.*).

ANARSIA SPARTIELLA, *Schr.*—Howth.

PLEUROTA BICOSTELLA, *Clerck.*—Sligo (*R.*); Belfast hills, locally abundant (*W.*); Castlehaven, Co. Cork; Killarney; Markree Castle, Co. Sligo; Toberdaly, King's Co.; and Cloghan, Co. Donegal (*K.*).

HARPELLA GEOFFRELLA, (*L.*)—Killarney; Sligo (*R.*).

DASYCERA SULPHURELLA, *Fb.*—Common everywhere.

ŒCOPHORA MINUTELLA, (*L.*)—Dublin, Howth, Galway.

Œ. FULVIGUTTELLA, *Zell.*—Dublin (*Hogan.*).

Œ. LAMBDELLA, *Don.*—Killarney.

Œ. FUSCESCENS, *Haw.*—Howth.

Œ. PSEUDOSPRETTELLA, *Sta.*—Universally abundant.

ŒCOGENIA QUADRIPUNCTATA, *Haw.*—Howth.

ENDROSIS FENESTRELLA, *Scop.*—Universally abundant.

BUTALIS GRANDIPENNIS, *Haw.*—Howth.

B. FUSCOÆNEA, *Haw.*—Killarney.

GLYPHIPTERYGIDÆ.

ACROLEPIA GRANITELLA, *Tr.*—Dublin and Howth; Cappagh, Co. Waterford (*K.*).

GLYPHIPTERYX THRASONELLA, *Scop.*—Common everywhere; Belfast (*W.*); Clonbrock, Co. Galway (*R. E. D.*); Sligo (*R.*), &c. Var. *cladiella*, *Sta.*—Sligo (*R.*).

G. HAWORTHANA, *St.*—Wicklow Mts.

G. EQUITELLA, *Scop.*—Island Magee, Co. Down, very abundant (*W.*).

G. FISHERIELLA, *Zell.*—Howth; Belfast, abundant (*W.*); Sligo (*R.*).

ARGYRESTHIIDÆ.

ARGYRESTHIA EPHIPPELLA, *Fb.*—Belfast, scarce.

A. NITIDELLA, *Fb.*—Generally common; Belfast (*W.*); Derry (*C.*); Sligo (*R.*), &c.

A. SEMITESTACELLA, *Curt.*—Belfast (*W.*); Armagh (*J.*).

A. ALBISTRIA, *Haw.*—Wicklow Mts.; Belfast (*W.*); Sligo (*R.*).

A. CONJUGELLA, *Zell.*—Belfast, abundant (*W.*); Sligo (*R.*).

A. MENDICA, *Haw.*—Belfast, abundant (*W.*); Sligo (*R.*).

A. RETINELLA, *Zell.*—Killarney; Westport, Mayo (*W.*); Enniskillen (*P.*).

A. CURVELLA, *L.*—Sligo (*R.*).

A. PYGMÆELLA, *Hb.*—Belfast (*W.*); Enniskillen (*P.*).

A. GEDARTELLA, *L.*—Dublin; Wicklow Mts.; Belfast, abundant (*W.*); Sligo (*R.*).

A. BROCHELLA, *Hb.*—Dublin; Wicklow Mts.; Belfast, abundant (*W.*); Sligo (*R.*); Enniskillen (*P.*).

A. ARCEUTHINA, *Zell.*—Sligo (*R.*).

OCNEROSTOMA PINIARIELLA, *Zell.*—Howth.

ZELLERIA PHILLYRELLA, *Mill.*—One example of this species, hitherto not recorded as British, was captured at Renvyle, near Letterfrack, Connemara, by the Rev. C. T. Cruttwell. A notice appeared in the issue of the 'Entomological Monthly Magazine' of January, 1900, p. 4, by Mr. Barrett, who identified it. Although two or three hardy species of *Phillyrea* are not uncommonly cultivated in shrubberies, the grounds at Renvyle were laid out a great many years ago on the sea-shore facing the Atlantic, and are isolated by many miles of wild country from any similar habitation. The insect must presumably have been introduced with the food-plant, if it feeds only on species of *Phillyrea*; and it would be interesting to investigate the circumstances of its naturalisation, and whether it is plentiful.

GRACILARIIDÆ.

GRACILARIA ALCHIMIELLA, *Scop.*—Generally common; Sligo; Cromlyn, Co. Westmeath, &c.

G. STIGMATELLA, *Fb.*—Belfast (*W.*).

G. ELONGELLA, *L.*—Of general occurrence near Ballincar, Sligo. A very singular yellow form was taken by Mr. Russ at Union Wood.

G. TRINGIPENNELLA, *Zell.*—Dublin; Howth; Galway; Island Magee, Co. Down, abundant (*W.*); Sligo (*R.*).

G. SYRINGELLA, *Fb.*—Dublin, Belfast, abundant (*W.*); Derry (*C.*); Sligo (*R.*); Clonbrock, Co. Galway (*R. E. D.*).

G. PHASIANIPENNELLA, *Hb.*—Howth.

G. AUROGUTTELLA, *St.*—Howth, and Wicklow Mts.

CORISCIMUM BRONGNIARTELLUM, *Fb.*—Bray, Co. Wicklow (see notice by W. F. Kirby, *Entom.* Oct. 1874, p. 117); also on the southern coast (*K.*).

C. CUCULIPENNELLUM, *Hb.*—Sligo (*R.*).

C. SULPHURELLUM, *Hav.*—Sligo (*R.*); and Clonbrock, Co. Galway (*R. E. D.*).

ORNIX ANGLICELLA, *Sta.*—Dublin and Howth; Armagh (*J.*); Belfast (*W.*).

- O. BETULÆ, *Sta.*—Belfast (*W.*).
 O. SCOTICELLA, *Sta.*—Enniskillen (*P.*).
 O. GUTTEA, *Haw.*—Sligo (*R.*).

COLEOPHORIDÆ.

- COLEOPHORA FABRICIELLA, *Vill.*—Sligo (*R.*).
 C. DEAURATELLA, *Lien.*—Sligo (*R.*); Enniskillen (*P.*).
 C. ALCYONIPENNELLA, *Kol.*—Howth: Sligo (*R.*).

(*C. VIBICELLA*, *Hb.*—Six specimens of this species—from the collection of Mr. Russ, labelled “Sligo,” identified by Mr. Barrett—are in the Dublin Museum of Natural History. As, however, the insect is not known to feed upon any plant except *Genista tinctoria*, which is not indigenous in Ireland, it seems advisable to defer the inclusion of *C. vibicella* in the Irish list until further information is available as to its habits.)

- C. ALBICOSTA, *Haw.*—Howth and Galway; Sligo (*R.*).
 C. ANATIPENNELLA, *Hb.*—Howth and Galway; Sligo (*R.*).
 C. DISCORDELLA, *Zell.*—Howth and Galway; Enniskillen (*P.*); Sligo (*R.*).
 C. CÆSPITITIELLA, *Zell.*—Abundant everywhere.
 C. LARIPENNELLA, *Zett.*—Howth; Sligo (*R.*).
 C. ARTEMISICOLELLA, *Brd.*—Howth.
 C. APICELLA, *Sta.*—Sligo (*R.*).
 C. ARGENTULA, *Zell.*—Sligo (*R.*).
 C. VIRGAUREELLA, *Sta.*—Howth.
 C. LARICELLA, *Hb.*—Enniskillen (*P.*).
 C. NIGRICELLA, *St.*—Dublin; Derry (*C.*); Westport (*W.*).
 C. FUSCEDINELLA, *Zell.*—Dublin; Enniskillen (*P.*).
 C. GRYPHIPENNELLA, *Bouché.*—Enniskillen (*P.*) and Howth.
 C. VITISELLA, *Greg.*—Wicklow Mts.
 C. VIMINETELLA, *Heyd.*—Enniskillen (*P.*).
 C. OLIVACEELLA, *Sta.*—Howth.

ELACHISTIDÆ.

BATRACHEDRA PRÆANGUSTA, *Haw.*—Dublin, abundant; Wicklow Mts.

ENOPHILA V-FLAVA, *Haw.*—Dublin, among fungi in spirit vaults.

CHAULIODUS CHÆROPHYLLELLUS, *Göze.*—Howth; Wicklow Mts.; Belfast (*W.*).

LAVERNA EPILOBIELLA, *Schr.*—Dublin.

L. SUBBISTRIELLA, *Haw.*—Clonbrock, Co. Galway (*R. E. D.*).

L. HELLERELLA, *Dup.*—Dublin, abundant.

L. ATRA, *Haw.*—Belfast, abundant (*W.*).

CHRYSOCLYSTA LINNEELLA, *Clerck.*—Holywood, Co. Down.

C. SCHRANKELLA, *Hb.*—Enniskillen (*P.*).

C. AURIFRONTILLA, *Hb.*—Howth, and near Dublin; Armagh (*J.*).

ASYCHNA MODESTELLA, *Dup.*—Dublin.

CHRYSOCORIS FESTALIELLA, *Hb.*—Howth; Killarney; Belfast (*W.*); Derry (*C.*); Sligo (*R.*).

ELACHISTA ATRICOMELLA, *Sta.*—Sligo (*R.*).

E. LUTICOMELLA, *Zell.*—Howth; Coolmore, Donegal (*J.*).

E. FLAVICOMELLA, *Sta.*—Howth. Originally described from two examples, taken here by Mr. R. Shield in July, 1855. Again taken in same place by Mr. J. Sang in 1883. Almost unknown otherwise.

E. KILMUNELLA, *Sta.*—Sligo (*R.*).

E. MONTICOLA, *Wk.*—Ballinahinch, Co. Down (*W.*).

E. NIGRELLA, *Hb.*—Generally common.

E. SUBNIGRELLA, *Dougl.*—Howth.

E. PERPLEXELLA, *Sta.*—Dublin; Belfast (*W.*).

E. BEDELLELLA, *Sircom.*—Armagh (*J.*); Sligo (*R.*).

E. OBSCURELLA, *Sta.*—Belfast (*W.*).

E. ZONARIELLA, *Tgstr.*—Howth.

E. TÆNIATELLA, *Sta.*—Howth.

E. MEGERLELLA, *Zell.*—Howth.

E. RHYNCHOSPORELLA, *Sta.*—Sligo (*R.*); Belfast (*W.*); Enniskillen (*P.*).

E. DISPUNCTELLA, *Dup.*—Howth.

E. POLLINARIELLA, *Zell.*—Howth.

E. RUFOCINEREA, *Haw.*—Dublin; Wicklow Mts.; Sligo (*R.*); Belfast (*W.*); Armagh (*J.*).

E. SUBALBIDELLA, *Schl.*—Belfast, abundant (*W.*).

E. ARGENTELLA, *Clerck.*—Of general occurrence.

TISCHERIA COMPLANELLA, *Hb.*—Belfast.

T. MARGINEA, *Haw.*—Howth.

LITHOCOLLETIDÆ.

LITHOCOLLETIS IRRADIELLA, *Scott.*—Raheny, near Dublin.

L. BREMIELLA, *Zell.*—Wicklow Mts.

L. POMIFOLIELLA, *Zell.*—Generally common.

L. CORYLI, *Nicelli.*—Malahide; Belfast (*W.*).

L. SPINICOLELLA, *Kol.*—Dublin.

L. FAGINELLA, *Mann.*—Dublin; Clonbrock, Co. Galway (*R. E. D.*).

L. SALICICOLELLA, *Sircom.*—Howth; Enniskillen (*P.*); Belfast (*W.*).

- L. ULMIFOLIELLA, *Hb.*—Howth; Enniskillen (*P.*).
 L. QUERCIFOLIELLA, *Fisch.*—Abundant everywhere.
 L. MESSANIELLA, *Zell.*—Dublin; Howth; Holywood, Co. Down.
 L. CORYLIFOLIELLA, *Haw.*—Dublin; Howth; Wicklow Mts.
 L. ALNIFOLIELLA, *Hb.*—Howth; Belfast (*W.*); Enniskillen (*P.*).
 L. HEEGERIELLA, *Zell.*—Wicklow Mts.
 L. CRAMERELLA, *Fb.*—Generally common.
 L. NICELLII, *Zell.*—Enniskillen (*P.*).
 L. SCHREBERELLA, *Fb.*—Clontarf, near Dublin.
 L. TRIFASCIELLA, *Haw.*—Howth.

LYONETHIDÆ.

- LYONETIA CLERCKELLA, *L.*—Donnycarney, near Glasnevin, Dublin; Holywood, Co. Down; Blarney, Co. Cork.
 CEMIOSTOMA SPARTIFOLIELLA, *Hb.*—Generally common.
 OPOSTEGA CREPUSCULELLA, *Fisch.*—Sligo (*R.*); Enniskillen (*P.*).
 BUCCULATRIX NIGRICOMELLA, *Zell.*—Sligo (*R.*).
 B. CRATEGIFOLIELLA, *Dup.*—Howth.
 B. MARITIMA, *Sta.*—Howth.

NEPTICULIDÆ.

- NEPTICULA ANOMALELLA, *Göze.*—Howth.
 N. OXYACANTHELLA, *Sta.*—Howth, and Coolock, Co. Dublin.
 N. SEPTEMBRELLA, *Sta.*—Howth.
 N. IGNOBILELLA, *Sta.*—Howth and Coolock, Co. Dublin.
 N. ARGENTIPEDELLA, *Zell.*—Howth.
 N. ACETOSÆ, *Sta.*—Howth; Bray, Co. Dublin (*S.*).
 N. PLAGICOLELLA, *Sta.*—Artane and Donnycarney, near Glasnevin, Dublin.
 N. GRATOSELLA, *Sta.*—Killester, Co. Dublin.
 N. MARGINICOLELLA, *Sta.*—Clontarf, Co. Dublin.
 N. AURELLA, *Fb.*—Of general occurrence.

MR. DONOVAN'S CAPTURES IN CO. CORK.

By W. F. DE VISMES KANE, M.A., F.E.S., &c.

THE list of moths captured by Mr. R. J. F. Donovan at Timoleague and its neighbourhood (*ante*, p. 103) is a contribution of much value to the student of geographical distribution; and it shows that this gentleman is a worthy successor of his brother, who, when resident at Glandore, did

most excellent work in the same direction, and added not a little to our knowledge of the lepidopterous fauna of a portion of Ireland hitherto neglected by tourists or naturalists, if we except marine zoology. Neither of these two stations, however, offers equal attractions in point of its fauna when compared with the Killarney district, which presents such varied features of forest, moor, and mountain in a state of nature—unaltered almost by the hand of man. And, indeed, in this respect, no part of Great Britain can compete with this part of Kerry, except the New Forest and portions of Scotland.

But the climate of the South of Ireland admits the survival of many insects which could not endure the severe conditions of the Scottish highlands. The mild and equal temperature of Killarney, however, is shared both by Glandore and Timoleague; and thus we find evidence of the existence of many species from these portions of Co. Cork which are peculiar to the warmer districts of these islands. It is interesting to find a well-marked zone in the southern half of Ireland, but stretching further north on the western coast, which is washed by the Gulf Stream, in which alone are found certain species. Many of these are included in Mr. Donovan's list, which the temperature, without reference to any physical features of the country, confines almost exclusively to these parts of Ireland. Among these may be instanced *Vanessa io*, *Epinephele tithonus*, *Thecla quercus*, *Gnophria quadra*, *Mamestra persicariæ* (which scarcely ever occurs in the North of Ireland), and perhaps *Agrotis corticea*; *Amphipyra pyramidea*, *Teniocampa pulverulenta*, *Hecatera serena*, *Chariclea umbra*, *Venilia macularia*, *Amphidasys strataria*, *Eupithecia plumbeolata*, and *E. debiliata*. There are other species, besides those in Mr. Donovan's list, which are similarly restricted, such as *Bombyx neustria*, *Heliothis peltigera*, and apparently *Dianthæcia cæsia*, the distribution of which, in regard to isothermal lines, elsewhere in the British Islands, would well repay investigation. I exclude also the three remarkable species which he has captured at Timoleague, namely, *Leucania extranea*, *Laphygma exigua*, and *Sterrha sacraria*, since two of them have only once before been recorded; while *L. exigua* is unique from Ireland. I regret that Mr. Donovan has included doubtfully *Acidalia trigeminata* in his list, on my authority. I have seen no Irish specimens of this moth. Probably they may be *A. bisetata* var. *fimbriolata*, which has been more than once sent me as *trigeminata*. The larvæ found at the roots of bog cotton, and attributed to *Tapinostola fulva*, may very well have been those of *Celena haworthii*, which are internal feeders in the roots of species of *Eriophorum*. It is to be hoped that other rarities may reward Mr. Donovan's perseverance.

LYCÆNA PHERETES AND ITS ALLIES IN THE SIKHIM
HIMALAYAS.

BY W. HARCOURT-BATH.

IN that very creditable and painstaking work, 'The Butterflies of India, Burmah, and Ceylon,' the author, Mr. Lionel de Nicéville, describes as distinct species *Lycæna lehana*, Moore, from Ladak, and *L. pheretes*, Hübner, from Sikhim. Subsequently, however, in the 'Gazetteer of Sikhim,' he unites them under the former, and explains that "the Himalayan form of *L. pheretes* may be distinct from the European and Central Asian form, but the Ladak and Sikhim forms are practically identical."

During my journey through Sikhim in 1897 I encountered three distinct forms of, or three species closely allied to, *Lycæna pheretes*:—

No. 1.—The first, which I found near Yeumtung at the altitude of 12,000 to 13,000 ft., is apparently the species given as *Lycæna pheretes*, Hübner, var. *asiatica*, Elwes, in the 'Butterflies of India, &c.' In expanse it measures just about the same as the form found in the Swiss Alps, namely, 1·1 in.; but, as pointed out by Mr. de Nicéville, it differs from the latter in the "narrower and pointed fore wings, and in having much more gloss on the under side." To this I may add that in the Sikhim form the blue is more brilliant, and the shape of the white spots on the under side of the hind wings is slightly different. The female is pale brown on the upper side.

No. 2.—This form, which I propose to call *Lycæna sikhima*, was taken about 1000 ft. higher up than the preceding, in the upper limits of the pine forests, and appears to be sufficiently distinct from the preceding, although aberrations were found somewhat intermediate between the two. In size it is very much inferior to No. 1, measuring under an inch in expanse, with much narrower and very pointed wings; but the principal distinction is in the colour, which gives it a very different appearance, being of the same tint of lilac as British specimens of *Cyaniris argiolus*. The female is very similar in colour to that of No. 1. I have not seen *Lycæna lehana* from Ladak, but, judging from the description of it in Mr. de Nicéville's work, it somewhat resembles this. He briefly describes it as follows:—"Expanse, '9 to 1 in. Male upper side violet-blue, brownish blue at the margins. Differs from *L. pheretes* in their much smaller size." This agrees with the Sikhim form as regards size, but not in the colour of the margins of the wings. As far as I can judge, without seeing specimens of the Ladak form, the latter appears to be some-

what intermediate between Sikhim form No. 2 and the one I am about to describe.

No. 3.—This form is totally distinct from either of the other two taken in Sikhim, although it is much closer to No. 2. In expanse, and in the narrow pointed shape of the wings, it agrees with the latter very closely, but the colour of the upper side of all the wings is totally different.

The following is a description of form No. 3:—Expanse, .8 to .9 in. Male, slaty grey-brown, powdered with pale blue scales, more especially at the base of the wings, with a pale blue discoidal spot on the fore wings, and frequently on the posterior pair; all the margins brown, but rayed with pale blue, more distinctly in some specimens than in others. In most of the examples the white spots of the under side show through on both the anterior and posterior wings, but are occasionally indistinct on the latter pair. The female differs from the male in being browner, and of a less slaty grey colour, with fewer blue scales at the bases, but the discoidal spots rather more distinctly marked. The under side in both sexes is very similar to those of Nos. 1 and 2, but the marginal border of pale brown spots is much more distinctly defined.

The peculiar greyish brown colour, with the blue rays and discoidal spots, give this butterfly altogether a very curious and distinctive appearance, totally different to either of the other two forms described, and no forms whatever connecting them were found; so that it appears to be quite distinct, and, in my opinion, deserves to rank as a species. It occurs at the highest altitude of any of the *Lycænidaë* in the Sikhim Himalayas, having been found by myself between the heights of 15,000 and 18,000 ft. on the extreme upper limits of phanerogamic vegetation. At the former altitude it was very plentiful in July at Momay Sandung, flying among the numerous alpine flowers which flourished in that region; many specimens were also taken at rest on a species of purple aster. From thence right up to within 500 ft. of the summit of the Donkia Pass it was found sparingly in company with two species of *Parnassius*, two of *Argynnis*, one of *Colias*, and one of *Encis*. To this interesting little butterfly I should like to give the name *Lycæna altissima*.

Longfleet, Dorsetshire: May 30th, 1900.

NOTES AND OBSERVATIONS.

MACROCEPHALUS ARIZONICUS = *UHLERI*.—When describing *Macrocephalus arizonicus* (Entom. xxxiii. p. 66), I unfortunately overlooked the description of *M. uhleri*, Handl. Verh. Ges. Wien, 1898, p. 383. I have not now seen that description; but Mr. Ashmead, at my request, has been so kind as to compare it with my type of *arizonicus*, which is now in the U. S. National Museum. He writes me that "it agrees exactly in every point, and unquestionably is identical."—T. D. A. COCKERELL; Mesilla Park, N. M., April 28th, 1900.

EGGS OF *CEROPLASTES IRREGULARIS* (Entom. xxvi. p. 351).—On January 16th, 1900, females of this species, with eggs, were found at Mesilla Park, N. M. The eggs from a single female were counted by my entomology class, and were found to number 1181.—T. D. A. COCKERELL.

DIPLOSI *PARTHENICOLA*, n. sp.—♀. Length about $2\frac{1}{2}$ mm. Dorsum of thorax shiny, black, slightly hairy; sides of prothorax brown; scutellum prominent, with four bristles directed backwards; eyes meeting on vertex; abdomen raspberry colour, blackish dorsally; ovipositor long, blackish, the narrow terminal segment light reddish-ochreous; legs very pale, ochreous-tinted; antennæ very pale, 2 + 12-jointed, joints cylindrical, a little constricted in the middle, short-pedicelled; halteres pale orange. Emerged March 26th, 1900, from galls on *Parthenium incanum*, collected at the foot of Picacho Mountain, Mesilla Valley, New Mexico. Larva orange. Pupa-shell colourless, with the anterior end dark sepia-brown. Galls at the bases of the leaves, about 5 mm. diameter, woolly and snow-white, like little tufts of cotton-wool.—T. D. A. COCKERELL.

ISCHNURA PUMILIO.—I am glad to be able to report that this dragonfly, which disputes with *Agrion mercuriale* the distinction of being the smallest on the British list, has turned up again, its haunts having been lost sight of for some fifty years perhaps. A short time since, a friend brought me a box of dragonflies for identification, and amongst them were two or three specimens of *Ischnura pumilio*, which I understand were taken in Norfolk last year. Strange to say, during a short stay in the New Forest at Whitsuntide of this year, I took seven specimens of the same species, five males and two females, both of var. *aurantiaca*. The insect appears to come on the wing at the end of May or beginning of June, and, judging from the fact that I have often hunted the New Forest locality at the very beginning of August, it must be over by that date. Possibly streams through peat-bogs would be good localities to search for the species, which should be well out by the end of the present month.—W. J. LUCAS; June 14th, 1900.

HELIOTHIS ARMIGERA.—As in other zoological regions where this species occurs, its appearance in New Zealand is also erratic. The present has been an *armigera* year on the Canterbury Plains, South Island, where the moths have been plentiful during the last two months. They appear to be much attracted by the flowers of *Araujia albens*, by which they are trapped and perish daily in fine weather. I possess some fine large plants of this Brazilian "moth trap," which have bloomed profusely each autumn for six years, but the present is

the first season in which I have observed *H. armigera* caught by the flowers. Noctuæ have been somewhat scarce at the flowers this summer in this district. In former years I have generally obtained numbers of perfect specimens of several species every morning, caught in the flowers the previous night. I find that great care is necessary in cutting open the flowers to liberate the captives' antennæ, in order to secure good specimens. I would surmise that vast numbers of insects must perish annually at these flowers in Brazil, where the plant is indigenous, and where insects are perhaps more numerous than in any other zoological region.—W. W. SMITH; Ashburton, N. Z., May 2nd, 1900.

NONODONTA CHAONIA.—In 1897, I picked out of the River Stour a half-drowned female *N. chaonia*, which deposited several eggs. These hatched, and I bred a long series in 1898. Some of the larvæ when full-fed were put in an ordinary breeding cage, in which I last year put other pupæ. When looking at these on the 10th, I found a freshly emerged female *chaonia*, which had therefore been three years in the pupal state, as I have not had any larvæ since 1897.—A. DRUITT; Christchurch, May 15th, 1900.

ERRATUM.—P. 157, line 4 from bottom, for "boxes" read "bones."

CAPTURES AND FIELD REPORTS.

LYCENA ARGIOLUS.—Whilst staying at Carmarthenshire this week I observed a female of *L. argiolus* depositing ova on the needles or shoots of the gorse or furze (*Ulex europæus*). I do not remember having seen this recorded as one of its food-plants.—T. B. JEFFERYS; Bath, June 2ud.

THECLA W-ALBUM LARVÆ ABUNDANT.—Mr. P. Richards tells me that he has found larvæ of *Thecla w-album* exceedingly common on a single wych-elm between Esher and Ripley, in Surrey. All or most of those that he secured have by this time pupated, and if other wych-elms are equally favoured, there should be an abundance of imagines of this butterfly shortly.—W. J. LUCAS; 12, Caversham Road, Kingston-on-Thames, June 14th.

NEW FOREST.—Three days' collecting at Easter with Mr. A. D. Wilson produced fair results, considering the very cold wind. From the sallows we obtained a great number of *Panolis piniperda*, which, with *Taniocampa stabilis*, were far the commonest moths. There were also a few *Taniocampa miniosa*, *T. gothica*, and *Orrhodia vaccinii*. During the day *Amphidasys prodromaria*, *Xylocampa lithoriza*, and *Tephrosia biundularia* were taken off trunks and fences.—H. WELLS; Hurstfield, The Avenue, Gipsy Hill, London, S.E., May 23rd, 1900.

ASSEMBLING.—On the 17th inst. I took a freshly emerged *Smerinthus tiliæ* female sitting on the fence, and placed her in the assembling cage, hanging it on the lower branches of a lime tree, with the following results: 17th, three males; 18th, seven males; 19th, four males; 20th, three males; 21st, very wet, none; 22nd, two males; 23rd, two males. A net result of twenty-one males by the agency of one female is, I think, somewhat of a record even for this district, in which *S. tiliæ* is fairly plentiful. A striking peculiarity is also noticeable in the circumstance. We have

assembled some dozens of this species, and on no occasion has the male arrived before 9 o'clock, nor have we ever been able to see one after 9.30.—WILLIAM A. CARTER; Burr Villas, Bexley Heath, Kent, June 6th, 1900.

PLUSIA GAMMA ABUNDANT.—On June 12th, just before a thunderstorm, I observed at this place a large number of *P. gamma* flitting about everywhere—hundreds of them. The previous evening I was at the same spot, and did not see a single specimen. Although they are still abundant, there is nothing like the same number as on the 12th. I thought the above of interest, as I did not see half a dozen specimens of *P. gamma* here all last season.—J. W. WOOLHOUSE; Summer Hill, Fakenham, Norfolk.

LYCÆNA ARGIOLUS.—This species has been common about the holly-bushes in gardens on Blackheath during the last three weeks.—WALTER DANNATT; Donnington, Vanbrugh Park, Blackheath, May 28th, 1900.

WHERE TÆNICAMPA GRACILIS LAYS ITS EGGS.—During the night of May 7th, whilst searching with a lamp for larvæ near Chester, I found a female *T. gracilis* laying her eggs on a dead last year's flowerhead of *Centaurea nigra*. I see from my note-book I had a similar experience, in the same lane, which is well fringed with briars, brambles, and willows, on the night of May 12th, 1899, only, in this case, the moth had chosen a dead grass-head. The larvæ feed on several plants—notably the trusses of unopened meadow-sweet flowers (Entom. xxxii. p. 126). The eggs of *T. opima* I have found on dead ragwort, thistle, and dwarf rose (Entom. xxiii. p. 307).—J. ARKLE; Chester. [Ova of *T. gracilis* are very frequently found on dead seed-heads, &c., of various low growing plants.—ED.]

EASTER (1900) IN THE NEW FOREST.—In spite of the bad weather preceding the holiday, my father and I found ourselves installed in our old quarters in the forest, at Bank, on April 12th. During the drive along the beautiful road from Brockenhurst, it was only too plain on every hand how backward is the season. The blackthorn, which a fortnight earlier last year was in full flower, was now only in bud, though a few bushes came into bloom during our stay. Several of the whitethorn bushes showed no green at all; many of the willows, we were told, had only come out during the last week; a suspicion of redness gave the sole indication of the oaks beginning to bud, but birch and beech looked very beautiful, the former pale yellow green with catkins and young leaves, the red buds of the latter all ready to burst.

The first night at the willows was scarcely reassuring. It was fearfully windy, and there was also a little rain. Insects refused to settle down, and were very restive. There were a few each of *Tanicampa stabilis* and *Cerastis vacciniæ*, one very fine *Pachnobia rubricosa*, and one *Eupithecia abbreviata*—a wretched night! Added to our other discomforts, the lantern, which had apparently not recovered from its long hibernation, refused to remain alight, so we turned in early. After this the weather became fairly fine as a whole, but about as adverse to collecting as it could be. When the day was otherwise bright and sunny there would be a terrific wind, and when there was no wind down would come the rain. At night, however, wind and clouds almost invariably disappeared, and a brilliant moon shone on the unfortunate collector. The total result of four whole days' collecting was fourteen *Xylocampa lithorhiza*, one *Tephrosia crepuscularia*, one *Pieris rapæ* (freshly emerged) two *Vanessa polychloros*, which was in great numbers on the Saturday; about twenty larvæ of *Sesia cynipiformis* (*asiliformis*) from oak stumps, a few larvæ (small) of *Agrotis*

agathina (?) from heath, and two each of *Cleora lichenaria* and *Hemithea thyntaria*. *Gonepteryx rhamni* was fairly abundant. Such insects as *Brephos parthenias*, *Lobophora lobulata*, &c., which one would naturally expect to find, did not put in an appearance at all. On pulling some bark off an old dead oak-tree, several *Rhagium inquisitor* and *R. bifasciatum* were exposed.

Sallows, though by no means good, were better than day-work. After the first night *Taniocampa stabilis* was extremely common, outnumbering *Cerastis vaccinii*, the next in numbers, by about ten to one. Of *Taniocampa miniosa*, which I did not take last year, I secured nine, mostly perfect specimens. *T. munda*, as in 1899, was represented by a solitary example. *T. cruda* was scarce, and in bad condition, apparently over. *T. gothica* very fine, and fairly common. We obtained also two perfect *Pachnobia rubricosa*, half a dozen *Panolis piniperda* (another collector whom we met took forty-two in one night), a few *Xylocampa lithorhiza* and *Eupithecia abbreviata*, and single specimens of *Hybernia marginaria* and *Anticlea badiata*. Two examples of *Scopelosoma satellitia* were also noticed, and one *Xylophasia lithoxylea* (surely a very unusual insect—I did not know it hibernated). Larvæ beaten at night were *Cleora lichenaria*, *Rumia luteolata*, *Triphæna fimbria*, and *T. pronuba* (? or *orbona*).

I should be glad if any one could tell me whether *Taniocampa incerta* (*instabilis*) is at all local, as I have not come across a single specimen in the New Forest, either this year or last. We returned home on Tuesday, and the following day the weather immediately became almost perfect.—F. M. B. CARR; 46, Handen Road, Lee, S.E.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*May 2nd, 1900.*—Mr. W. L. Distant, Vice-President, in the chair. Mr. A. A. Dalglish, of 21, Prince's Street, Glasgow, was elected a Fellow of the Society. Mr. W. L. Distant exhibited the cocoon, measuring nearly three and a half inches each way, of a Coprid beetle—probably belonging to the genus *Heliocopris*—found at Pretoria, in the Transvaal. The Rev. Theodore Wood exhibited a specimen of *Carabus auratus*, L., taken in either June or September, 1898, by Mr. Ferrand, of Littlefield House, Exmouth, on the Haldon Hills, in the neighbourhood of that town. Mr. McLachlan exhibited an example of *Ithinocypha fulgidipennis*, Guérin, a brilliant little dragonfly of the subfamily Calopteryginæ, a native of Cochin China, which, so far as he knew, had not been captured since prior to 1830. It had been in M. Guérin's hands, and Mr. McLachlan had received it from M. René Oberthür. Dr. T. A. Chapman exhibited various specimens illustrating *Acanthopsyche opacella*: fresh females showing the six nearly complete rings of silky wool with which she is clothed; specimens preserved *in cop.*, showing the exact position of the male moth in the female case, and the position of the two moths in relation to the female pupa-case. It was incidentally mentioned that the inflation of the male abdomen with air was observed to be the main force employed in advancing the male abdomen into position, and that observation of the immature wing threw considerable light on the real neuration in this species. Mr.

Barrett exhibited specimens of Heterocera destructive to the fruit crops of South Africa. Among them *Sphingomorpha mouteironis*, Butl., known as the Fruit Moth in Cape Colony—a bold and powerful insect, with a sucking tongue strong enough to pierce the sound skin of a peach or fig. The presence of a light does not appear to disturb it, so that examination of its methods can be readily made, when it can be seen that it does not take advantage of the natural opening into a fig, or of a crack or other injury to a peach, but deliberately pierces a hole which afterwards shows as a small round spot, from which decay invariably results. It seems a matter of indifference to the moth whether the fruit has fallen, or is on the tree, ripe or unripe. With regard to *Achæa lienardi* and *Serrodus inara*, the two species are restless and timid, and therefore more difficult to observe. In the present season, however, both have been extremely abundant, and have been seen at apparently uninjured fruit, so that it seems they are capable of equal destruction, and this is the more probable as all the species alike are provided with somewhat saw-like teeth toward the tip of each section of the sucking apparatus. Several others, feeding mainly on damaged fruit, were also taken with the aforesaid species, among them several new to science, and recently described by Sir George Hampson. They included *Pseudophia tirrhæa*, Cr., *Ophiusa melicerta*, Drury, *O. mor-moides*, Walker, *Ophiusa griseimargo*, Hampson, *O. selenaris*, Hampson, *Dysgona faber*, Holt, *Ericcia unangulata*, Gn., *Homoptera glaucinans*, Gn., *H. edusina*, *Pandesma umbrina*, *P. fugitiva*, *Trigonodes obstans*, *Audea ochripennis*, *Dordura tegulata*, Hampson, *D. retracta*, Hampson, *Hybocala deflorata*, *Deva natalensis*, *Oresia argyrosigma* and var. *provocans*, *O. emarginata*, *Agrotis segetum*, *A. munda*, *A. spinifera*, *A. amatura*, *A. decipiens*, *A. rimosa*, *Noctua atrosignata*, *Axylia interstriata*, Hampson, *Gonites sabulifera*, *Cosmophila erosa* and var. *xanthynidyna*, *Leucania interciliata*, Hampson, *L. alboritta*, Hampson, *L. monosticta*, Hampson, *L. rhabdophora*, Hampson, *L. tacuna*, Feld., *L. amens*, *L. torrentium*, *L. loryi*, *Laphygma exigua*, *L. orbicularis*, and *Eulaphygma abyssinia*. Mr. Jacoby exhibited *Callomorpha wahlbergi* from Africa, and *Spilopyra sumptuosa* from Australia. A paper was communicated on “New Palearctic Pyralidæ,” by Sir George F. Hampson, Bart.—C. J. GAHAN & H. ROWLAND BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—April 12th, 1900.—Mr. F. Noad Clark in the chair. Mr. G. B. Browne, 43, Southbrook Road, Lee, was elected a member. Mr. Edwards exhibited a living specimen of *Scorpio europæus*, sent by Dr. Chapman from Cannes; it fed readily upon cockroaches. Mr. Sich, living larvæ and cases of *Coleophora lineola*, from Chiswick. Mr. Clark, photomicrographs of the ova of (1) *Eugonia fuscantaria*, showing clearly the serrated edges; (2) *Geometra vernaria*, in piles as deposited; and (3) *Neuronia popularis*. Mr. Colthrup, specimens of *Bombyx quercus* var. *callunæ*. Mr. Tutt gave an interesting account of the Lasiocampid Moths, to which he had recently been devoting his attention. He showed that they formed a clearly definable section, and contained numerous easily distinguishable, although closely allied, subsections and genera. The various points of view of ovum, larva, pupa, and imago were taken into consideration, and contrasted and compared with allied groups, as well as *inter se*.

April 26th.—Mr. W. J. Lucas, B.A., F.E.S., President, in the chair. Mr. Rowden, of Kingston Hill, was elected a member. Mr. Buckstone exhibited specimens of *Triphaena jimbria*, bred from ova; the larvæ had been fed exclusively on cabbage. Mr. Turner, Longicorn Coleoptera: (1) *Saperda populnea*, taken by Mr. Day at Carlisle; (2) *Rhagium bifasciatum*, from the New Forest; (3) *Clytus mysticus*, from Brockley; (4) *C. arietis*, from Lewisham; together with larvæ of (1) *Callimorpha dominula*, from Deal, where they were comparatively scarce; (2) *Bombix quercus*, from Deal, on garden rose; (3) *Pericallia syringaria*, from Bexley. Mr. Moore, a Kaffir necklace made of ants' "eggs"; these so-called eggs are really the encysted pupæ of a species of Coccid, of subterranean habits, belonging to the genus *Margarodes*. Mr. Lucas, a specimen of the dragonfly, *Sympetrum vulgatum*, a male, taken by Mr. Hamm, of Oxford, at Torquay on Aug. 15th, 1899; this is the second authenticated British specimen. Mr. Adkin, a fine bred series of *Eugonia fuscantaria*, from Lewes ova, and stated it was easy to breed when sleeved. Mr. Clark reported that he had received ova of *Gonepteryx rhamni* which had been found deposited on the stems of the buckthorn. Mr. Harrison reported having seen a dragonfly, *Libellula quadrimaculata*, on the wing at Easter.

May 10th.—The President in the chair. Mr. Adkin exhibited a series of *Cubera exanthemaria*, showing variation in the relative positions of the transverse lines.

May 24th.—The President in the chair. Mr. Clark exhibited a sawfly cocoon of a most delicate fibrous structure. Mr. Enock gave a series of interesting notes, illustrated with admirable lantern-slides, on various incidents in insect life, including (1) a long series of slides showing all stages in the closing of the wings in the earwig; (2) a series showing the gradual unfolding and growth of the wings in *Papilio machaon*; and (3) all stages in the emergence and hardening process of *Æschna cyanea*.

RECENT LITERATURE.

KUHLGATZ. *Eine neue Plataspidinen-Gattung aus Deutsch Ost-Afrika mit geweihartiger Verlängerung der Juga beim Männchen sowie über einige der nächsten Verwandten dieser neuen Gattung* (S. B. Ges. Naturf. Freunde, Berlin, 1900, pp. 120-135, figs. 1-3). [Rhynchota.]

Herr Theodor Kuhlitz describes an extraordinary Coptosomatine (Cimicidæ), closely allied to *Plataspis*, from German East Africa, which he terms *Elatpheozygum goetzei*, gen. et sp. n. In the male the juga (the lateral portions of the dorsal part of the head) are enormously elongate, being much longer than the thorax and abdomen together; each jugum is forked near the apex. Such an appearance is common enough among Coleoptera, but in Rhynchota very rare. The female is normal in structure, though an abnormal specimen of this sex is figured, in which the left jugum is distinctly longer than the right; this the author considers may perhaps be an hermaphrodite. The paper concludes with an analytical table of the eleven genera of the *Plataspis* group.—G. W. K.

C. M. WEED. *The Spiny Elm Caterpillar* (New Hampshire Exp. Sta. 1899, Bull. 67, pp. 123-141, 16 figs.)

This Bulletin will be of interest to British lepidopterists for the information about the habits, in America, of a butterfly, rare with us. *Euranessa antiopa* (commonly known in America as the "Mourning Cloak") is extremely injurious in some of the eastern States to the foliage of elm trees—photographs of this damage are presented to the reader—but feeds also on willow, poplar, and, rarely, on hackberry (*Celtis occidentalis*), birch, pear, and rose.

Like some other of its allies, it has a wide distribution, ranging over "the entire breadth of the northern hemisphere, below the arctic circle as far south as the thirtieth parallel of latitude," that is, from Canada to Bermuda and Mexico, Europe, Japan, &c.

The damage done to elms and poplars, though only occasional and limited in area, is sometimes very great, Prof. Lugger observing that they were so numerous upon elms in Michigan "that branches were broken by their weight."

The Bulletin concludes with a notice of the parasites and enemies of the insect, and remedies against its devastations.—G. W. K.

ANTON HANDLIRSCH. *Wie vielen Stigmen haben die Rhynchoten?* (Verh. Zool. Bot. Ges. Wien, 1899, sep. p. 1-12, figs. 1 & 2).

After briefly reviewing the work of Dufour, Mayer, Schiödte, Hansen, and others, and discussing the position and structure of the stigmata in various Rhynchota, the author sums up his researches as follows.

The fundamental type in Rhynchota is—two pairs of thoracic stigmata (meso- and metathoracic) and eight pairs of abdominal stigmata (segments 1-8). This type embraces the whole of the Homoptera, except the more or less degraded Psyllidæ, Aphidæ (? Aleurodidæ), and Coccidæ, in which a more or less considerable progressive reduction (from behind forwards) of the abdominal stigmata occurs, which reaches its maximum in the Coccidæ. In waterbugs an inconsiderable modification, taking in account the necessary adaptation to special conditions of existence, takes place, which is increased in the landbugs, in which there is a tendency to atrophy of the first pair of abdominal stigmata. Only the absolutely wingless group of Pediculidæ, strongly modified by their eminently parasitic manner of life, deviate considerably from the original type, the first two pairs of abdominal stigmata and those of the metathorax having vanished.

We find, also, an astonishing antithesis between the plant parasites and the animal parasites, of which the former are obviously derived from the Homoptera, the latter probably from the Heteroptera, if indeed they belong to the Rhynchota at all.

We regret that the Direction of these *Verhandlungen* still find it convenient to issue the author's copies with a separate pagination, thereby creating two references for the same work, with no concomitant compensating advantage. As the separate copy only is before us, we are unable to indicate the correct pagination.—G. W. K.

Proceedings of the South London Entomological and Natural History Society for 1899. Pp. 120, with one plate. Published at the Society's Rooms, Hibernia Chambers, London Bridge. 1900.

ALTHOUGH something like three-fourths of its income is needed to defray rental charges and general working expenses, this Society always seems able to publish its volume of Proceedings. The balance-sheet shows us that a sum of £44 was paid during the financial year for printing. We further glean from the same document that donations to the Publication Fund amounted to £26, and that £20 was transferred thereto from the General Fund.

In his address the retiring president (Mr. A. Harrison), after briefly referring to the affairs of the Society, and reviewing the work of the season, discourses at some length on the subjects of Telegony, and the connection of the mosquito with malarial fever. There are five papers, and one of these, by Dr. Chapman, entitled "Some Points on the Evolution of the Lepidopterous Antenna," is of special importance. Mr. J. W. Tutt's paper treats of the "Nature of Metamorphosis." Mr. Malcolm Burr contributes an instructive paper on Orthoptera, in which he gives an outline of the literature on the subject in chronological order, and makes some helpful remarks on species of the order, specially referring to those occurring in Britain. Mr. Robert Adkin furnishes another of those interesting accounts of his entomological observations while on holiday at Eastbourne. Although not strictly entomological, we must not omit to mention a brief but useful paper by Mr. D. J. Scourfield on "Fresh-water Entomostraca."

A good deal of valuable information will be found in the "Abstract of Proceedings."

We heartily congratulate the Society on the production of this excellent volume.

OBITUARY.

MR. WILLIAM WATKINS died at his residence, Villa Sphinx, Eastbourne, on June 9th last, aged fifty-one years. We have very little knowledge of his early career, except that he had a passion for collecting butterflies when quite a boy. When he arrived at the age of manhood he went to India, where for six years he acted as Orderly-room Clerk to the 76th Regiment, and devoted a good deal of his leisure time to the capture of Lepidoptera. On his return to England he sold his collection to Mr. Horniman, and subsequently decided to adopt entomology as a business. He was originally connected with the well-known entomological firm in the Strand; subsequently he carried on business in Piccadilly, and finally he removed to Eastbourne. In 1881 he established and conducted the arrangements of the Insect-house at the Gardens of the Zoological Society, and a year or two later he opened a similar concern at the Crystal Palace. From time to time Mr. Watkins held exhibitions in various parts of the country. On one occasion, when at Newmarket, he was honoured by a visit from the Prince of Wales and the Duke of Cambridge.

THE ENTOMOLOGIST

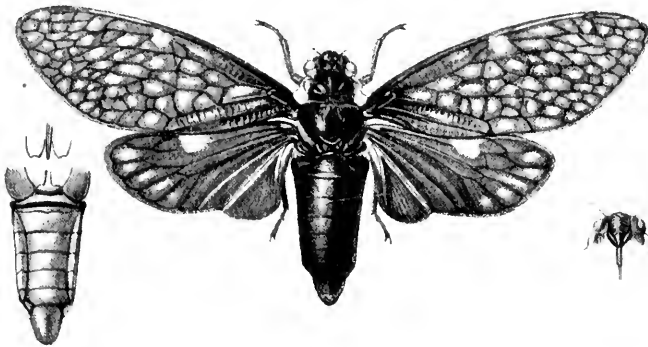
VOL. XXXIII.]

AUGUST, 1900.

[No. 447.

DESCRIPTION OF A NEW SPECIES OF CICADIDÆ FROM CHINA.

By W. L. DISTANT.



Talainga chinensis, sp. n.

♂. Body and legs black; eyes ochraceous, their posterior margins sanguineous; pronotum, with the lateral margins and a spot on lateral areas behind the eyes sanguineous. Tegmina black, opaque, with a pale creamy-white spot in almost all of the many cell-like areas, the most prominent spot being subcostal, and situate at the apex of the radial area. Wings black, with a large creamy-white spot extending across and a little below the radial area at about two-thirds from its base; five small submarginal creamy-white spots situate in the apical areas, and some basal streaks and some of the longitudinal venation margined with the same colour. Long. excl. tegm. ♂, 30 millim. Exp. tegm. 83 millim.

Hab. China: Kualun, N. W. Fokien (Coll. by Tang-wang-
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wang and Tang-chung-how; and presented by J. de la Touche, Esq., to the British Museum).

This is the second representative of the genus, which I described in 1890 from a species collected in Burma. From that species, *T. binghami*, it differs completely by the opaque and differently coloured tegmina and wings.

MIGRATIONS OF DRAGONFLIES.

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

SUCH a powerful appearance have some of the larger dragonflies, and so considerable is their wing-expanse, that we are not surprised to hear of their making migrations to a great distance. The British dragonfly in which this propensity seems most strongly developed is undoubtedly *Libellula quadrimaculata*. Many flights of this insect, sometimes in enormous numbers, have been recorded, and it would seem that one or more flights of the same dragonfly have to be noted as having taken place during the early part of the present season.

Mr. H. Stocks, of Weybridge, a very careful observer, sends me the following communication:—"At Margate, on the 10th of June, I observed vast numbers of dragonflies flying about the cliffs. Do you think they were part of the swarm that visited the Continent some days previously? I much regret being unable to catch any specimens. They were of large size, with thick bodies of a dark brown colour, with wings a shade lighter, and different from any I have usually seen. I do not think they were bred near, as there are no rivers or ponds in the neighbourhood. I do not know much of the district, but their appearance was evidently uncommon, from the remarks one heard about them. By the end of the week they disappeared—at least, I did not see any more." On enquiry, Mr. Stocks tells me:—"The day was very warm, with a nice gentle breeze. I am not quite certain, but I think the wind was south-east, and I am under the impression there were more dragonflies in the evening than in the morning." There seems little doubt that the dragonflies were *Libellula quadrimaculata*, and that they formed part of the same or a similar swarm to that seen at Antwerp, and noticed in a very general way without a name to the insect in several of the daily papers just before Mr. Stocks' observation.

Writing to Mr. South on June 19th, Mr. G. Bolam, of Berwick, asked for the name of a dragonfly (*Libellula quadrimaculata*), of which he enclosed a specimen taken by a friend, and of which he said, "It was observed arriving upon the coast here on Sunday afternoon (presumably June 17th) in hundreds." He states that

the captor observed it from three o'clock till half-past three in the afternoon coming up from the seashore over the low cliffs, and that they passed him almost continually in little parties of fours and fives at the rate, he estimated, of about five or ten per minute, and when he left the banks the flight seemed to show no signs of abating. The weather was warm and sunny, and the wind westerly. They mostly sailed inland without stopping on the sea-banks, and appeared to come direct from the sea. Mr. Bolam adds that, though he is quite familiar with the appearance of the insect, it is not common near Berwick.

Though a week later than the Margate flight, this may be part of the migration noticed on the Continent, which will probably turn out to be of this species, and of which we hope to hear more definitely when the observations appear in the entomological papers—newspaper entomology being, as a rule, useless for scientific purposes.

July 16th, 1900.

NOTES ON THE RESPIRATION OF THE DRAGONFLY NYMPH.

BY REV. ARTHUR EAST.

So little attention seems to have been devoted to the powers of breathing common air possessed by the dragonfly nymph, that a few somewhat elementary notes may perhaps be acceptable.

Two specimens of *Æschna cyanea* were taken from a pond in my garden in January of this year, and observations were made as to the length of time the nymph could live out of water. The nymphs were 20 mm. long when captured, and were restored to the water at varying intervals, and for different lengths of time; when out of water they were kept in a bottle with damp weed, and they fed, of course, only when restored to the water, so that the following summary of absence from the water means equally the time they went without food. The two nymphs observed are designated A and B:—

A. Nymph of *Æschna cyanea*.

Captured Jan. 1st, 1900, and put in bottle with damp weed.

Restored to water Jan. 3rd for 2 minutes.

“	“	“	5th	“	2	“
“	“	“	8th	“	30	“
“	“	“	13th	“	4 hours.	
“	“	“	18th	“	6	“
“	“	“	25th	“	4	“
“	“	Feb.	8th	“	20	“

B. Nymph of *Æschna cyanea*.

Captured Jan. 19th, 1900.

Restored to water Jan. 24th for 4 hours.

“ “ “ 31st “ 6½ “
 “ “ Feb. 8th “ 20 “

On February 8th A and B were put together and kept out of water until March 8th. They were then finally restored to the water, and, after appearing somewhat lethargic for about an hour, recovered perfectly, and fed freely.

On March 16th I received some specimens of *Erythromma naias*, kindly sent me by Mr. Lucas; one of these was kept out of water, in similar conditions to the *Æ. cyanea* mentioned above, from March 16th to April 16th, and appeared quite well when restored to the water; and, curiously enough, during the time of enforced fasting the nymph cast a skin, becoming, however, slightly smaller, *viz.* from 27 mm. to 25 mm. in length. The change of skin occurred on April 7th.

It will be seen therefore that both these species are able to live a month at least out of water. As to whether the after development is affected I cannot say, as the nymphs were mixed with others, and undistinguishable; but they did not appear to suffer in any way.

Four nymphs of *Agrion puella* were also kept under observation. One of these apparently got tired of the experiment after three weeks, and wandered off, and was lost; but the other three were kept thirty-three days out of water, and appeared none the worse for it.

The power of fasting possessed by the nymphs is connected, I suspect, with the vexed question as to the time passed in the nymphal state. To give an instance: of several nymphs of *Æschna cyanea* caught in January last, all of which were of about the same size, *viz.* 20 mm. long, one had not changed a skin by April 15th, and had not grown at all; another had cast several skins by the same date, and was twice the length, *viz.* 40 mm.—a big nymph. I have now (June 8th) five of these nymphs just ready to emerge; but the small one referred to grows very slowly, and does not look like being ready to change this season.

May I mention, in reply to the query of Mr. Lucas, that when I said that the majority of my specimens of *Æ. cyanea* came out at night, I meant, not early morning particularly, but any time from late evening to midnight, and from midnight to early morning—an inconvenient habit for the photographer. I have many times covered up the nymphs just ready to emerge, in hope of inducing them to believe that darkness had really arrived; but I do not remember to have been successful in deceiving the nymphs, so as to persuade them that night had come.

Southleigh Vicarage, Witney, Oxon: June 8th, 1900.

THREE NEW SPECIES OF NYMPHALINÆ FROM SIAM.

BY PERCY I. LATHY.

Terinos falcipennis, sp. nov.

♂. Upper side: Fore wing rich violet, with brown velvety patch, as in *T. clarissa*, Boisd.; apex velvety brown. Hind wing rich violet, with velvety brown apical patch and brown costal border; outer margin dull ochraceous, as in *T. fulminans*, Butl., but almost without violet reflections, and containing two rows of obscure blackish lunules, which are most pronounced at anal angle. Under side: Fore wing olive-brown, with faint blue reflections about basal half; a dark brown spot below costa, and near apex outwardly bordered with whitish. Hind wing olive-brown, with bluish reflections on outer margin; a conspicuous white bar beyond cell, just beyond this a series of five brown spots between the nervules, two above and three below white bar, and beyond these a series of six obscure ochreous lunules. Exp. 84 mm.

Four males. In coll. H. J. Adams.

This species was originally described and figured by De Nicéville, Butt. Ind. vol. ii. p. 39, t. xxiii. f. 101, from a single male obtained by Captain Bingham in Upper Tenasserim; owing to want of material it was treated by him as *T. clarissa*, Boisd. The four specimens from Siam agree pretty well with the description and figure of the Tenasserim example, and are, I think, sufficiently distinct from the Bornean *T. clarissa* to rank as a local race, and receive a name.

T. falcipennis may be distinguished from *T. clarissa* by its more falcate fore wings, the more produced tail, and the much more obscure inner row of lunules of hind wings; on the under side by the obscurity of all its markings, with the exception of white bar beyond cell.

From *T. fulminans*, Butl., it differs in the richer violet of upper side, and below in same way as from *T. clarissa*.

Penthema mimetica, sp. nov.

♀. Upper side: Fore wing dark brown, strongly glossed with purplish blue, except on outer margin; an obscure whitish submarginal spot between middle and lower median nervules, and a geminate white spot at anal angle. Hind wing dark brown, basal half glossed with purple; a discal row of seven oval and a submarginal row of eight more or less sagittate white spots, the three posterior ones being confluent with those in the discal row; the submarginal spots outwardly bordered with dark brown; a whitish patch on inner margin near anal angle; cilia white between nervules. Under side: Fore wing purplish brown at base, paler towards outer margin; a purple spot at lower end of, and a row of six purple spots beyond cell, of which the fourth, counting from the costa, is much nearer cell than the others; beyond these a series of six small white-

centred purple spots; submarginal markings more distinct than above, and an additional spot between upper and middle median nervule, and a few whitish scales on inner margin near anal angle. Hind wing as above, but paler, without purple gloss, and white markings more distinct. Exp. 116 mm.

One female. In coll. H. J. Adams.

This fine species is nearest to *P. binghami*, Wood-Mason, but may easily be distinguished from that species by the total absence of discal and partial absence of submarginal markings of fore wings; also by the beautiful blue and purple gloss. *P. mimetica* appears to mimic *Menama camaralzeman*, Butl.

Bassarona affinis, sp. nov.

♂. Upper side: Fore wing blackish brown, with a very indistinct black bar at end of cell, and series of submarginal spots; a discal band composed of seven pale greenish yellow spots, which decrease in size towards costa, the spot next costa being out of line, and nearer the base; a subapical spot of same colour. Hind wing blackish brown, paler at apex, and with an obscure dentate black submarginal band; a discal band composed of eight spots of same colour as on fore wing; this band is wider on inner margin than on costa; its inner border is regular, and outer dentate. Under side: Fore wing pale brown, with dark suffused patches at apex and anal angle; a round black spot within and a lunular black spot at end of cell, each centred with crimson; discal band as above, but narrower, and indistinctly edged with brown; subapical spot obscure; an indistinct submarginal row of blackish points. Hind wing pale brown; a small round black spot within and two black lines at end of cell; discal band as above, but obscure; a submarginal row of short black lines.

♀. Upper side: Fore wing olive-brown; a round black spot within and a lunular black spot at end of cell, both centred with ground colour, and the latter also containing an indistinct dull crimson streak; discal band composed of six well separated greenish white spots, the one next costa being the largest and oval, the four below triangular, and the sixth a small round spot; a small subapical spot of same colour; a submarginal series of indistinct blackish spots. Hind wing olive-brown; discal band represented by only four small greenish white spots extending from costa to centre of wing; a highly dentate blackish submarginal line bordered outwardly with whitish at apex. Under side: Fore wing pale reddish brown, with violet reflections beyond discal band; a large round spot within and a lunular spot at end of cell, each centred with crimson; discal band and subapical spot as above, the band indistinctly edged with brown; a submarginal row of indistinct blackish points. Hind wing pale reddish brown, with violet reflections beyond discal band; a black spot within and two black lines at end of cell; discal band composed of seven pale greenish white spots, the one next costa being oval and well separated from the rest, the next five triangular with apex pointing towards outer margin, the seventh and largest extending from lower median nervule to inner margin; a submarginal series of short black lines. Exp. ♂ 70 mm., ♀ 90 mm.

One male, two females. In coll. H. J. Adams.

This species is closely allied to *B. goodrichi*, Dist., from which it may be separated, in the male, by its much wider and yellower discal bands, and in the female by the total absence of discal bluish grey scaling. The second female obtained has the lower spot of discal band wanting in both wings.

Lynton Villa, Sydney Road, Enfield.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

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

(Continued from p. 175.)

5. *J. F. Stephens*: 'Illustrations of British Entomology,' vol. vi. Mandibulata, 1828-46. [Mandibulata 1835-37. Dragonflies, 1836.]

In 1829 Stevens published *A Systematic Catalogue of British Insects*, which is simply a list without any description whatever; but the work before us takes more the form of monographs of the various groups. As regards the Dragonflies, we find careful descriptions of all that were known to the author. Unfortunately his estimate of the number of species was much exaggerated, and this makes his work of very little practical use at the present day.

Family I. AGRIONIDÆ.

Genus AGRION.

- Sp. 1. **rubellum** = *Pyrrhosoma tenellum*. Figure poorly coloured (pl. xxix. f. 4).
2. **xanthopterum** = perhaps *Ischnura pumilio*, the orange var. *aurantiaca*.
3. **elegans** = *Ischnura elegans*.
4. **ezonatum** = perhaps *Ischnura elegans*, but description does not point clearly to it.
5. **Puella** = *Agrion pulchellum*, from the definite description of the shape of the spot on segment 2.
6. **furcatum** = *Agrion puella* for the same reason as for preceding species.
7. **hastulatum** = *Enallagma cyathigerum* no doubt; but the description of segment 2 is not quite satisfactory.
8. **annulare** = *Agrion puella* ♀.
9. **rufescens** = seems to be the orange variety of *Ischnura elegans*, only that Stephens gives two sexes, and the var. only occurs in the female.
10. **minium** = *Pyrrhosoma nymphula*.
11. **fulvipes** = *Pyrrhosoma nymphula*, ♂; the varietal form mentioned after the description seems to be *Pyrrhosoma tenellum*, ♀.

12. **chloridion** = *Erythromma naias*.

13. **platypoda** = *Platycnemis pennipes*. Var. β *albicans* is the pale form with reduced markings.

Genus **LESTES**.

Sp. 1. **viridis** }
 2. **nympha** } = { All appear to be *Lestes sponsa*—the first
 3. **forcipula** } { teneral, the second older, the third mature
 and powdered with blue.

Genus **CALEPTERYX**.

Sp. 1. **virgo** = partly *Calopteryx splendens*, and partly *C. virgo*. The vars. appear to be:—

α . = *C. splendens*, ♂.

β . = *C. virgo* ♂.

γ . = *C. virgo*, ♂ and ♀, immature.

δ . = *C. splendens*, ♀.

ϵ . = *C. virgo*, ♀, probably from the description of hind wings, but that of fore wings points to *C. splendens*, ♀.

2. **Ludoviciana** = *Calopteryx virgo*,

var. α . = *C. virgo*, ♂.

β . = *C. virgo*, ♂.

γ . = *C. virgo*, ♂ and ♀, the ♂ being immature or var. *anceps*.

3. **xanthostoma** ♀ = probably a very mature ♀ of *C. virgo*.

4. **anceps** = *C. virgo*, var. *anceps*.

Family II. **LIBELLULIDÆ**.

Genus **ANAX**.

Sp. 1. **formosa** = *Anax imperator*.

Genus **ÆSCHNA**.

Sp. 1. **rufescens** = *Æschna isoceles*.

2. **grandis** = *Æschna grandis*.

3. **maculatissima** = *Æschna cyanea*.

4. **juncea** = *Æschna juncea*.

5. **mixta** = *Æschna mixta*.

6. **affinis** = *Æschna mixta*.

7. **vernalis** = *Brachytron pratense*.

Genus **CORDULEGASTER**.

Sp. **annulatus** = *Cordulegaster annulatus*.

Genus **GOMPHUS**.

Sp. 1. **forcipatus** ♀ = *Gomphus vulgatissimus*.

2. **flavipes** = *Gomphus flavipes* (figured pl. xxx. f. 1).

Genus **CORDULIA**.

Sp. 1. **ænea** = *Cordulia ænea*.

2. **metallica** = perhaps *C. ænea* also. "Found in Metropolitan district in June—anal appendages short, lower pair triangular" can scarcely apply to *Somatochlora metallica*. The "acuminate process below the ninth segment of the ♀" does seem, however, to point to *metallica*. Possibly there is a little confusion among Stephens's specimens.

3. **Curtisii** = *Oxygastra curtisii*.

Genus LIBELLULA.

A. PLATETRUM.

- Sp. 1. **depressa** = *Libellula depressa*.
 2. **conspurcata** = *Libellula fulva*.

B. LEPTETRUM.

3. **quadrinaculata** = *Libellula quadrinaculata*.
 4. **prænubila** = *Libellula quadrinaculata* var. *prænubila*.

C. ORTHETRUM.

5. **bimaculata** = *Libellula fulva*, ♀, and teneral ♂.
 6. **cancellata** = *Orthetrum cancellatum*.
 7. **cærulescens** = *Orthetrum cærulescens*.

D. SYMPETRUM.

8. **Scotica** = *Sympetrum scoticum*.
 9. **pallidistigma** = Generally considered to be immature *S. scoticum*; but the size, pale legs, and the long pterostigma seem rather to point to *S. striolatum*.
 10. **rufostigma** = *Sympetrum sanguineum*.
 11. **angustipennis** = probably immature *S. sanguineum*.
 12. **vulgata** = *Sympetrum striolatum*.
 13. **basalis** = apparently immature *S. sanguineum*.
 14. **flaveola** = *Sympetrum flaveolum*.

ON A SMALL COLLECTION OF BEES FROM JUAREZ, MEXICO.

By T. D. A. COCKERELL, M.M.Agr.Exp.Sta.

ON Oct. 6th, 1899, I had the opportunity of spending a little while at Juarez, in the State of Chihuahua, and of collecting there the bees enumerated below. The species marked with an asterisk had not previously been reported from Mexico.

* (1.) *Halictus pectoraloides*, Ckll., one female, at flowers of *Aster (Leucosyris) spinosus*.

* (2.) *Perdita sphaeralcea*, Ckll., one female, at flowers of *Sphaeralcea fendleri lobata*.†

* (3.) *P. heliotropii*, Ckll.; see Entom., 1900, p. 63.

(4.) *P. albipennis* var. *helianthi*, Ckll., one female, at flowers of *Helianthus annuus*.

* (5.) *Andrena pulchella*, Rob., one female, at flowers of *Helianthus annuus*.

(6.) *Melissodes agilis*, Cress., one male, two females, at flowers of *Helianthus annuus*.

† This is *Sphaeralcea lobata*, Wooton, Bull. Torrey Bot. Club, xxv. 1898, p. 306. At Mesilla Park, N.M., it varies into a form having leaves exactly as in the type of *S. fendleri*, Gray, of which it may be considered a subspecies. The plant is new to the flora of Mexico.

*(7.) *M. tristis*, Ckll., one male, at flowers of *Ipomœa mexicana*.

*(8.) *Anthophora vallarum*, Ckll., one male, two females, at flowers of *Ipomœa mexicana*.

(9.) *Megachile occidentalis*, Fox, one male, at flowers of *Helianthus annuus*.

(10.) *Xylocopa arizonensis*, Cress., one female, at flowers of *Ipomœa mexicana*. Instead of entering the corolla, it cut a slit on the outside, near the base.

MOSQUITOS AND MALARIA.

By GUY A. K. MARSHALL, F.Z.S.

As the above subject hardly appears to have received the attention it merits in British entomological journals, it was a pleasure to read Mr. G. W. Kirkaldy's all too short *résumé* of the views of Celli and Grassi on the question in the 'Entomologist' for April, 1900. The facts and contentions set forth in this *résumé* would seem to leave but little doubt that mosquitos of the genus *Anopheles* are the sole carriers of malarial contagion, and that they themselves can, in turn, only acquire the parasites from malarial man. Yet the fact remains that in a malarious country like Mashonaland, where probably three-fourths of the inhabitants have had a practical experience of the disease, the theory is regarded with a considerable amount of scepticism, not merely by laymen, but also by the majority of medical men. While personally I do not share this scepticism, I can yet appreciate the difficulties which stand in the way of the acceptance of the theory in its present form, when tested by experience in a malarial country; and therefore it may be useful to draw attention to these counter-arguments, in the hope that they may be satisfactorily explained away.

If we accept the proposition that malaria can only exist in the presence of two factors, *viz.* malarial man and *Anopheles*, then we are logically bound to accept the conclusion that, if a man, or party of men, free from malarial poison, should penetrate from a healthy area into an unhealthy, but uninhabited, region, it would be impossible for them to contract fever, however much they might be bitten by mosquitos; further, it follows that all uninhabited regions, even of comparatively small size (seeing that the range of individual specimens of *Anopheles* is apparently very limited in extent), must be entirely devoid of malaria, even though they may be full of swamps, and teem with mosquitos.

Such conclusions certainly do not appear to be borne out by experience. It would doubtless be difficult to find many areas in

Europe which present these supposed conditions, but in a sparsely populated country like Africa they may be found on every hand. In Mashonaland we have numberless areas of this description, but perhaps the most typical are to be found in the Umfuli District, where there are considerable tracts of land rendered uninhabitable owing to the fact that they contain no surface-water during the dry season, although during the rains they may be sometimes under water for several weeks at a time; and yet these very localities are among the most unhealthy in the country. Again, in the Northern Transvaal there are large stretches of totally unpopulated country, more especially where the brackish rivers prevail; and yet it is a matter of common knowledge that the Boer hunters who used to penetrate into these wildernesses from the healthy high veldt invariably suffered severely from malarial fever.

Another conclusion which must be drawn from the theory as it now stands is that in any malarial region where *Anopheles* is generally distributed the most unhealthy portions must necessarily be those in which the population is thickest. This conclusion is practically the exact reverse of what is actually the case in this country, at least so far as the white population is concerned. For example, Salisbury is by far the most densely populated portion of Mashonaland, and, further, I have found three species, if not four, of *Anopheles* in the town, one of which is certainly common; moreover, not only is a mild form of fever prevalent in the district, but also all the severer cases of fever from the lower veldt are brought into the town for treatment, thus creating a continual supply of foci for the distribution of the disease. And yet despite all this there can be absolutely no question that Salisbury is far more healthy than the vast majority of the sparsely populated districts which surround it, although in these latter the chances that a mosquito will carry malarial contagion from one man to another are necessarily more remote, and, indeed, often infinitesimal.

In fine, the theory proposed by Grassi amounts to this: given *Anopheles* and a certain number of malarial patients, then locality goes for nothing in the causation of malaria; a position which is, to my mind, untenable.

The foregoing objections do not in any way militate against the supposition that *Anopheles* is the sole carrier of malaria, but only affect the proposed explanation as to how the mosquito itself is infected. Other objections, however, are raised on the ground that there is reason to believe that fever can be acquired otherwise than through the agency of mosquitos.

The argument most generally adduced is that ploughing is in itself a very unhealthy occupation in malarial districts, more particularly where new ground is being broken up, and that in such cases mosquitos cannot reasonably be regarded as a factor.

The correspondent of the Sierra Leone Expedition, writing to the 'British Medical Journal,' endeavours to explain this on the supposition that the breaking up of the soil would tend to cause puddles suitable for the breeding of *Anopheles*. But the explanation does not carry conviction; firstly, because the loosening of the soil would rather tend to increase percolation than to aid in the formation of puddles, more especially as ground that has a tendency to hold water is generally avoided for agricultural purposes; and, secondly, if *Anopheles* be already present, as his explanation predicates, there is no reason why the formation of a few more puddles should necessarily result in an attack of malaria for the ploughman, apart from the fact that the effects, as usually stated, follow too rapidly to allow of an explanation on these lines. I am inclined to believe, however, that, when properly investigated, the supposed connection between the breaking up of land and the occurrence of malarial fever will be found to be more apparent than real.

Finally, I may mention the difficulty that frequently occurs in tracing any given attack of fever to the bites of mosquitos. For example, to refer again to the Sierra Leone Expedition, in one article the correspondent states that Mr. Austen was the only member who had so far suffered from fever, he having on one occasion slept without a mosquito-net, although he had no knowledge of having been bitten. And many similar cases might be adduced where persons who have suffered from malaria are quite positive that they have not been previously bitten by mosquitos; this being perhaps the commonest objection to the theory, for it is argued that the average mosquito has an unpleasant way of making her presence felt, if not at the time, at all events afterwards. This difficulty might be removed if it could be proved that the poison of *Anopheles* is of a much less irritant character than that of *Culex*, so that the bite would not be noticed during sleep, and would leave little or no subsequent irritation. The little evidence before me tends to support this view, though unfortunately the idea occurred to me too late to enable me to test it by experiment last fever season. Could this be demonstrated it would remove a considerable amount of opposition to the theory, and, further, it might perhaps in some degree account for the fact that the malarial parasite can flourish in *Anopheles*, and not in *Culex*.

Salisbury, Mashonaland: May, 1900.

DIPHYLETISM IN THE LEPIDOPTERA.

BY AMBROSE QUAIL, F.E.S.

IN his paper (*ante*, p. 120) Prof. Grote did me the honour of mentioning my name; therefore I claim the privilege of reply. Grote's separation of the Papilionides from all other butterflies in phylogeny is based on the presence in the former of a short anal nervure on primaries, which he calls IX, and for which Dr. Chapman proposes the name "Grote's vein." I do not propose here to discuss the modifications of neuration to be observed in the Rhopalocera, having done so elsewhere;* and I have also given reasons for believing that "Grote's vein" is homologous of the rudimentary anal nervure on primaries of other groups.† I will, however, take up this particular question of the homology of "Grote's vein." Curiously, the only direct reference by Prof. Grote that I am able to find is worded: "IX applied only by me; . . . whether this is homologous with VIII, to which it is opposed in position, is uncertain."‡ I now quote Dr. Karl Jordan:—"It remains for Prof. Grote to show that what he styles in Papilionidæ vein IX (absent from all other butterflies, according to Grote) is *not* homologous of what he calls in the other butterflies vein VIII (absent from Papilionidæ, according to Grote)."§

If we direct our attention to the neuration of the whole Lepidoptera, a very suggestive fact is observable, that is, nowhere can we find more than two definite anal nervures on the primaries; usually there is also a short vein, attached near its base to that anal nervure farthest from the cubital system. I at least have been unable to find more than these. In extremely rare instances the latter rudimentary vein has a projection beyond the normal juncture, which clearly indicates that it is the remnant of a third anal nervure. I may mention, of my own observation, *Zeuzera d'urvillei*, Schiff., an Australian species; *Cossus robinia*, an American species. Comstock|| gives a figure in Psychidæ, No 253, and another in Megalopygidæ, No. 247; the latter is most pronounced in its indication. We may also observe that the anal nervure nearest the cubital system (present in Cossidæ, &c.) has been lost from the primaries of many Heterocera, leaving only one anal nervure—that with the rudimentary attachment; the missing anal nervure is often, in fact generally, indicated by a scar.

Compare the Rhopalocera with other groups of Lepidoptera, and observe the identical modification of neuration last men-

* North London Nat. Hist. Soc. 1896; extract, 'Entom. Record,' vol. ix.

† 'Natural Science,' vol. xiii. p. 391, 1898.

‡ *Ibid.* vol. xii. p. 88, 1898.

§ *Ibid.* vol. xiv. p. 79, 1899.

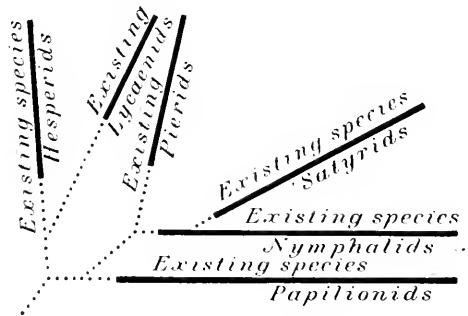
|| Comstock, 'Text-book,' 1895?.

tioned, *viz.* loss of inner anal nervure, retention of outer anal nervure, with attached rudimentary (VIII), in all groups except Papilionides; in the latter we have not the rudiment, but an actual nervure—"Grote's vein." It seems to me an indisputable indication that "Grote's vein" is homologous of VIII.

At first sight it appears remarkable that Papilionids should have retained that nervure, even if homologous of VIII, which has become rudimentary so generally in the Lepidoptera; but we must regard its persistence in so many groups of the Lepidoptera, which actually lose one other anal nervure, as evidence that it (VIII) is of actual value as a part of the wing-structure, whether retained as rudimentary or as a "vein" (Grote's), is a matter of degree only; clearly we have no evidence that VIII and "Grote's vein" are morphologically distinct.

If we look for evidence of affinity between Papilionides and the other butterflies, we find in generalised Nymphalids (*Anosia*) a "cubital blotch" on primaries, and a "subcostal-radius connection" on secondaries; their identity cannot be doubted, as remnants of the "cubitus-anal connection" of primaries and "humeral cell" of secondaries are retained in Papilionidæ. It detracts nothing from their value as indication of affinity when we observe that amongst higher Nymphalids and other groups they are completely lost; since we find, as Prof. Grote has shown,* that the "cubitus-anal connection" of primaries and the "humeral cell" of secondaries are not present amongst higher Papilionids.

I can only repeat my original conclusion from a study of the neuration; † generalised Hesperids, Nymphalid-Pierids, Papilionids "represent the surviving links in the continuity of specialization, a primary modification of neuration antecedent to and quite apart from the special modifications peculiar to the several groups." Thus—



Neuration of the wings is only one of the many structural

characters, imaginal and embryological, which go to establish affinities, any one of which by itself may mislead. May I give an example? By movement of the fourth radial of primaries, *Porina* has a different wing-pattern to that of *Hepialus*; by neuration,

* 'Natural Science,' vol. xiv. p. 79, 1899.

† *Ibid.* vol. xiii. p. 395, 1898.

Trictena identifies with *Hepialus*, the antennal structure of *Trictena* is distinctly a specialized *Porina*: wing-scales, *Trictena* resembles *Hepialus* (*Charagia*). Pupal characters of *Trictena* are those of *Porina*, especially in regard to the spines of seventh abdominal segments. (MSS. Quail.)

Palmerston North, New Zealand: May 20th, 1900.

NOTES AND OBSERVATIONS.

LYCÆNA PHERETES AND ITS ALLIES IN THE SIKKIM HIMALAYAS.—In the July number of the 'Entomologist,' p. 199, Mr. Harcourt-Bath describes two new forms as *Lycæna sikkima* and *Lycæna altissima*, and has been good enough to send me specimens of them to compare. I have described in P. Z. S., 1882, p. 402, *L. pheretes* var. *asiatica*, from two male and four female specimens received from native collectors, whom I sent to the Chumbi Valley, which were probably taken on or near the Jeleplah Pass, at about the same elevation as Mr. H.-Bath's, which were taken in the Lachoong valley. Of his three forms, no. 1, which he thinks is the same as mine, is larger, and in the male of a brighter blue than in European *L. pheretes*, and resembles in tint males from Ladak; *L. lehana*, Moore, which are smaller; and others, from E. Tibet, sent me by Messrs. Leech and Oberthür, which are larger. No. 2, which Mr. Bath calls *L. sikkima*, is just like some of my var. *asiatica*, and, though of much duller blue, is, I think, only an extreme form of it. Mr. Bath says "aberrations were found somewhat intermediate between the two." Of no. 3, which he calls *L. altissima*, he sent me two females; the first, which agrees with his description of *altissima*, male, is a female of his *sikkima*, with a good deal of blue gloss on the upper side. I have a very similar specimen of *L. pheretes*, female, from the Hindu-Kush mountains, and find the blue gloss more or less present in several Asiatic and a few European female *L. pheretes*. The other specimen is just like my females of var. *asiatica*, except that the pale discal spot, as in the first specimen, is prominent, as in some female *L. pheretes* from Europe and Asia. I have, therefore, no doubt that these three forms are all referable to *L. pheretes*: and, if a separate name is wanted (which I rather doubt), *lehana*, Moore, is the oldest.—H. T. ELWES.

LYCÆNA PHERETES, ETC.—I must apologise for troubling you to rectify an error (*ante*, p. 200) which was owing to a slip of the memory and want of precaution in not examining the genitalia, as I find that the pale dimorphic variety of the female of *L. altissima* (*mihi*) was described as the male, whereas the latter is blue, but of a duller tint than that of the male of *L. sikkima* (*mihi*), with which it unfortunately got mixed up at the time of setting. It is, of course, merely a matter of opinion whether the above should be considered local varieties of, or distinct species from, *L. pheretes*, their nearest ally; but, personally, I prefer to consider all local forms as distinct species, provided their morphological characters are sufficiently distinct.—W. HARCOURT-BATH.

PARASITE IN LEPIDOPTEROUS OVUM.—During the first week of July, while collecting a few miles from Beaconsfield, I found a few eggs of *Ptilodontis palpina* on some small aspen bushes. A day or two ago I was much surprised by three ichneumon flies emerging from one of these eggs.—G. F. BIRD; Rosedale, 162, Dalling Road, Hammersmith, W., July 23rd, 1900.

OVIPOSITION OF POLYGONIA C-ALBUM.—My attention has been directed to a note by Mr. South (Entom. xxx. p. 173, 1897), where he quotes Mr. Frohawk's observations that the eggs of this butterfly are laid singly. I only once took the trouble to get this butterfly to lay eggs, and it then laid them in short chains of two, three, and four. No doubt Mr. Frohawk's observations, like mine, were made on the butterfly in captivity. So it is very possible that his observation, or mine, was vitiated by an abnormal habit caused by this circumstance. It seems to me more probable that this butterfly varies in its habits in different individuals. All I can testify to, however, is that *c-album* does, upon occasion at least, lay its eggs in chains, like its American kindred.—T. A. CHAPMAN; Betula, Reigate.

PAIRING OF VANESSA URTICÆ AND EPINEPHELE IANIRA.—This morning, while walking down from my house to the town, I noticed two butterflies *in cop.* on a wall by the side of the road. I cautiously approached them, when I was much surprised to find that they were not of the same species—the male being *Vanessa urticæ*, and the female *Epinephele ianira*. I had no apparatus with me, but I succeeded in catching the two insects in my fingers, and brought them back to my house, where I placed them in a breeding-cage. Should the female lay any eggs, I should be very happy to send them to anybody who would care to try and rear them.—J. WILLIAMS VAUGHAN; Bryn-y-Mor, Tenby, July 11th, 1900.

HABITS OF COSSUS LIGNIPERDA.—The interesting note by Mr. Robt. Adkin on this subject (*ante*, p. 128), recalls to my mind many pleasant excursions in the past in search of this species. Mr. F. B. Harvey, Mr. M. Culpin, and others will recollect the Chingford locality, which, some ten years and more ago, we used to call the "*Cossus ground*"; between us, I believe, we learnt a good deal relative to its habits. One experience, but an instance from natural choice of the larva, resembles Mr. Adkin's experiment—"full-fed larvæ placed in the dry stump of a limb, produced imagines." I have recorded elsewhere (Ent. Rec. ii. 211) how, in 1889, my friend Culpin and myself procured dozens of the larvæ, which had gone into cocoon for the winter, from the old stumps of willow trees, which had been cut down some years before. Undoubtedly the larvæ, when full-fed, usually leave the larval burrow, and search for a suitable place in which to make the winter cocoon. They do, however, pupate in the locality of, if not actually in, the larval burrow. We have not unfrequently taken the imago drying its wings, just above the empty pupa-case protruding from a hole through bark and tough wood. Moreover, in some instances, until the pupa broke through the bark, there was no evidence of the existing tunnel; in this respect the habit is similar to that of the Australasian Hepialidæ—*i. e.* the wood-borers—which, however, never leave the

larval burrow until the imago stage. *Zeuzera pyrini* pupates in the larval burrow. Dr. May's note clearly indicates that *Cossus ligniperda* does, at times, pupate in the earth. I have seen other records. Mr. J. A. Clark, if my memory serves me, had one or two examples of pupæ which pupated in earth, in his very interesting collection illustrating the life-history of this species. The life-history of *Cossus*, which I prepared some years ago, now in the possession of Mr. F. B. Harvey, illustrated the actual position of the pupal cocoon in relation to the burrow through the bark of the tree.—AMBROSE QUAIL; Palmerston N., New Zealand, May 23rd, 1900.

CAPTURES AND FIELD REPORTS.

COREMIA QUADRIFASCIARIA IN ESSEX.—On Friday last, June 29th, I was beating the tall hedges round Hazeleigh Wood, when a very dusky Geometer came out, and scurried away over a recently-cut clover field. Thinking it was *Larentia didymata*, of which I want a new series, I went in hot pursuit, and, with some difficulty, succeeded in netting the obscure fugitive, which, to my surprise and delight, turned out to be a fine male *C. quadrifasciaria*. This species was recorded, some twenty years ago (in the 'Entomologist,' I think), as having been taken by a Londoner when visiting Danbury, three miles from here. It is, no doubt, a scarce species; but generally to be obtained by beating hedgerows in the daytime or netting at dusk, where it is known to occur. I have taken it at Brentwood and Harlow in this county, and at Fordham in Cambridgeshire; and, in 1896, I took a specimen at Pantou in mid-Lincolnshire, which I believe to be the most northerly record in the British Isles.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, July 3rd, 1900.

COLIAS EDUSA AND C. HYALE AT EASTBOURNE.—I obtained two specimens of *C. hyale* and one example of *C. edusa* in a clover field on the cliffs near Beachy Head, on June 12th. The *edusa* was worn, and looked as if it had hibernated; but the *hyale* were perfect.—STANLEY A. BLENKARN.

ANTICLEA SINUATA.—I took two examples of *A. sinuata*, on July 13th, at Cranborne, Dorset.—T. H. FISHER; Cranborne Vicarage.

ÆSCHNA CYANEA AT PADDINGTON.—A not full-coloured example of *Æschna cyanea* flew into one of our offices here last Friday; and one of the clerks gave it to me.—FRED. NOAD CLARK; Paddington Infirmary, Harrow Road, W., July 18th, 1900.

ISCHNURA ELEGANS IN LONDON.—Mr. F. N. Clark has sent me a couple of specimens of the small dragonfly, *Ischnura elegans*, taken from the banks of the Grand Junction Canal, adjoining the Paddington Infirmary. As this dragonfly is scarcely capable of migration, the specimens must be looked upon as true-born Londoners, and a record of their capture is, therefore, of interest.—W. J. LUCAS; July 3rd, 1900.

COLLECTING IN HAYWARD'S HEATH DISTRICT.—I shall be very much obliged if any of your readers could inform me of any places, open to the public, which are good for insects in the Hayward's Heath (Sussex) district.

We are surrounded here by the Balcombe, St. Leonard's, and Ashdown forests, and there should be many places well worth visiting by entomologists. I believe, in days gone by, *Apatura iris* was to be had in Balcombe Forest, but I do not know in what part, or whether it is open to the public.—A. H. RYDON; Awbrook, Lindfield, Sussex, July 1st, 1900.

NOTE ON A SPIDER.—Last week a farmer brought an enormous black spider which he had caught upon an adjacent bog, and thought I might like to have it for my collection. Never having seen anything like it before, I forwarded it to the Science and Art Museum, where it has been kindly named: it is a specimen of *Dolomedes fimbriatus*. This species has been found in Connemara and Galway, but, hitherto, only once in Leinster (this year at Tuillamore). So West Meath has proved fortunate in finding it a second time.—FRANCES J. BATTERSBY; Cromlyn, Rathowen, Co. West Meath, June 13th, 1900. [The above note may interest those of our readers who study the Arachnida.—ED.]

NEW FOREST NOTES.—Though, perhaps, we must believe the experienced collector who tells us that the "Forest" is "played out," yet the lepidopterist who spends a few days there, unless he be very *blasé*, and provided that the weather is respectable, always enjoys himself thoroughly, and comes back with boxes much fuller than when he started. Arrived at Brockenhurst the Saturday before Whit Monday, we started out for a little dusk at Queen's Bower, where we met certain members of the South London Entomological Society, just returning to Brockenhurst after a day's collecting.

Bapta temerata, *Larentia pectinaria*, *Ephyra omicronaria*, *E. trilinearia*, *Lomaspilis marginata*, *Ligdia adustata*, *Melanthia ocellata*, *Melanippe montanata*, *Cabera pusaria*, *Panagra petraria*, *Cilix spinula*, and *Pechypogon barbalis* were netted; whilst from heath two larvæ of *Noctua neglecta*, and an example of *Syrichthus malvæ* were swept. Day work was very fair. *Pieris rapæ* and *P. napi* were common, but *Euchloë* (*Anthocharis*) *cardamines* was decidedly scarce. *Gonepteryx rhamni*, abundant, *Argynnis ephrosyne* was undoubtedly the most plentiful butterfly seen, and one battered example of *Vanessa polychloros* was netted. With regard to *Pararge egeria* the first brood was practically over and in very bad condition, but during the last two days of our stay, six magnificent specimens, evidently quite fresh from the pupæ, were taken. *P. megæra* was fairly fresh, but common. *Cenonympha pamphilus* was far from common, but in fine condition. *Thecla rubi* was not uncommon among hawthorn and blackthorn, but decidedly local, and none too easy to catch. *Polyommatus phleas* very fine, but not common. *Lycæna icarus* was just coming out, and became more plentiful towards the end of the week. *L. argiolus*, as at most localities this season, was exceptionally abundant, but over as far as condition goes. *Nemeobius lucina* was not too common in the neighbourhood of Stubby Copse, and a short series only was secured. *Syrichthus malvæ* (common) and *Thanaos tages* (locally abundant) complete the list of butterflies.

Turning to the moths, one of the most noticeable features was the absence of *Noctuæ*. Treacle was fruitless, nor did the flowering plants appear to attract any visitors—apparently there were none to attract. The only three species noticed were the sun-loving *Euclidia mi* and *Phytometra ænea* (both common), and a single *Euplexia lucipara* beaten from oak. *Macroglossa fusiformis* was fairly common at the azaleas at Rhinefield, and

at the common bugle in another locality, but only one bad *M. bombylififormis* was taken; the latter seems by far the scarcer insect. A few *Hepialus lupulinus* were seen at rest. *Halias* (*Hylophila*) *prasinana* was beaten not uncommonly from oak, and *Euchelia jacobææ* was noticed abundantly flying in the sunshine. A few females of *Spilosoma mendica* were taken, most of which laid freely in chip boxes, and one male was beaten from oak; about two hundred young larvæ are now feeding up well on plum. Single examples of *Drepana lacertinaria* and *D. falcata* were taken, and *Cilix glaucata* (*spinula*) was fairly common. One specimen of *Phalera bucephala* was beaten from oak. Geometers were better represented, though most of the species were common ones:—*Rumia cratagata*, *Venilia macularia*, *Odontopera bidentata* (two), *Amphidasys betularia* (a female), *Boarmia roboraria* (two males), *Iodis lactearia* (a few, beautifully fresh and green), *Ephyra porata*, *E. punctaria*, *E. trilinearia*, *E. omicronaria* (a few), *Acidalia remutaria*, *Cabera pusaria*, *C. exanthemata*, *Bapta temerata* (two), *B. taminata*, *Macaria liturata*, *Panagra petrarica*, *Fidonia atomaria* (abundant), *F. piniaria* (one female, males very abundant), *Ligdia adustata*, *Lomaspilis marginata*, *Larentia pectinaria*, *Melanthia ocellata*, *Melanippe subtristata*, *M. montanata*, *Coremia propugnata*, *C. ferrugata*, *C. unidentaria*, *Triphosa dubitata* (a hibernated female), *Cidaria corylata* (three), and *Anaitis plagiata* (four). The Deltoidea were represented by one species only, *Pechypogon barbalis*, which was very abundant—in fact, six specimens, on one occasion, flew off one oak bough. Of the Pyralides, *Pyrausta purpuralis* alone was noticed; and of the Pterophoridae, three specimens of *Alucita hexadactyla*.

By far the best work among the "Leps" was undoubtedly larva-beating, which was practically neglected until the Friday; but both Friday and Saturday were devoted to it, with the following results:—*Limenitis sybilla* (full-grown), *Thecla quercus* (common, and mostly full-grown), *Nola strigula*, *Gnophria quadra*, *Liparis auriflua* (*Porthesia similis*), *Psilura monacha* (abundant), *Pecilocampa populi*, *Orgyia antiqua*, *Halias bicolorana* (*quercana*), *Diloba caruleocephala*, *Asphalia ridens* (a great many died while small), *Tenioampa miniosa*, *T. stabilis*, and *T. cruda* (both the latter abundant), *Scopelosoma satellitia*, *Cosmia trapezina* (very abundant), *Amphipyra pyramidea*, *Catocala sponsa*, *C. promissa*, *Drymonia* (*Notodonta*) *chaonia*, *Phorodesma bajularia*, *Phigalia pendaria* (*pilosaria*), and *Himera pennaria* (last two abundant, but nearly all ichneumoned), *Ennomos angularia*, *Amphidasys prodromaria* (all very small, but are now full-grown), *Hybernia defoliaria*, *H. aurantiaria*, *H. progemmaria*, *H. leucophearia*, *H. rupicaprarica*, *Hemithea thymiarica*, *Oporabia dilutata*, and *Eupithecia abbreviata* (?). Besides these, a single larva of *Epinephele tithonus* was found on grass, and six larvæ of *Noctua neglecta* (?), and a few *Eubolia palumbaria* were swept from heath.

Two mornings were spent with Mr. W. J. Lucas in collecting dragonflies, and some good work was done. *Libellula depressa* was seen nearly every day; but seeing is not everything with this insect, which seems almost human in its cleverness, always avoiding the bank on which one is standing, but settling on various points on the other banks; but if one goes and stands by one of its resting-places, it will desert it and find a new one on the bank just vacated by the anxious collector; it also seems fond of settling on brambles and furze-bushes, for the express purpose of tearing one's net. However, about five specimens were captured. *L. quadrimaculata* also wants catching (though it doesn't want to be caught), and

two specimens only were netted. *Orthetrum cærulescens* was just coming out, and fairly common. Of *Gomphus vulgatissimus*, which is by no means so common as its name would lead one to expect, four specimens were taken (two of them by Mr. Lucas). A single example of the handsome *Cordulegaster annulatus* was secured; it had recently emerged and was drying itself on a reed, the empty nymph-case being found on the other side of the stem. Five specimens of *Brachytron pratense* were netted, flying over a pond in the neighbourhood of Beaulieu Road, where it appeared to be common. This is another dragonfly which seems somewhat hard to catch, flying low and swiftly over the water—they seemed, however, fond of flying through a narrow channel formed by the water running between a small island and the bank, and here they were easily netted. *Calopteryx virgo* was common nearly everywhere, but of immature colouring. *Platynemis pennipes* was fairly common, and *Pyrrhosoma nymphula* very abundant; three specimens of a variety of the female were taken, in which the red of the abdomen is effaced by the black, the segmental divisions being yellowish. The catch, however, was *Ischnura pumilio*, eleven specimens being taken (seven by Mr. Lucas, already recorded). A few *I. elegans* were netted. *Agrion puella* was very common, and a few *A. mercuriale* were taken.

Altogether a very pleasant and profitable holiday was spent, rendered far more so than it would otherwise have been by the companionship of others of like pursuits.—F. M. B. CARR; 46, Handen Road, Lee, S.E., July 7th, 1900.

COLIAS EDUSA AT RINGWOOD.—On the 23rd inst. I distinctly saw a specimen of this butterfly. It flew over the river into an adjoining meadow, thus making capture impossible.—FRED. G. BELLAMY; Ringwood, June 25th, 1900.

COLIAS EDUSA IN SOMERSETSHIRE.—On June 23rd my friend Mr. E. Copper, whilst collecting in the vicinity of Wiveliscombe, Somersetshire, captured one female and two male specimens of *C. edusa*. One male is in perfect condition. These were the only examples seen by him.—A. CANT; 54, Weymouth Street, W.

COLIAS EDUSA IN DEVONSHIRE.—After the last three weeks of dull wet weather, I was agreeably surprised this morning to see a specimen of *C. edusa* making the most of a gleam of sunshine in the grounds of the barracks here. Whether this will turn out an “*edusa* year,” I leave to August and September to determine.—T. B. FLETCHER; Royal Naval Barracks, Devonport, June 22nd, 1900.

A WINTER DAY'S SPORT WITH THE NET IN DURBAN, NATAL, SOUTH AFRICA.—On June 26th, which is equivalent to Dec. 26th in England, I started out for a day's sport in the Stella bush, about two and a half miles from the town, and my captures for the day were as follows:—Eight *Danais chrysippus*, four vars.; this species was in great evidence, and I could easily have taken a hundred, in fact it was flying in great numbers even in the town. *Mylothris agathina* was the next most common insect; it was in perfect condition, and very easily netted. *Eurytela hiarbas*, which greatly resembles our *L. sibylla*, and has the same graceful flight, was fairly plentiful. Two *Cebrene junonia* and three *C. cheli*; both these were the winter forms, and although just as brilliant, were much smaller than the summer brood. Six *Teracolus theogone*, three *T. evippe*, and two of the rarer *T. jobina*, were all I obtained of this family. Of the whites,

Pieris severina simply swarmed, and *P. charina* was fairly common, but I only netted two *P. alba* and four *P. gidica*. *Pontia alcesta* was common in one spot only, and I took four males and six females; this fly greatly resembles the British *Leucophasia sinapis*; it has the same slow flight, and is very easily captured. Four *Atella phalanta* gave me some trouble to net, and I missed several others. *Hypanis ilithyia* were very common, and I took six specimens, the under sides of which were all different to the type. Of the *Acræas* *A. burtoni* was certainly the commonest, and I took ten examples; also two of *A. petræa*, one only of *A. nohara*, and three *A. doubledayi*—one male a very beautiful red variety. Of the larger kinds I was only successful in getting two *Charaxes varanes*, one very chipped; three *Papilio cenea*, two males and one female; the latter is totally different to the male, and imitates for protective purposes *Amauris echeria*, of which I easily took eight specimens, five of the yellow and black, and three of the white and black forms. Two *Melanitis leda* I obtained, after great trouble, and, for a wonder, in good condition. *Eronia cleodora* also turned up at intervals, and I netted four, after a good chase in every case. Four *C. edusa* and two *V. cardui* were the only insects that occur in England that I saw, or in fact have seen since my arrival here. Two *P. natalica* I found at rest, one in splendid condition. Of the blues I captured four *Hypolycaena burtoni*, two *Lycæna batica*, and a pair of *Myrina dermaptera* I took in grand condition *in cop.*; this is by far the prettiest blue I have yet seen; it greatly resembles our *Thecla quercus*, but is larger and has beautiful purple-red long tails. Two *Terias regularis* and five *T. zoë* were all I captured, but the latter was very abundant. Of the skippers I took eight *Pyrgus vindex*, two *Hesperia forestan*, three *Pamphila hottentota*, two *P. mohopaani*, six *Crenis natalenses*, and one specimen each of *Neptis marpessa*, *Mycælesis safitza*, *Precis elgiva*, *P. tukua*, *Teracolus annæ* (a beautiful var), *Euralia tarquinia*, *Charaxes neanthes*, and *Salamis anacardii* (mother of pearl) completed the butterflies. Of moths very few are named here, but I took on the tree-trunks seven Geometers greatly resembling our *Boarmia consortaria*, and also nine pupæ of the hawk-moth, *Nephele hesperus* (? *argentifera*), and five pupæ of *Macroglossa trochilus*; three of the latter have since emerged. I also dug about thirty pupæ of various Noctuas. I arrived home about 6 p.m., well satisfied with the day's result, and all were taken in an area of half a mile square. To any entomologist arriving from England, the great number of butterflies on the wing in one spot is quite bewildering, and it requires great care to net the one you desire to catch. I am sending home moths from time to time to England to obtain their names, as it is almost impossible to get them here, and many, I believe, are not known at all. I may mention that collecting goes on all the year round here, and that this is considered to be a very bad season, owing to lack of rain. I may mention that I took an example of *D. celerio* on June 20th.—G. F. LEIGH; Musgrave Road, Durban, Natal, June 30th, 1900.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—
 June 14th, 1900.—The President in the chair. Dr. Chapman exhibited bred specimens of *Orygia antiqua* from the South of France, and noted

that the black markings were much intensified. Mr. Turner, specimens of the Coccid, *Pulvinaria ribesiae*, the white woolly scale, from his own garden, and read notes on its occurrence. Mr. Enoch, a living female of *Ranatra linearis*, with its ova, which are deposited in leaves and stems of water-plants, and are attached to a curious Y-shaped body; also living nymphs of *Erythronna najas* and *Ischnura elegans*. Mr. Clark, micro-photographs of the ova of several species of Lepidoptera, including *Cyaniris argiolus* and *Hadena genistæ*. Mr. Lucas read the report of the field meeting to Oxshott, and illustrated his remarks by a large number of lantern-slides of well-known spots in the district.—HY. J. TURNER, *Hon. Report Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—On June 23rd the President, Mr. S. J. Capper, gave a garden party to the members of this Society and other entomological friends at his residence, Huyton Park. About a hundred were invited, and there was a large gathering. Mr. Capper has been President of the Society since its foundation twenty-three years ago, and in his address in January last he invited the members to this gathering, as it would afford them, especially the younger members, an opportunity of inspecting his collection of British Lepidoptera and his educational collection of all orders of insects. His collection of British Lepidoptera, which occupies considerably more than a hundred large drawers, was for the occasion specially displayed on large tables, and afforded a magnificent sight. This collection is acknowledged to be unique as regards the varieties and aberrations it contains. It has been amassed during the past sixty years, and was considerably enriched by the incorporation therein of the collection formed by the late Alfred Owen, who made variety and aberration his special study when scarcely any attention was paid to this subject by others. Some four years ago, thinking that there might be a possibility of the collection being dispersed at some future period, Mr. Capper applied to Mr. S. L. Mosley, the well-known naturalist and natural history painter, to ask if he would undertake to depict those of his varieties which are of special note. This Mr. Mosley kindly consented to do, and these coloured drawings, to the number of about four hundred, were also exhibited, as well as many curious and valuable works on Entomology from Mr. Capper's library. Miss Capper, as hostess, assisted her father in entertaining the guests; splendid weather adding to the surroundings, the members thoroughly enjoyed their visit.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—June 18th, 1900.—Mr. A. H. Martineau in the chair. Mr. R. C. Bradley showed a piece of wood with borings, taken from a paling at Selsley, Glos., at Whitsuntide, from which he was breeding beetles of a species of *Clytus* which had been noticed to be common in the neighbourhood of the paling. Mr. A. D. Imms, two unusually small female specimens of *Euchloë cardamines*; one from Hall Green, near Birmingham, measured only $1\frac{1}{4}$ in. in expanse; the other, from Hay in S. Wales, measuring $1\frac{1}{3}$ in. Mr. A. H. Martineau, a series of the uncommon ant, *Leptothorax acervorum*, from Selsley, where he had found a small colony; also a black variety of *Formica rufa*, taken on April 22nd, 1900, in the company of ordinary specimens, at Haywood.—COLBRAN J. WAINWRIGHT, *Hon Sec.*

RECENT LITERATURE.

A Natural History of the British Lepidoptera. By J. W. TUTT, F.E.S.
London: Swan Sonnenschein & Co., Paternoster Row. Berlin:
Friedländer & Sohn, 11, Karlstrasse.

THE second volume of Mr. Tutt's great work fulfils the promise of the second, and indeed supplies some chapters which were wanting to complete matters of a general character. That most striking of all the attributes of insects, metamorphosis, is in this second volume treated at length, the observations and theories of the well-known leading authorities on the subject being stated and discussed with especial reference to the many recent contributions to the knowledge of it by Dr. Chapman, to which great prominence is given, and whose views are generally adopted by Mr. Tutt. There is a separate chapter on phenomena incidental to metamorphosis, such as the passing sometimes of several years in the pupal stage, and the impossibility in such cases of forcing. The external morphology of the pupa has a chapter to itself, the author correcting some common errors as to the structure and significance of the different parts, and setting forth the view that the pupa is the (modified) representative of the ancestral form of the insect, from which the larva on the one side, and the imago on the other, have been developed. Professor Poulton's views are discussed very fully, and in some cases combated. Many interesting questions are treated in a separate chapter on the internal structure of the pupa, including the formation of the wings and of the scales upon them. The chapter on the phylogeny of the lepidopterous pupa is by Dr. Chapman, whose previously published writings on the subject are well known, and it is unnecessary to say that it is characterised by great fulness of original observation and carefully thought-out conclusions.

The introductory chapters noticed occupy as far as the hundredth page; the rest of the volume, comprising 467 pages, is taken up with descriptions of species and all that belongs to them in the same copious style as in the first volume. Over three hundred of these pages are occupied with the superfamily of the Psychides, that strange tribe with the extraordinary females—fleshy bags—to our eyes singularly repellent and even loathsome, but most fascinating and attractive to their gay and active partners. There is no accounting for tastes, especially where sex comes in. These three hundred pages present all that is known of the British species, with very full references to many others, and a complete catalogue of the species of the Palæartic region. Vast labour has been devoted by the author and his coadjutors to this part of his work, a study of which is indispensable to all who desire to be fully informed on this obscure and difficult subject.

The rest of the volume is occupied with a portion of the "Lachneides," which many will know better by the older name of the Lasiocampidæ, or, as Stainton called them, the Bombycidæ, the woolly brown moths with large and beautiful caterpillars, which are the delight of young collectors and breeders. The present volume takes in our old and familiar friends the "December moth" (*Pœcilocampa populi*), *Trichiura crategi*, the "small eggar," *Lachnis (Eriogaster) lanestris*, and the "lackeys," *Malacosoma (Clisiocampa) neustria* and *castrensis*.

The volume is completed by that great desideratum, a full index, and there are several plates. To some of these no exception can be taken, but we cannot say this of the plate opposite p. 73, the process adopted in which is not sufficiently delicate for its object. The phylogenetic tree at p. 462 is not pretty, but serves its purpose. We would venture to suggest that in the forthcoming volumes, to which we look forward, there should be a table of contents, naming the species treated of.

It may seem a little ungracious to find any sort of fault—although only in matters of very minor importance—in this most valuable work; our excuse must be that we wish to render it even more so.

With this we must for the present conclude. Nothing but a lengthened study, such as there has been no time to give it, could do justice to the work; and when we think of the amount of attention necessary to assimilate its contents, we are filled with admiration of the labour that must have been devoted to its production.

F. M.

T. H. MONTGOMERY. *Note on the Genital Organs of Zaitha* (American Nat., 1900, XXXIV., pp. 119–21, 2 figs.). [Rhynchota.]

The author states that an examination of the male genital organs of *Zaitha* showed him that they were very different from those of *Belostoma*, as described by Leidy.* In the females the two genera are quite similar, but in the males each testis consists of a single convoluted follicle (or “capsule”) in *Belostoma* [sec. Leidy], while in *Zaitha* each testis is a large organ composed of five follicles, each of the latter thickened anteriorly, the posterior three-fifths forming a narrow tube.

Mr. Montgomery is inclined to lay great stress on these alleged differences for taxonomic purposes, but as he was unable to procure *Belostoma* for practical study, and relied entirely on Leidy's descriptions and figures, it will be well to suspend judgment until a comparative examination can be made. The two genera are certainly extremely closely allied in their external characteristics.

G. W. K.

The following have also been received:—

Proceedings of the Eleventh Annual Meeting of the Association of Economic Entomologists (U. S. Department of Agriculture, Division of Entomology. Bull. 20, n. s.). P. 112. Washington, 1899.

Preliminary Report on the Insect Enemies of Forests in the North-West: an Account of the Results gained from a Reconnaissance Trip made in the Spring and Early Summer of 1899. By A. A. HOPKINS, Ph.D. (U. S. Dep. Agr., Div. Entom. Bull. 21, n. s.). Pp. 27. Washington, 1899.

The Coccid Genera Chionaspis and Hemichionaspis. By R. A. COVLEY, B.Sc. (Special Bulletin, Hatch Experiment Station of the Massachusetts Agricultural College). Pp. 57. Plates i–ix. Amherst, Massachusetts, 1899.

*1847, J. Ac. N.S. Philad. (2), I. pp. 57–67. I have retained Montgomery's nomenclature, but Montaudon has lately shown (1900, Bull. Soc. Sci. Bucarest IX., nos. 2 & 3, p. 9) that *Belostoma*, Latr. = *Zaitha* auct., and that *Amorgius*, Stål, Montaudon = *Belostoma* auct.

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A BUTTERFLY HUNTER'S HOLIDAY.

BY E. G. ALDERSON.

ENTOMOLOGY, like several other things which were once regarded as amusements, has now become a very serious and scientific business; but there are still many people who are content to be mere collectors, and to such the New Forest is a never-failing centre of attraction. To step down upon the familiar platform at Lyndhurst Road is like entering on enchanted ground, where all sorts of pleasant anticipations at once arise, and we are filled with the hope of again seeing *Apatura iris* and *Limenitis sibylla* on the wing, if only the weather—rather dubious to-night—will keep fine; all the more delightful if the collector has not been upon the classic ground for two or three entomologically barren years, relieved only by a day's hunt after *Papilio machaon* in its somewhat dreary fastnesses at Wicken Fen. One's first capture of that noble butterfly is a delightful experience, but it cannot give Wicken the glamour of the Forest, and it is pleasant to set foot again in a good land—a land of trees and bracken, of scented pine and wild honeysuckle—even though it be a place where “swallow-tails” are not.

Alas for the weather—that one uncertain element in the prospect—on the evening of July 2nd, when, full of such hopes and anticipations, I got out at Lyndhurst Road. The morning of the 3rd broke dark and rainy, and the march through the woods to Brockenhurst was no cheerful undertaking. The trees looked dismal as sodden umbrellas; the woodland drives were hopeless sloughs of yellow mud. The spiritless fluttering of washed-out “meadow browns” deepened rather than relieved the gloom of the weeping day. Where were the swarms of *Argynnis paphia* which are wont to brighten the woods? Where, too, was *L. sibylla*? A few stragglers of the latter species presently appeared, but not to advantage. It was not the weather to make them sail about

with that inimitable languorous grace which they display in the sunshine; they merely fluttered uneasily round the tops of the hollies and settled down again, heedless of clods and other incitements. We ploughed, almost literally, through Stubby Copse, and saw a few *Hesperia sylvanus*, evidently just out, bright as gold, and caring little for the reeking moisture. Met a coleopterist, who thought he had seen *A. iris*. With this doubtful encouragement we emerged upon the Brockenhurst Road, and were at once favoured with a gleam of sunshine and the capture of *A. aglaia*, always a lovely species, and doubly welcome after the morning's experience. Brockenhurst Station at last, and on the platform a group of porters holding an inquiry upon a huge and disreputable *Smerinthus populi*, which had been caught napping on the palings. After lunch we returned by train to Lyndhurst Road, where an hour of sunshine was fruitlessly spent in looking for *Melanargia galatea*. Its favourite riding near the station was quite deserted, and I am told it has completely disappeared from this locality.

Fortunately, the spell of bad weather came to an end that night, and next day, and for very many days after, there was glorious sunshine. The forest began to look more like itself with a few *A. puphia* out for their first flight, and the "white admirals" showed themselves more freely. They were still, however, far from common, though the few specimens that appeared were exquisitely fresh. Those who do not breed *L. sibylla* can seldom see it in perfection. The deep soft black, which is its principal charm, gets rusty very soon by exposure to sun and rain. On the heaths *Polyommatus ægon* was out in great numbers. Still, it was quite clear that I was too early for most things, the season being unusually backward. A couple of nights' sugaring, from which I returned empty, save for one *Lecania turca* and a few *Calligenia miniata*, convinced me that I had better employ myself elsewhere for a time, and leave the forest to develop its entomological resources in peace against my return.

Accordingly I went down to Bournemouth, and began to prospect for insects around Swanage—always a likely place for other things besides *H. actæon*. *M. galatea* was the first to appear, and after failing to find it in its old quarters at Lyndhurst, I was glad to get a few choice specimens. In a day or two after my first visit this butterfly was prodigiously abundant, and it was possible to take any quantity of both sexes. But, quite apart from any question of needless waste, the pleasure of catching *M. galatea* soon palls. It may be magnificent, for beginners, but it is not sport, for the insect is hardly, to say the least, a spirited flyer. Such an easy prey is demoralising, and when presently *Colias edusa* went past like a rocket, I was not in the least surprised at missing him by several yards. It was no surprise, either, on reaching the *H. actæon* locality, to see

more than one green net moving about in the scrub below the cliffs. I wonder if on any fine day during July and August one could find this particular spot empty of collectors. Were I a sporting character. I would far rather put my money on the chance of finding *H. acteon* hunters here, than on that of taking the brisk little butterfly itself. Well, there is plenty for all, and the skippers will last our time and perhaps longer—as long, I am inclined to think, as that rugged cliff-face retains its steep and treacherous character.

H. acteon was out, but not in great numbers, and the females were only just beginning to appear. On the other hand, *H. linea* was extraordinarily abundant, which I have noticed on former visits is never the case when *H. acteon* is fully out. *A. aglaia* was plentiful here, but almost impossible to catch, and before leaving the neighbourhood I saw *C. edusa* again, twice. The first specimen was seen on July 10th, rather early in such a backward season. It was a fine fresh male. A few *P. agestis* and *P. argiolus*, with *Satyrus semele* (just out, in splendid condition), were the only other noticeable butterflies seen.

I returned to the New Forest on July 20th, and found the entomological situation considerably changed by the fine weather. On my first visit I could find no var. *valesina*. This time I had not been in the woods ten minutes before I got one, but to my surprise this, and nearly every other specimen I caught—about a dozen in all—appeared to be torn and battered, and not worth keeping. It was the same story with *L. sibylla*, which was now out in countless numbers. Nearly all were partial or total wrecks. Ten days before one of these insects was not out at all, and the other was only just coming out. Their bad condition was hard to explain. Perhaps the wonderful sunshine had tempted them to take an unusual amount of exercise, and in that case the preference they both display for holly bushes and brambles would account for their exceeding shabbiness. I may remark that in many previous visits to the forest I have never found *valesina* so scarce as it was this season.

Hearing rumours of another and more serious failure—the non-appearance, up to date, of *Catocala promissa*—we did not go out sugaring at first, but contented ourselves with the butterflies: there were plenty of them. *Thecla quercus*, as usual, was present in myriads, and, as usual, there was hardly a decent specimen to be got. One very hot day brought forth a regular invasion of *Gonepteryx rhamni*. Twenty-four hours previously not one could be seen, but in the interval they arrived unmistakably. Their abundance was really extraordinary. *Vanessa polychloros* was also in great force. I suppose I ought to be ashamed to confess that, even after a fairly long collecting experience, the sight of *polychloros* always makes me eager to catch him. He is a most tempting insect, with his large size and gorgeous colouring, as

he sits lazily expanded on the end of a twig or on the sunny side of a paling; a most sporting insect, too; a regular dodger, hard to catch by reason of his floppy tumbling flight, and tantalising withal, inasmuch as when caught he is nearly always snipped or rubbed, so that each successive specimen you see—and miss—seems finer than any you already possess.

But there was nobler game abroad in the forest, and if I had not been very much abroad also, I should have had several head of it. In one of those unhappy moments which come to entomologists as well as to other people, when you feel inclined to wish that the earth would open and swallow you, I missed a sitting shot at a grand *Apatura iris* that let me get within a yard of it, while I was beating up a patch of bracken. I had other chances—and missed them—but this was the chance of a season. There were many *A. iris* about, but the great heat seemed to make them lazy, and the most they would do was to take a leisurely turn round the tree tops, well out of reach of the net.

Moths were not a serious object, but I made one final sugaring expedition, when the local collectors had almost come to despair of *C. promissa*, and had the pleasure of opening the long-deferred season by the capture of three fine "crimsons." We also took *Triphæna fimbria* and one enormous *Cossus ligniperda*. But sugaring in our time was not a success. I can only hope that later arrivals have been more successful. Moths beaten out in the daytime included *Liparis monacha* and *Lithosia quadra*. The latter species has been very abundant in the forest this year, and once or twice I saw the female flying in bright sunshine. On the whole, the season seems a good one, and I expect to read many favourable reports from collectors who have bided their time and then made the most of it. I cannot with a clear conscience say that I did either; but though my list of captures left much to be desired, I shall always remember with pleasure my visit to the forest in the glorious weather of July, 1900.

Pampisford Vicarage.

NOTES ON [♂]*TRICEPHORA SANGUINOLENTA*, MARSH., EDW.

BY REV. F. A. WALKER, D.D.

[♂]*Tricéphora vulnerata*, Illiger; [♂]*Cercopis vulnerata*, Illig., Curtis;
C. sanguinolenta, Panz., Burm.

THIS very handsome species of British Cicada is sure to attract attention wherever noticed, being tropical or semi-tropical in appearance, and not resembling any of its English congeners or any ordinary English insect, with the possible sole exception of its wing-cases bearing a likeness to the fore wings of *Zygæna*

filipendulæ. My object in writing this notice is to add another county to the localities already quoted in connection with this species. Between 12 and 1 p.m. on Saturday last, June 9th, while working with the net in a lane up a somewhat steep slope on the south side of the railway station of Chorley Wood, Bucks, I noticed one in the hedgerow, but I most unfortunately missed securing the same, which must have dropped from the leaf into the grass beneath. A few minutes later, I was presented with a second by a resident in one of the new villas in the neighbourhood, and on our return the researches conducted jointly by two juvenile scientists who accompanied me, and myself, resulted in the capture of ten additional specimens. So far as my observation went, this species appears especially to favour the twigs and leaves of hazel and alder. I had never previously come across this insect in Britain, but, on referring to my collection of foreign Hemiptera, have to record the following captures that I made abroad of this species:—Aceldama, April, 1882 (Palestine); Ephesus, May, 1882 (Asia Minor); Langaron, May, 1891 (South of Spain).

I have also been given a continental specimen or two (one of them from Leghorn) by a brother entomologist. My specimens from Aceldama (always supposing that they represent the same species of *Triecphora*) are somewhat differently marked, having a larger proportion of black in comparison of the red. Other English localities and counties where the above insect occurs will be found on p. 81 of vol. i. of Buckton's 'British Cicadæ,' and in Edwards's 'Hemiptera-Homoptera of the British Islands,' 1896, pp. 77, 78. The latter author records it on alder and willow, also on grasses and *Pteris*. Buckton speaks of it as near alder bushes. My father, on p. 668, vol. iii. of 'List of Homopterous Insects in Collection of British Museum, 1851,' gives the following localities for this species:—England, France, South of France, Spain, Turkey. As he styles var. *a* of Burmeister *Cercopis atra* (Herrich-Schaff.), and var. 1 *nigra* (Amyot), it is possible that the darker specimens I took at Aceldama belong to one or other of said varieties. According to my father's catalogue there are nineteen species of *Triecphora*, but only three of them European. In the interleaved manuscripts of his book, four European species described by Fieber are recorded—*T. vulnerata*, *mactata*, *arcuata*, and *sanguinolenta*: but according to my father's printed list, the 1st, 2nd, 4th—*vulnerata*, *mactata*, and *sanguinolenta*—are synonyms for one and the same kind, as indeed the meaning of those words testifying to its appearance would seem to imply.

Dun Mallard, Cricklewood: June 12th, 1900.

BIBLIOGRAPHICAL AND NOMENCLATORIAL NOTES ON
THE RHYNCHOTA. No. 1.

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

THESE notes will serve as a commentary, to some extent, on the "Nomenclature of the Genera of the Rhynchota" now appearing serially in the 'Entomologist.'

I wish, first of all, to modify "method" No. 3 (*l. c.*, 1900, p. 26). After considerable correspondence with my friend Mr. L. B. Prout, who is making similar studies upon the nomenclature of certain Lepidoptera, I have come to feel with him that a more logical method is to work out each genus independently. Fabricius was ignorant of (or ignored) Latreille's work published the previous year, and there is no doubt that the genera are co-extensive and practically identical. I have not, therefore, adopted the usual plan, in such a case, of fixing the remaining (or one of the remaining, if there are more than one) species as the type of the other genus.

1762. Geoffroy's 'Histoire abrégé' has been placed by Reuter (in his 'Revisio') among the non-Linnean works, *viz.*: 'Arbeiten in welchen die binäre nomenclatur nicht durchgeführt ist.' I have but little to say on this point, except that if such genera as those in Latreille's "Précis"—*Pentatoma*, Oliv., *Cylindrostethus*, Fieber, &c.—are to be (as they are apparently universally) accepted, it is not logical to refuse admittance to Geoffroy's work, which was, generally speaking, far more scientifically conceived and accurate than almost any other entomological work of his century. He himself was certainly under the impression that his work was based on Linné's system, for which he expressed the greatest admiration.* His genera are clearly defined, and in all the Linnean species redescribed Linné's nomenclature is adjoined. It appears to me quite logical to quote his "Grande Punaise à avirous" (for instance) as "*Notonecta glauca*, Linn., Geoffr., 1762, Hist. abr. i. 476." In 1764, O. F. Müller (Ins. Fridrichsdal.) confirmed all Geoffroy's Rhynchota genera, except *Tetigonia*, which he seems to have overlooked.

* "Cependant l'histoire des . . . insectes est restée jusqu' à nos jours dans cette espèce de confusion et c'est à M. Linnæus, cet infatigable Naturaliste Suédois, que nous devons le premier Ouvrage methodique sur cette matiere . . . si son Ouvrage est encore cloigné de la perfection au moins doit on lui savoir gré d'avoir montré la route qu'il faut suivre" ('Discours Preliminaire,' p. x).

"A l'aide d'un ordre methodique, nous pratiquerons la même chose sur les insectes . . . et l'on pourra trouver le nom et l'espèce d'un insecte inconnu auparavant" (*l. c.*, xii).

"Nous sommes donc infiniment redevables à M. Linnæus d'avoir cherché le premier à ranger methodiquement les insectes, et à trouver des caracteres génériques qui les fissent plus aisément connoître" (*l. c.*, xiii), &c.

1825. The exact date of publication of the tenth volume of the 'Encyclopédie méthodique' and of Latreille's 'Familles naturelles' is uncertain; but, from internal evidence, pp. 1-325 of the former were apparently published before, and pp. 326 to the end, after, the appearance of Latreille's work. *Reduvius cruciatus* is fixed for the type of *Ectrichodia* for the following reason, viz., seven species are mentioned, but in the individuals of one only (*cruciata* = *crux*, Thunb.) were the full number of antennal segments present, and this is specified in the generic description: "S'il nous eût été possible de vérifier les antennes de plusieurs espèces, nous n'aurions par hésité à proposer cette subdivision comme genre sous le nom d'Ectrichodie (*Ectrichodia*), mais nous ne les avons complètes que dans une seule espèce."

1835. Lewis, in Trans. Ent. Soc. i. pp. 47-52. This paper is usually quoted "1836"; but Burmeister states that it was published in 1835 (Arch. f. Naturg. 1836, ii. pt. 2, p. 327).

1843-4. Guérin-Méneville's 'Iconographie' (Insectes) is dated 1829-38; the date of the Rhynchota part is, however, 1843-4. On p. 352 (in the same part as p. 343, on which the Rhynchota begin) is written: "Nous avons publié dans la 'Revue Zoologique de la Société Cuvierienne,' 1843," &c.; and on p. 381 ("error," 831) the author states that Amyot and Serville's 'Suites à Buffon, Hemipterès' (pub. 1843), is "actuellement sous presse." Pp. 369-81 may have appeared very early in 1844, as the author subscribes the date of writing (p. 385 in the same part) as "Décembre, 1843." Although dated 1843, Amyot and Serville's work may have actually appeared in 1844.*

1834. Reuter (Revisio Syn. 1888) incorrectly assigns *argus* (= *malabaricus*) as type of *Asopus*, Burm. This genus was founded in 1834, in Rev. Ent. ii. 1-26, for two species, viz., *gibbus* (= *cayennensis*) and *dianæ* (= *anchorago*), which cannot be generically separated (sec. auctt.) from the types of *Discocera*, Lap., and *Stiretrus*, Lap., respectively. Burmeister states that this part of the Rev. Ent. was published before his contribution to Meyen's 'Reise' (vide 'Handbuch,' ii. 349): "Ich. habe den von mir vorgeschlagenen (in nov. acta. phys. med. vol. xvi. suppl. p. 418) Gattungsnamen beibehalten . . . Früher" (in Silbermann's 'Revue,' ii. 19)," &c.

"*Kleidocerus*, West. Hope Cat. 1842," is erroneously quoted (Lethierry and Sev. Cat. ii. 158) as a synonym of *Ischnorhynchus*. The former name does not occur in the Hope Catalogue, and I cannot find that it was ever described. It was undescribed, as "*Kleidocerys*," in Stephens' Catalogue, 1829, and in Westwood's "Introduction," Gen. Syn. 123 (1839).

* The plates of this work were, in part at least, issued about 1834, for Burmeister quotes them (1835, Handb. Ent. ii. p. 152), and some are dated 1834.

NOTES ON LETHIERRY AND SEVERIN CAT. VOL. I. (1893).*

Pp. 1 & 2. The first description of *Aphanopneuma biloba* and *Cantharodes cœnosa*, Westwood, appeared in 1846, under the generic name of *Plataspis*, the subgenera being indicated, but not described till 1847.

P. 1. The specific reference to *Ceratocoris bucephalus*, White, is correct; but the genus was not named nor described till 1842. Trans. Ent. Soc. Lond. iii. 84.

P. 18. **Scutiphora*, Guér. Coquille, 1830-1 = *Peltophora*, Burm.

P. 83. *Dryptocephala*, Lap., 1832 = **Storthis*, Perty, 1834. Delect. p. 215 (type of *Storthis* is *Phlea livida*, Perty; p. 168 [nec 169 as in index] = *Storthis livida*, l. c., p. 215).

P. 105. *Stenotoma*, Westw., was first described, with its type, in Proc. Ent. Soc. Lond., 1844, p. cxix (reprint, 1864, p. 99).

P. 119. *Rhytidolomia*, Stål, 1872 = *Pentatoma*, L. & S. = *Lioderma*, Uhl. (preocc. Mars., 1857) = *Chlorochroa*, Stål, 1872. Type *senilis*, Say.

P. 183. Delete "*Pentatoma*, Linné," &c.!!

P. 202-20 (see above, re *Asopus*). *Discocera*, Lap. = *Asopus*, Burm. (p.); *Stiretrus*, Lap. = *Asopus*, Burm. (p.); *Amyotea*, Ellenrieder = *Asopus*, Leth. & Sev.

P. 224. *Agapophyta*, Guér., 1830-1, is wrongly attributed to Laporte.

P. 239. *Megymenum*, Guér., 1830-1, is wrongly attributed to Laporte.

P. 240. The original description of *Eumenotes* (and its type) was in Proc. Ent. Soc. Lond., 1844, p. cxv (reprint, p. 95).

P. 243. The correct spelling is *Schyzops* (see p. 297, Spinola).

P. 224. *Oncomeris flavicornis*, Guér., 1830-1, is wrongly attributed to Burmeister, 1835.

NOTES ON VOL. II. (1894).

P. 20 (α). *Acanthocerus*, Pal. B., 1805 [not preocc., as saith Burm.] = *Crinocerus*, Burm. Type, *sanctus* (Fabr.), Lap.

(β). *Hymeniphora*, Lap. = *Hymenophora*, Am. Serv. = *Acanthocerus*, L. & S. Type, *crucifer* (Pal. B.), Lap.

P. 42. *Lybastes*, n. n. = *Lybas*, Dall. (nec Chev., 1834). Type, *annulipes*, Dall.

P. 77. *Acanonicus*. Westw., Hope Cat. ii. p. 3 (1842). This reference, I think, stretches the meaning of "reference to a previously described genus or subgenus" to its farthest limits. Westwood simply substitutes "*Acanonicus*" for "*Spartocerus*, b. Burm."; but as the section "b" is based on structural characters, it may perhaps pass muster.

P. 95. **Coriomeris*, Westw., l. c., p. 6 (1842) = *Merocoris*, Hahn (1831, nec descr.), 1834 (preocc., Perty, 1832) = *Coreus*,

* An asterisk (*) before a name signifies that it is omitted in Lethierry and Severin's Catalogue, vols. i.-iii.

L. & S. (nec Fabr., typ.). Type [*pilicornis*, Klug. =] *denticulatus*, Scop.

P. 123. *Berytinus*, n. n. = *Berytus*, L. & S. (nec Fabr., typ.) = *Neides*, L. & S. (nec Latr., typ.). Type, *claripes*, Fabr.

P. 150. *Lygæosoma sardea*, Spin., 1837 = *reticulata* (H.-S., 1838).

P. 165. *Blissus*, Klug, 1830, nec 1845.

P. 190. *Chiroleptes*, Kirby, 1837 = *Myodocha*, L. & S. (nec Latr., 1807).

P. 205. *Plinthisus*. I have been unable to find a reference to this in Latreille, Gen. Crust. Ins. iii.

P. 214. *Aphanus*, Lap., 1832 = *Calyptonotus*, D. & S., 1865. Type, *roland[r]i* (Linn.).

NOTES ON VOL. III. (1896).

Pp. 7 & 8 (α). *Dictyonota*, Curt. = *Seraulia*, Stål. Type [*eryngii*, Curt., nec Latr. =] *strichnocera*, Fieb.

(β). *Alcetha*, n. n. = *Dictyonota*, L. & S. (nec Curt., typ.). Type, *tricornis*, Schranck. [= *crassicornis*, Fall., L. & S.].

P. 9. *Coleopterodes*, Phil., 1864 = *Solenostoma*, Sign. (nec Raf., 1815).

P. 29. *Macrocephalus*, Swed. = **Macrothyreus* (subg.), Westw. Trans. Ent. Soc. Lond. iii. p. 28.

P. 41. *Dysodius lunatus* (Fabr.) = **lunulatus*, Lep., Serv., 1825.

P. 51. *Næogeus*, Lap., 1832 [nec *Næogæus*] = *Hebrus*, Curtis, 1833.

P. 62. *Cylindrostethus productus* (Spin.) = *Gerris producta*, Spin., 1837, L. & S. p. 62 = *Hydrobates fieberi*, L. & S. p. 63.

P. 96. *Physoderes*, Westw., 1844, Proc. Ent. Soc. Lond. p. cxv (rep. p. 96) = *Epirodera*, Westw., 1847.

P. 103. *Tetroxia*, Am. Serv., 1843 = *Acanthaspis*, 1843.

P. 112. *Sorglana*, n. n. = *Macrophthalmus*, Lap., 1832 (nec Latr., 1829) = *Macrops*, Burm., 1835 (nec Perty, 1832). Type, *pallens*, Lap.

P. 113-14 (α). *Tapinus*, Lap., 1832 = *Opinus*, Lap., 1832 = *Tapinus*, Burm., 1835 = *Sminthus*, L. & S. Type, *pictus*, Lap.

N.B. *Opinus* is only mentioned in the analytical tables.

(β). *Staliastes*, n. n. = *Opinus*, Stål. (nec Lap., typ.). Type, *rufus* (Lap.) Whether *Tapinus* or *Opinus* be ultimately preferred for *pictus*, neither of these generic names can be used for *rufus*, for this species was included with doubt by Laporte in his *Tapinus*.

P. 116. *Triatoma*, Lap., 1832 (not preoccupied) = *Conorhinus*, Lap., 1832. *Triatoma* ought to have preceded.

Pp. 133, 137, & 139 (α). *Rhiginia*, Stål., 1850 = *Ectrichodia*, L. & Sev.

(β). *Loricerus* (Hahn), Burm. = *Larymna*, Stål, 1859. = *Ectrychotes*, Leth. & Sev. Type, *hæmatogaster*.

(γ). *Ectrichodia*, Lep. & Serv., 1825 = *Ectrychotes*, Burm.,

1835 [= *Loricerus*, Hahn (p.), nec descr.] = *Physorhynchus*, Leth. and Sev. Type (*cruciatus*, Lep. & S. =), *crux*, Thunb.

N.B. *Ectrychotes* was simply an "emendation" (sic!), and cannot be used otherwise than as a pure synonym of *Ectrichodia*.

P. 135. *Castra*, n. n. = *Cimbus* (Hahn), Burm., 1835, L. & S., nec Laporte, 1832. Type, *productus* (Hahn).

P. 151 (α). *Zelus*, Fabr. = *Euagoras*, Burm. (nec *Eragoras*). Type of latter, *speciosus*, Burm.

(β). *Diplacolus*, n. n. (subg.) = *Diplodus*, Am. Serv. (nec Raf., 1815).

Pp. 157-95 (α). *Rhynocoris*, Hahn (Nov., 1833) = *Harpactor*, L. & S. Type (*cruentus*, Fabr. =) *iracundus*, Poda.

(β). *Harpactor*, Lap., 1832 = *Sthienera*, L. & S. Type, *angulosus* (Lep. Serv.), Lap., Essai, 1832, pp. 8 and 88.

P. 184. *Darbanus*, Am. Serv., 1843 = *Euagoras*, L. & S. (nec Burm., typ.).

P. 202. *Nabis*, Latr., 1802 = *Prostemma*, L. & S. Type, *guttula* (Fabr.), Latr., 1804.

P. 207. *Reduviolus*, Kirby, 1837 = (subg.) *Nabicula*, Kirby, 1837 = *Aptus* (Hahn, nec descr.), Stål. = *Nabis*, L. & S. Type, *inscriptus*, Kirby.

P. 226. *Leptopus*, Latr. Consid. gén. (1810).

P. 237. *Dolichomerium*, n. n. (subg.) = *Dolichomerus*, Reut. (nec Macq., 1850).

MISCELLANEOUS NOTES.

✓ [^] *Colgar*, n. n. = *Atella*, Stål. (nec Doubl., 1847). ^v ^o Type, *peracuta* (Walk.).

✓ ^o *Darthula*, n. n. = *Urophora*, Westw. (nec Desv., 1830). Type, *hardwickii*, Westw.

✓ ^o *Cicada aurifera*, Say, 1832 = *marginata*, Say, 1832 (nec Oliv., 1790).

✓ ^o *Thaumastopsaltria*, n. n. = *Aerilla*, Stål (nec Adams, 1860). Type, *adipata* (Stål).

✓ ^o *Tongorma*, n. n. = *Craspedum*, Am. Serv. (nec Ramb., 1838-42). Type, *phyllomorphum* (Latr.).

✓ ^o *Tonga*, n. n. = ^v *Cyrene*, Westw. (nec Heck., 1840). ^v ^o Type, *guttulata* (Westw.).

✓ ^o *Zoraida*, n. n. = *Thracia*, Westw., 1840 (nec Blainv., 1825). Type, *sinuosa* (Boh.).

✓ ^o *Phoronastes*, n. n. = *Phoroncus*, Stål (nec Raf., 1815). Type, *crassifemur* (Stål).

✓ ^o *Sronachlachar*, n. n. = *Aleria*, Stål (nec Marsh., 1874.) Type, *asopoides*, Stål.

**Leptomeres picta*, Lap., Essai, 1832, p. 10, from Paris. What is the modern synonymy of this genus and species, apparently not included in Puton's nor in Lethierry and Severin's Catalogues? The generic name is preoccupied by Hübner, 1816.

○ *Edwardsiastes*, n. n. = *Glyptocephalus*, Edw. (nec Gotts., 1835).
Type, *proceps*, Kirschb.

✓ ○ *Proranus*, Spin., 1850 = *Epiclides*, Am. Serv. (nec Guér., 1838).

✓ ○ *Balclutha*, n. n. = *Gnathodus*, Fieb. (nec Pand., 1856).

✓ ○ *Hindola*, n. n. = *Carystus*, Stål (nec Hübn., 1816). Type,
viridicans (Stål).

✓ ○ *Jamaicastes*, n. n. = *Domitia*, Stål (nec Thoms., 1858). Type,
basistriella (Walk.).

○ *Krisna*, n. n. = *Siva*, Spin. (nec Hodgs.). Type, *Strigicollis*
(Spin.).

○ *Lydda*, Westw., 1840 = *Diospolis*, Westw., 1841. Type,
elongatus (Fabr.).

✓ ○ *Kalidasa*, n. n. = *Phoronis*, Stål (nec Wright, 1857). Type,
sanguinalis (Westw.).

○ *Hilda*, n. n. = *Isthmia*, Walk. (nec Gray, 1821). Type,
undata (Walk.).

○ *Flosshilda*, n. n. = *Autonoë*, Stål (nec Bruz., 61). Type,
albigera (Stål).

○ *Phorastes*, n. n. = *Phorus*, Stål (nec Montf., 1810). Type,
femoratus (DeGeer).

○ *Zyzza*, n. n. = *Germania*, Lap. (nec Desy., 1830). Type,
cucullata (Lap.).*

I have not seen, nor have I been able to obtain accurate information regarding, Hahn's 'Icones ad monogr. Cimicum,' 1826. There were apparently twenty-four plates, but only one page of letterpress, so that the genera were probably not defined. The following appear to be at least named in this work, viz. :—*Globocoris*, *Pilophorus*, *Centroproctus*, *Hypselonotus*.

SOME BEES VISITING THE FLOWERS OF MESQUITE.

By T. D. A. COCKERELL, N. M. Agr. Exp. Sta.

THE bees here enumerated were collected by Miss Nora Newberry at the flowers of mesquite (*Prosopis glandulosa*, Torrey) at Mesilla Park, New Mexico, May 20th, 1900. It is an indication of the richness and variety of our bee-fauna, that even after so many years of collecting by the present writer in the immediate vicinity, two of the species are new.

- (1.) *Centris rhodopus*, Ckll., three males.
- (2.) *C. lanosa*, Cress., one male.
- (3.) *C. hoffmanseggiae*, Ckll., one female, four males.
- (4.) *Anthidium paroseleæ*, Ckll., five males.
- (5.) *Megachile chilopsidis*, Ckll., one female.
- (6.) *M. cleomis*, subsp. *lippiae*, Ckll., two females.
- (7.) *M. sidalceæ*, Ckll., one female.

* Subgenus (?) of *Tetigonia*, Geoffr.

(8.) *Megachile newberryæ*, n. sp., one male.

Length 13 mm., form of *M. fidelis*, but differing from that species as follows:—Pubescence white, that of face and abdominal bands pure shining white; a little black hair on each side of the middle of the mesothorax, but none on the scutellum, vertex, or first three abdominal segments; fourth segment with very short erect hair, mixed dark and light; fifth segment with abundant long black bristles; vertex microscopically tessellate, dull, with sparse shallow punctures (in *fidelis* it has strong close punctures); mesothorax and scutellum sculptured like the vertex; wings clear, with an apical cloud, stigma very dark ferruginous, marginal cell considerably shorter than in *fidelis*; end of abdomen in lateral profile like *fidelis*, but apex, instead of having a small deep notch, with a broad shallow very jagged emargination; anterior tibiæ black; anterior tarsi with the process of the first joint cream-colour, deeply hollowed, shaped as in *M. pugmata*, but broader, and not quite so produced at the tip; remaining joints of anterior tarsi cream-colour, but the other tarsi black; spines of anterior coxæ long, black, blunt, with a prominence about the middle of the outer upper border, whence runs a groove to the tip. The eyes in life are black at the top and sides, otherwise green; antennæ wholly black, last joint slightly broader than the one before; tegulæ dark; fringe of anterior tarsi orange-ferruginous within. This cannot be the male of *M. rallosum*, *populi*, *chilopoidis*, or *prosopidis*, the sculpture of the thorax being entirely different.

(9.) *Lithurgus gibbosus*, Smith, one male.

(10.) *Colletes prosopidis*, Ckll., one male, one female.—The female has not been described; it is about $7\frac{1}{2}$ mm. long, and resembles the male, except in the usual sexual characters. The flagellum, except the first two joints, is light reddish brown beneath; clypeus shining, with strong sparse punctures; no black hair on head or thorax: tarsi very dark brown, penultimate joint of hind tarsi extremely small.

(11.) *Colletes algarobiæ*, n. sp., one male, three females.

♂. Resembles *C. prosopidis*, but is larger, with the very long flagellum only dull brownish beneath, and conspicuously, though very finely, pubescent; second submarginal cell much broader, less narrowed above; enclosure of metathorax with about eight distinct longitudinal ridges, and bounded by a strong single ridge (in *prosopidis* the bounding ridge is generally double). The tarsi are clear bright ferruginous; nervures and stigma very dark brown; malar space but little broader than long.

♀. Length $8\frac{1}{2}$ mm., similar to *C. prosopidis*, but larger; flagellum wholly dark; the white pubescence of vertex, mesothorax, and scutellum (particularly the last) with blackish hairs intermixed; hind margins of ventral abdominal segments whitish hyaline. Wings hyaline, nervures and stigma black; abdomen with distinct and broad white hair-bands; tegulæ shining dark brown; mesothorax rather sparsely punctured; malar space much broader than long. Differs from the female

of *texana* by the less conspicuous black hair of thorax, differently sculptured metathoracic enclosure (that of *texana* being divided by the ridges into square portions), and especially by the much smaller and less crowded punctures of the mesothorax.

The specific name is derived from that of the subgenus to which the mesquite belongs. From *C. dalece* the male differs by the broader and shorter abdomen, dark stigma and tegulæ, &c. The malar space is much shorter than in *dalece*.

At the same locality, and on the same day, Miss Newberry took six bees at flowers of *Opuntia engelmanni*. These prove to be *Megachile sidalceæ*, Ckll., one male; *Diadasia rinconis*, Ckll., five females.

Mesilla Park, New Mexico, U.S.A.: May 21st, 1900.

THE ANT-HILLS AT THE PARIS EXHIBITION.

BY VIVIAN ST. CLARE MACKENZIE.

ENTOMOLOGISTS who pay a visit to Paris during the Exhibition season should not omit to enter the chamber in the Palais des Sciences, where Mons. Charles Janet is showing five artificial ant-hills. The hills are made of pink plaster of a porous nature covered with glass, through which visitors may observe the ants bustling about in the performance of their multifarious duties.

M. Charles Janet has devoted many years to the study of ants, bees, and wasps, and exhibited a similar suite of nests at the International Exhibition at Brussels in 1897. His contributions to the Société Zoologique de France describe observations and experiments extending over a series of years, and those of his brochures which treat of ants are not the least interesting. The ant-hills which he has placed in the Palais des Sciences are constructed after the model of a natural hill in a garden near Beauvois, and contain the following species:—*Formica rufa*, *F. sanguinea* with slaves, *F. fusca*, *Lasius flavus* with *Claviger testaceus*, *L. mixtus* with myrmecophiles, such as *Lepismina poly-poda*, *Antennophorus uhlmanni*, *Discopoma comata*, *Lelaps holothyroides*. At the present moment the ants are busily engaged in carrying those of the eggs which almost hatched to the surface, so that the young on making their *début* in this world may see it at its best, and enjoy the warmth and brightness of the sunshine.

It is amusing to watch the audacity of the *Lepismina poly-poda*, an inmate quickly distinguished by his extraordinary agility and pale yellow colour. A *Lasius mixtus* returns from his country walk, ambles up to a comrade, and stands *vis-a-vis* preparing to

disgorge a little drop of liquid nourishment which he has brought home. The couple are watched. The impudent *Lepismina* rushes forward, hurls himself between the two ants, snaps the *bon-bouche*, and hurries away. Pursuit is futile, for the thief, as his cognomen *polypoda* implies, has many legs, and knows how to use them. But even these gentlemen, who live by taking the bread from the mouths of others, are not the only objectionable characters with which the respectable ant-citizen has to contend. There is the *Antennophorus*. Three of these parasites fasten themselves on the body of the *Lasius*, one on each side of the abdomen, and one under the head, where he has the satisfaction of supervising the dietary of his host. The *Antennophorus* passes easily from one ant to another, always displaying a marked preference for young workers which have not long left the egg; doubtless, as M. Janet suggests, with a view to profiting by the attention bestowed on the latter by their elder companions. If the *Lasius* escapes the *Antennophorus*, he falls a victim to the *Discopoma comata*, in which case one would think that the last state of that *Lasius* was worse than the first; but these ants not only submit to, but treat well, their inevitable *attachés*.

This enviable spirit of philosophy is curiously demonstrated in the artificial nests, where brief observation shows that while the ants calmly tolerate the *Discopoma* which cling to their bodies, they invariably make an infuriated onslaught upon those they find detached on the floor of the nest.

M. Janet had made numerous analyses with a view to determining whether any means of oral communication obtains among ants. That two ants are in the habit of hob-a-nobbing by tapping their heads together, and making movements which appear to be gesticulations, has been observed by Büchner. Landois goes further, and maintains, from experiments with a delicate vibratory instrument placed on the abdomen, that they possess a language of sounds. This theory, although strongly combatted by no less an authority than Sir J. Lubbock, is endorsed by M. Janet, who states that it is certain that, at any rate, the insects produce peculiar grating noises, which are probably due to the rubbing together of their bodies, and that these sounds, cumulatively resembling the noise of boiling water, accompany many of their characteristic movements. It is also certain that ants possess a sense of hearing very highly developed. The question, however, is still of the character of a *lis pendens*; and many who remember to visit M. Janet's ant-hills will have every opportunity and encouragement to investigate for themselves.

NOTES AND OBSERVATIONS.

MIGRATION OF *LIBELLULA QUADRIMACULATA*. — Part of the migration of *L. quadrimaculata* alluded to by Mr. W. J. Lucas (*ante*, p. 210) evidently reached here. Prior to this year, so far as I know, the species has never been observed in the Huddersfield district; but in June, and up to July 2nd, specimens taken miles apart were brought to me, the last one by some boys near my own residence. — GEO. T. PORRITT; Crosland Hall, near Huddersfield, August 10th, 1900.

HALIAS PRASINANA AUDIBLE.—A male of this species was heard distinctly by me the other night at a distance of eighteen feet at least. I took the sound for that of a mouse at first, as it was somewhat similar to that sound. A better description would perhaps be that it resembled the squeak of *Acherontia atropos*, except that it was continuous so long as the semicircular flight of the moth lasted. As the moth turned in its flight the sound stopped. This flight was like that of a *Hepialus* wheeling in half-circles round a bough of an elm, about eight feet from the ground. I suppose many of your readers will have noticed this before; but how is it caused?—R. FREEMAN; Prescott, Lanes.

PROCTOTRYPIDIS *ex* LEPIDOPTEROUS OVA. — Referring to Mr. Bird's statement at p. 224, I suspect his "ichneumons" were really members of the Proctotrypidæ, which are the insect-egg devourers *par excellence*. He says the eggs were found upon aspen at Beaconsfield during the first week of July, and emerged *circa* July 21st, 1900. On Aug. 13th, 1899, Mr. H. W. Shepheard-Walwyn, M.A., sent me for identification from Strath-Tay a batch of white eggs with one black vertical spot, each perforated with a more or less regularly circular hole, from which had emerged a single minute hymenopteron (some still alive), of which I carded eleven examples, along with the eggs. There were sixty-six ova, and each one is thus punctured, some of the flies having succumbed in process of exit, which, curiously enough, they *appear* to effect tail first. Mr. Walwyn says he put the eggs down as those of *Notodonta dictæa*, L.; they were upon poplar, so, if he be mistaken, they are probably *N. ziczac*, L. Knowing nothing of the parasites, I subsequently sent them to Rev. T. A. Marshall, in Corsica, who tells me they are referable to Nees's genus *Prosacantha* (= *Teleus*, Walk.), but that the species is probably undescribed; and, further, that there are thousands of these tiny beings (the total length of mine is $\frac{3}{4}$ mm.; Mr. Bird's must be less) at present undescribed and tabulated. We trust Mr. Marshall will rectify this omission, since no one else can, in his forthcoming volume upon the Proctotrypidæ. I wish, moreover, to enter an apologetic protest against calling the whole Parasite Hymenoptera by the sweeping title "Ichneumonidæ," which is not only incorrect (in more recent entomological times), but also misleading; and I would refer your readers to the didactic table—surely sufficiently comprehensible—at Entom. xiii. p. 27. P.S.—I shall be glad of, and will acknowledge any, Ichneumonidæ sent to me. — CLAUDE MORLEY; Ipswich.

CAPTURES AND FIELD REPORTS.

SIREX GIGAS.—A fine specimen of *Sirex gigas* was brought to me on July 20th, having been taken in a shop in this town. This species occurred in the same shop some years ago, and within a few yards of the localities of two other records of the same insect.—(Miss) E. M. ALDERSON; Worksof.

LIBELLULA QUADRIMACULATA.—On June 10th, between Margate and Broadstairs, I noticed a very unusual swarm of a dragon-fly which I believe to be *L. quadrimaculata*. I think this was the same day that Mr. H. Stocks saw them at Margate. I noticed also that they seemed to be flying inland, and they certainly appeared to increase in numbers towards evening. I managed to net three, and these I have now in my collection.—A. J. MANN.

BLACK VARIETIES ON A SOUTH LANCASHIRE MOSS.—Last summer I took an almost uniform dark brown (nearly black) *Macaria liturata* (beaten); also a black *Luperina testacea* at light. Last week I took an almost black *Acronycta leporina* and an almost black *Xylophasia rurea* var. *combusta* (at least that is what I take it to be). Dr. Cotton, of St. Helen's, was with me the night the black *leporina* occurred, and he took a good specimen of *A. alni* the same night. The thorax of the *A. leporina* is quite black, and the fore wings only show the least little trace of grey.—R. FREEMAN; Prescot, Lancashire.

PAPILIO MACHAON IN KENT.—On June 10th, about 6 p.m., a friend caught a fine male specimen of *P. machaon* on the border of a cornfield between Broadstairs and St. Peter's. I have never heard of one being caught in these parts before, though it may have escaped from a breeding-cage.—A. J. MANN; Lindenthorpe, Broadstairs, Aug. 13th. 1900.

PAPILIO MACHAON IN KENT.—It may be of interest for you to know that, while staying at Herne Bay in the middle of May last, I captured a specimen of *P. machaon*, on the wing, in a lane on the outskirts of Blean Woods. The insect was flying slow and apparently with difficulty, and when I took it I found that the tail of one under wing was missing, and nearly the whole of the other under wing completely gone. The colour of the upper wings was good, and might have belonged to a freshly emerged insect.—G. B. BROWNE; 43, Southbrook Road, Lee, S.E.

PAPILIO MACHAON IN THE NEW FOREST.—I have just seen a fine specimen of this butterfly, bred from a larva taken in a kitchen garden in Lyndhurst. When found the larva was full-fed, and was crawling in a bed of shallots, seeking a place in which to pupate; probably it had fed on carrot, a bed of which is near to the place where it was picked up by the gardener. It pupated July 17th, and the butterfly emerged Aug. 1st. Can anyone say if *P. machaon* has been taken in this neighbourhood since the date given by Newman?—E. F. CHAWNER; Lyndhurst, Aug. 2nd, 1900.

CÆNONYMPHA PAMPHILUS VAR.—On June 23rd last I took a specimen of *C. pamphilus* with the eye-spot on the fore wing entirely absent on both sides. The specimen is also very dark, and the veins are black and very distinct; otherwise it is normal. It was taken on a heath within two miles of Poole, Dorset. I have been told that this variety is rather uncommon, and should like to know if it has a name.—C. E. O. CARTER; Parkstone, Dorset, July 15th, 1900.

ARGYNNIS ADIPPE IN SURREY.—I believe this insect is generally looked upon as somewhat scarce, but on July 7th I captured six, and again, on July 14th, I took eight more. I saw quite double that number. I found them in a clearing in Worth Forest, taking every one off the blossoms of the black knapweed (*C. nigra*).—HERBERT BEADNELL; Fernside, Redhill, Surrey, July 24th, 1900.

COREMIA QUADRIFASCIARIA AND MELANIPPE PROCELLATA IN ESSEX.—I am able to supplement Mr. Raynor's record of this species in Essex (*ante*, p. 225) by two captures, one in July, 1899, and the other in July of the present year. Both specimens were taken in the grounds of the Countess of Warwick's School at Bigods, near Dunmow. I was not aware, till I saw Mr. Raynor's note, that this geometer was an Essex species, and I had noted my captures for future record. The other specimens in my collection were taken some twenty years ago, near Chilworth in Surrey, where the species was at that time quite common. I should also like to record the occurrence of *Melanippe procellata* at Bigods, as this species is generally associated with chalky districts. We are a long way from the chalk at Dunmow, but the district is covered in parts by chalky boulder clay.—R. MELDOLA; 6, Brunswick Square, W.C.

COREMIA QUADRIFASCIARIA IN ESSEX.—On July 11th, 1893, I met with a couple of wasted female specimens of this species in a chalk-pit near Grays, Essex; from the ova of one of them a few examples were bred, emerging the following May.—R. M. PRIDEAUX; Reigate, Surrey, Aug. 13th, 1900.

SCOTOSIA VETULATA AT HEMEL HEMPSTEAD.—A single male specimen of this local insect has been taken here, early in July. It was beaten from a very thick hedge, under the shelter of a high bank. The hedge runs between the cemetery and Anchor Lane.—BERNARD PIFFARD.

PLUSIA MONETA IN OXFORDSHIRE.—Three specimens have been taken this year: the first on July 8th, at dusk, hovering over honeysuckle in the vicarage garden; the second on the following evening, at the same bush, by my son; a third on July 21st, at light, in the study. The specimens have been identified at the Oxford University Museum, and one deposited there. It is believed that this is the first recorded occurrence of the insect in Oxfordshire.—JOHN W. B. BELL; Pyrtou Vicarage, Oxou.

DICYCLA OO IN SURREY.—On July 16th I took here a female specimen of *D. oo*; is not this rather a rare species so near London?—LEWIS S. GILES; 1, Loudon Road, Norbury, S.W., Aug. 16th, 1900.

DASYCAMPA RUBIGINEA IN DORSETSHIRE.—I took two specimens of *D. rubiginea* in 1898, and the same number of examples in 1899.—C. E. O. CARTER; Parkstone, Dorset, July 15th, 1900.

LARVA OF ACRONYCTA ALNI AT TUNBRIDGE WELLS.—On Aug. 1st a larva of *A. alni* was taken by me on a small elm-tree on Tunbridge Wells Common. It has since pupated.—T. PERCIVAL SMITH; Relva House, Sutton, Surrey, Aug. 9th, 1900.

MACROGLOSSA STELLATARUM, &c., AT HUDDERSFIELD.—*M. stellatarum* has again occurred all over this district, and has been common at flowers in my own garden. It has been even more plentiful than last season, when it was also common, but until that year had scarcely been seen here for

probably twenty years or more. It is possible that this year's specimens may be the produce of the district specimens of 1899; but I am more inclined to consider it another migration of the species, though it is extraordinary it should occur in two following years after so long an interval. *Plusia gamma* has swarmed here this year and is still abundant, but I have seen nothing of *Vanessa cardui*.—GEO. T. PORRITT; Crosland Hall, Huddersfield, Aug. 10th, 1900.

COLIAS EDUSA AND *C. HYALE* IN 1900.—We have received a number of reports of the capture of these species in various parts of England during August and the latter part of July. As other notes on the occurrence of the species will probably be sent in, it seems advisable to postpone publication until the October issue, when a fuller list of localities may be available.

VANESSA ANTIOPA IN OXFORDSHIRE.—I have to-day, Aug. 19th, taken a specimen of *V. antiopa* in the vicarage garden, on a post which had been sugared for moths last night.—(Rev.) JOHN W. B. BELL; Pyrton Vicarage, Watlington, Oxon.

SPHINX PINASTRI IN SUFFOLK.—On July 29th, while cycling near Southwold, in Suffolk, I captured a male *S. pinastri* at rest on the trunk of an oak about nine feet from the ground. It is in very fair condition, and I should think was undoubtedly bred in the locality.—ALFRED E. DOUGLAS.

SPILOSOMA LUBRICIPEDA EMERGING IN AUGUST.—I have noticed this season that *S. lubricipeda* is double-brooded, and as I find in all the entomological works to which I have immediate access that the insect remains in the pupa throughout the winter, my experience may be worth recording. The ova were laid June 4th, hatched June 27th; larvæ full-fed about July 25th; and first imago emerged Aug. 13th, since when a considerable number have come out. The larvæ were fed entirely on stinging-nettle.—ALFRED E. DOUGLAS; "Glen Royd," Devon Crescent Road, Red Hill, Aug. 16th, 1900.

ACHERONTIA ATROPOS IN BUCKS.—Eight fully-fed larvæ of this species were found during the last week in July, on a potato patch near Haddenham. I managed to secure the last three taken, the others being previously destroyed by the finder.—W. H. BARTON; The Poplars, Spencer Road, Grove Park, Chiswick, W.

ACHERONTIA ATROPOS AT NORTHAMPTON.—An entomological acquaintance has just informed me that this species is plentiful in the larval stage around the above town this year. He further states that he had in his possession eight fine examples, two of which he forwarded to me.—A. D. IMMS; "Linthurst," Oxford Road, Moseley, near Birmingham, Aug. 20th.

ACHERONTIA ATROPOS AT CHICHESTER.—The larvæ of *A. atropos* have been fairly numerous here this season. The first found was on July 28th.—JOSEPH ANDERSON.

LEUCANIA ALBIPUNCTA AT BEXHILL.—Whilst sugaring at Bexhill-on-Sea on Aug. 18th and 19th, Professor Meldola and myself took four *L. albipuncta*. I do not know if this locality has previously been recorded.—J. W. FINZI; 53, Hamilton Terrace, N.W., Aug. 22nd, 1900.

SUGARING.—I am pleased to be able to say that I have found sugaring very successful this year. Most of the species taken are common, but they are in quantity more than I have found the last five or six years. *Noctua*

rhomboidea I have previously taken singly, but never such numbers as it is in this year. *Dicycla oo* I have been unable to take where I used to get it three years ago. *Triphæna fimbria* is common. The above remarks refer to woods within ten miles of London.—WALTER DANNATT; "Donnington," 75, Vanbrugh Park, Blackheath, S.E., Aug. 21st, 1900.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*June 6th, 1900.*—Mr. George Henry Verrall, President, in the chair. Mr. Hedworth Foulkes, B.Sc., of The College, Reading; and the Rev. H. C. Lang, M.D., of All Saints' Vicarage, Southend-on-Sea, were elected Fellows of the Society.—Mr. G. H. Verrall exhibited a species of the genus *Ceratitis*, Macleay, apparently identical with Bigot's *C. frenicillatus*, from the Gold Coast (W. Africa). Mr. Claude Fuller, State Entomologist for the Department of Agriculture, Natal, writes of this as "one of our greatest local pests which is responsible for the destruction of tons of fruit; the larvæ infest apples, apricots, peaches, plums, oranges, mangoes, guavas, and I have reared them from the berries of *Solanum giganteum*." Mr. Verrall also exhibited a very handsome Trypetid reared from the fruit of *Mimusops caffra* by Mr. Claude Fuller at Durban.—Mr. C. O. Waterhouse exhibited specimens of a hemipteron, *Spongopus nepalensis*, from Capt. Gorman, I.M.S., who states that they are found under stones in the dry river-beds of Assam. They are much sought after by the natives, who use them for food pounded up and mixed with rice.—Mr. Merrifield exhibited a number of pupæ of *Aporia crataegi*, and called attention to the want of correspondence between the markings on the pupal and those on the imaginal wing. On the latter, as is well known, there are no spots, only darkened nervures, the darkness spreading out a little on the outer margin, but on the former there are black spots, some of them forming an oblique black row across the wing, a series of black marginal spots, and no darkened nervures; and, when the imago is about to emerge, so that its markings show through the transparent pupal wing, it is seen that its nervures run between the black marginal spots on the pupal wing, which in no way correspond to the broadening out of the marginal terminations of the dark nervures on the imaginal wings. There is great variety in the black markings on the pupal wing; in some they are few and small, in others they expand and unite, so that more than half the wing is black. The ground colour of the pupa varies from bright greenish-yellow to whitish-grey. As might be expected of an insect whose larva pupates by preference on stems screened by foliage, its colour is not very greatly affected by its surroundings. On comparing some which had had yellow or orange surroundings with others which had had dark ones, it was shown that the former tended to yellow ground colour, and the latter to grey, having also an increase of the dark spots with which the thorax and abdomen are thickly strewn.—Mr. Merrifield also exhibited some enlarged coloured photographs of the green and dark forms of *Papilio machaon*, obtained by causing the larvæ to pupate on green, yellow, or orange surfaces, and on dark ones respectively. In answer to Mr.

Jacoby he stated that though, when the pupa first appeared, it was always of the green form, it had also, if it was going to be a dark one, from the moment of its appearance a few very minute subdorsal and sublateral dark spots, and a little darkening of the anal end. The darkening began to spread in an hour or two, and at an ordinary temperature was complete in much less than twenty-four hours. Whether the pupa was to be green or dark was determined by the surroundings to which it had been exposed before it had cast off the larval skin, and, if it was going to be a dark one, the dark colouring came on exactly the same in complete darkness as in light.—Sir G. F. Hampson exhibited specimens of a moth belonging to the subfamily Hydrocampinæ of the Pyralidæ: *Oligostigma aræalis*, Hampson, from Ceylon, where his correspondent, Mr. J. Pole, had met with a swarm on an island in a river which he estimated at 20,000. When disturbed the buzz made by their wings was quite audible, and after three waves of the net 236 specimens were bottled from round its edges, the net still appearing quite full; as in the some thirty specimens sent the sexes were in almost even proportions, this was not a case of male assemblage. He also exhibited cleared wings, showing the neuration of *Diacrissia russula*, *Tyria jacobæ*, *Callimorpha hera*, and *C. dominula*, the two former being typical Arctiadae and agreeing with the definition of that family in the costal vein of the hind wing anastomosing with the subcostal to half the length of the cell, whilst in the two latter and also in the eight or ten other known species from the oriental region the costal vein does not anastomose with the subcostal, but only connects with it at a point. He contended that the genus *Callimorpha* should therefore be removed from the Arctiadae and placed in the Hypsidæ, where it is closely allied to *Nyctemera*, *Callarctia* and other genera, and that the fully-developed proboscis, the non-pectinate antennæ, the smoother scaling, the more diurnal habit, and the larvæ being scantily clothed with hair, all bore out the correctness of this association, — Dr. Chapman exhibited a portion of a stem of *Ferula communis* from Ile St. Marguerite, near Cannes, showing pupa-cases of *Lozopera francillonana*. The larva feeds in the flower-heads and seeds, and burrows into the stem for hibernation. It does so anywhere, but in the majority of cases under the protection of the great sheathing petioles at the lower joints. As many as thirty or forty and even fifty holes of entry may often be counted immediately above one node. When the larva pierces the stem it is full grown, and the entry holes are as large as or larger than those of exit. Dr. Chapman doubted whether it eats any of the material when it is freshest at the date of entry. The burrows in the stem are full of bitten but undigested material. These burrows proceed in all directions, but most frequently upwards, for several inches, often as much as eight or ten inches, and then approach the surface, and the burrowing appears to go on all winter. In February and March larvæ may be found that have not completed their burrows. On completion the burrow approaches the surface, and the opening is of full calibre, but a delicate film of tissue is left to be ruptured by the emerging pupa. On the specimen exhibited about a dozen empty pupa-cases protruded, and it was noticeable that they all faced downwards. This was in a sense accidental. The larva burrowing upwards makes the final portion of the burrow curved. The pupa, as in most Tortrices, is also

curved when extended, and so, when extruded, continues the curve of the burrow. As this curve is upwards inside the stem, horizontal at the surface of the stem, it becomes downwards if continued outside. One pupa-case just below the node was not so correctly oriented, whilst in other specimens a pupa emerging below the node, and therefore from a downward burrow, faced and curved upwards. A number of vacant holes were also visible, being the exit of an ichneumon, which affects a large majority of the Tortrix. The species was believed to be *Chelonus inanis*, Nees. The heads of several dead ones that failed to emerge successfully were to be seen at some of the holes. Dr. Chapman said he had placed a black circle round four holes, as prepared by the larva of the Tortrix for emergence, that were still intact, and in two of these it was to be noted that the diaphragm was, as he had described, the cuticular tissue of the plant; in the two others, however, this had been damaged, and here the larva had made a silken diaphragm fortified with chips of the stem-tissue. In the neighbourhood of the node especially, the holes of entry were to be seen packed tightly with frass, which appeared to be uneaten material. At the extremities of the specimen, which was too short to contain the whole of the individuals that entered at this node, the larvæ had burrowed in the stem. — Mr. F. Enock exhibited living specimens of male and female *Ranatra linearis*, Linn., from Epping, together with the peculiar forked eggs, which he had observed laid by the *Ranatra*, as it rested upon the upper surface of the leaf grasping the edges with its claws. The short anterior legs are held well up close together, in a line with the body, the head raised about an inch from the leaf, while the tip of the abdomen and ovipositor is pressed against the leaf—a downward and forward movement being given. The ovipositor is thus forced through the leaf, then partially withdrawn and the egg extruded and forced into the hole as far as the forked filaments, which prevent it from going right through the leaf. The eggs are frequently laid in the half-decayed stems of aquatic plants. The peculiar *Prestwichia aquatica*, Lubbock, has been bred from the eggs of *Ranatra*.— Mr. H. K. Donisthorpe exhibited a larval case of *Clythra quadri-punctata* from the nest of *Formica rufa*, and a case fastened to a piece of wood in the nest containing pupæ; larva- and pupa-cases in spirit, removed from cases, and an empty case fastened to a twig, showing how the beetle escapes; and the perfect insect. He also exhibited *Lomechusa strumosa* with its host *Formica sanguinea*, sent by Father Wasmann from Holland, the insects mounted in the position assumed by the guest and host when the former is being fed by the latter; and *Cossyphodes bewickii*, Woll., a beetle from Cape Colony, with ants with which it is found—*Pheidola megacephala*, var. *punctulata*, Mayr. The beetle is a good example of the protected guests. — Mr. C. J. Barrett exhibited two females of *Spilosoma mendica* reared by Mr. J. E. Robson, of Hartlepool, tinged with purplish pink, and ordinary specimens of the same for contrast.—A paper was communicated on “Life-histories of the Hepialid group of Lepidoptera.” by Mr. Ambrose Quail; and “A note on the habits and structure of *Acanthopsyche opacella*, H. Sch.,” by Dr. T. A. Chapman. — C. J. GAHAN and H. ROWLAND BROWN, *Hon. Secs.*

RECENT LITERATURE.

E. P. FELT. *Insects Injurious to Forest Trees*. (1898, Fourth Ann. Rep. Commiss. Fisheries, &c., of New York, pp. 1-31 [? sep. pag.]. Plates 1-3 and 11, text-figures, &c.).

Although dated 1898, copies of this valuable paper have only recently arrived in London. It consists of a report on the insects injurious to maple-trees, the following species being discussed, viz. *Notolophus leucostigma*, *Clisiocampa disstria*, *Zeuzera pyrina*, and *Sesia acerni* [Lepid.]; *Plagionotus speciosus* and *Elaphidion villosum* [Coleopt.]; and the Coccid *Pulvinaria innumerabilis*. Of these the life-history, habits, distribution, natural enemies, and remedies against their deprecations are discussed, with coloured illustrations of the various stages of the pests and of their operations, with text-figures of their foes, and various other details.

Of special interest to the workers who limit their energies to palæarctic forms will be the account of the "leopard-moth" (*Zeuzera pyrina*), an accidental introduction into America, the earliest authentic record there being as recent as 1882. Twelve years later it was characterized as "one of the worst insects we have to contend with." Limited at present to New York, New Jersey, Connecticut, &c., it will doubtless rapidly extend its distribution, especially in a northerly direction. It has been recorded as attacking eighty-three species of trees and shrubs, elms and maples suffering most severely, and in Central Park almost every species of tree and shrub, except evergreens, was injured to some extent.

The Report is prepared in the thorough and lucid manner usual with the entomologists of New York State Museum, and the three coloured plates and the plain figures—three of which are full-page, representing a spraying outfit in operation, a defoliate sugar orchard, and details of the hymenopteron *Thalessa lunator*—are all well executed.

G. W. K.

W. A. LUFF. *The Insects of Alderney* (Trans. Guernsey Soc. Nat. Sci. 1899, pp. 1-23 [sep. copy?]).

Five hundred and nineteen species are now recorded from this interesting island, consisting of 138 Lepidoptera, 64 Rhynchota, 143 Coleoptera, 113 Hymenoptera, 45 Diptera, 4 Trichoptera, 7 Orthoptera, and 5 "Neuroptera"; so that additions will probably be made among the Homoptera, Diptera, and smaller Hymenoptera.

23 Lepidoptera, 10 Rhynchota, 15 Coleoptera, 31 Hymenoptera, and 2 others—a total of 81—are noticed as not occurring in Guernsey, but no comparison is made with Jersey. Among the insects not found in Britain may be noted *Eubolia peribolatu* (Lep.), *Lygæus punctatoguttatus* (Rhynch.), *Rhizotrogus æstivus* and *Cryptocephalus vittatus* (Col.) *Andrena flessæ* and two Ichneumonidæ (Hym.).

We trust that Mr. Luff will shortly prepare a work on the Insect-Fauna of the Channel Isles, in which he will include a map of the islands, and tabular comparisons of the faunas of the various islands *inter se*, and with the South of England and Normandy.

G. W. K.

Occasional Memoirs of the Chicago Entomological Society. Vol. I. No. 1.
March, 1900. Containing:—

- (1) J. L. HANCOCK: "Some New Tettigidæ from Madagascar," based on the collection of the English orthopterist Burr, pp. 1-16. Plate I.
- (2) J. TOUGH: "A New Species of *Gomphus*" [Neuroptera], pp. 17-18.
- (3) J. G. NEEDHAM: "Insect Drift on the Shore of Lake Michigan," pp. 19-26.
- (4) A. J. SNYDER: "The Argynnids of North America," pp. 27-38.

Another addition to the already unwieldy periodical literature of Entomology. It is, however, but just to say that it apparently possesses distinct scientific value.

DR. NEEDHAM discusses the mortality among insects occasioned by storms and floods. He remarks that at certain times there are "a few insects cast up by the waves [of lakes, &c.] habitually," *viz.* May-beetles (*Lachnosterna*) in early summer; strong-flying butterflies (*Anosia plexippus*, &c.) throughout the summer; and on warm hazy days in September and October, grouse-locusts (Tettigidæ); these he considers have fallen into the water alive, since they are able to crawl upon the beach, although sorely battered and torn. On Lake Michigan beach, however, in August of last year, the light-coloured sandy beach appeared black after a couple of days' storm, being thickly covered with "millions" of black crickets (*Nemobius fasciatus*), either dead or half-drowned, in a continuous line in both directions. There were other insects present, but in vastly inferior numbers, and the "wreckage" was examined carefully for a mile along the shore. "Only insects seemed to have suffered by the storm; no other dead animals were seen on the beach, save the occasional fishes which are always to be found there."

The next day was spent, three miles south, in studying the harvest, a mile of the shore being qualitatively examined.

Orders.	Lesser Groups.	Conditions on approaching shore.	Finally killed. per cent.
Orthoptera.	Gryllidæ—Crickets.	Mostly alive.	50
"	Acrididæ.	"	50
"	Tettigidæ.	All alive.	...
"	Locustidæ.	Few alive.	100
Odonata.		None alive.	100
Lepidoptera.		Mostly alive.*	100
Coleoptera.	Coccinellidæ.	A few dead.	5
"	Scarabæidæ, &c.	Many dead.	75
Diptera.	Asilidæ—robber-flies.	Mostly alive.	40
"	Muscidæ, &c.	All dead.	100
Hymenoptera.	Bumblebees and Wasps.	"	100
Trichoptera.		Mostly alive.	10
Hemiptera.	Stink-bugs.	Mostly dead.	100
"	Water-bugs.	Few dead, but fewer uninjured.	90

* "But with wings ruined for flight; ultimately the victims of predatory foes." "Every few feet along the wind-row, perched on some high point, would be seen a poor butterfly, trying vainly to use its ragged wings."

Finally, Dr. Needham gathered about a litre* of the drift, consisting of "insects intermixed with a considerable quantity of cinder flotsam from the lake steamers, scooping it up with a trowel, and made a quantitative examination It contained the following" :—

- 2520 crickets (*Nemobius fasciatus*).
- 601 red-legged locusts (*Melanoplus femurrubrum*).
- 170 other Orthoptera of five species mostly.
- 75 dragonflies of two species.
- 15 butterflies of four species (*Anosia plexippus*, *Pieris rapæ*, *Polygonia* sp., and *Argynnis* sp.).
- 30 moths in very bad condition.
- 49 Diptera.
- 10 bumble-bees.
- 21 "wasps."
- 31 land-bugs of four species.
- 11 water-bugs *Belostoma* [*Zaitha fusciventris*].
- 16 Trichoptera.
- 220 Coleoptera, not including a large number which were probably foragers.

3769 Total in one pint and three quarters !

In conclusion, Dr. Needham notes two facts: (a) The species present were nearly all in almost inconceivable numbers. "Twenty-five hundred and twenty crickets per meter,† and the drift-line perhaps fifty miles, perhaps a hundred miles long!" Despite the enormous numbers of drowned individuals, the dragonflies were flying the next afternoon in their usual haunts as thickly as ever. (b) "The species were nearly all the dominant ones in their respective groups."

The paper is illustrated by a photograph of the shore, showing the drift-line of insects.

Mr. SNYDER does not synoptically revise the North American Argynnids, but, after some preliminary remarks, notices most of the individual species. Fifty-seven species and fifteen varieties are acknowledged, and apportioned among six groups, of which the following species serve as types, viz. *diana*, Cram.; *monticola*, Behr.; *edwardsii*, Reak; *semiramis*, Edw.; *eurynome*, Edw.; and *myrina*, Cram. The author mentions that he "has on several occasions taken the sexes of different species *in coitu*, and from personal observation satisfied himself that the Argynnids are polygamous in their habits. Somewhat similar species are frequently found in the same locality, and with them examples which are clearly varieties or intergrades. Another fact generally overlooked is, that almost without doubt there are dimorphic males and females of some species of *Argynnis*. There is little question of the fact that there are two forms of the female of *cybele*. *Artonis* and *eurynome* cohabit, also *eurynome* and *clio*." A large series of specimens is evidently necessary for the elucidation of this difficult group, as Mr. Snyder mentions that he has captured between thirteen and fourteen hundred examples of *A. eurynome* and its variety *artonis*!

* About 1½ pint.

† Misprint for "litre."

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SOME ADDITIONAL NOTES ON *ÆSCHNA CYANEA*.

BY REV. ARTHUR EAST, B.A.

Now that the dragonfly season is drawing to a close, the Editor will perhaps allow me to offer a few notes on *Æschna cyanea*, supplementary to those which appeared a short time since (*ante*, p. 211). It is well known that during the final change of this nymph the head and thorax are thrown right back, and that the emerging insect hangs suspended head downwards from the old nymph skin. No observations, however, seem to be recorded as to the manner of the previous changes—those, namely, which take place under water—and it is surprising how seldom one catches the nymph in the act of changing: the pale green object always seems to have *just* finished. However, several have been seen this season, and the process is as follows.

The nymph seems to be much extended, the joints of the abdomen appearing stretched, and especially the head seems to be extended far forward. Soon a split occurs down the middle of the back of the thorax, and the pale green body is extruded *straight forward* by muscular action of the abdomen alone, the legs taking no part in it, nor is the body bent at all in any direction. When the whole nymph has projected itself out of the old skin, with the exception of the last two segments, it rests for a short while (two or three minutes, perhaps), the legs all parallel with one another and with the abdomen, and reaching slightly forwards, but touching nothing. Then the nymph gently takes hold of the support it is on with all six legs, gives a slight wriggle with the abdomen which shakes it free from the cast skin, and is ready in half an hour to begin feeding again. The whole process is very short, and from the first appearance of a split in the nymph skin to the skin's final rejection it only takes a few minutes—seven or eight perhaps.

The following observations (although incomplete) will, I hope,

throw some light on the length of time that *Æ. cyanea* spends as a nymph, and also on the number of times it changes its skin. In January of this year two or three nymphs were taken from a pond in my garden, and these measured 20 mm. each. Together with others from the same pond, they have all (with one exception) changed into perfect insects. In July of this same year nineteen small nymphs, 10–17 mm. long, were found in the pond, this date being of course long anterior to the time when *Æ. cyanea* begins ovipositing. It may of course be thought that these are only some belated specimens, but it will, I think, be agreed that this supposition cannot be maintained when it is stated that during August more than two hundred nymphs, all of about this size, were taken from the same pond. In confirmation of the view that these are last year's laying, I was fortunate enough to find in one aquarium, on July 30th of this year, a solitary nymph 10 mm. long, and upon searching the aquarium three empty skins were found, measuring respectively $6\frac{1}{2}$ mm., 5 mm., and $3\frac{1}{2}$ mm. Now, looking to the fact that the egg of *Anax imperator* (according to Mr. Lucas) is $1\frac{2}{3}$ mm. long, this smallest nymph skin, measuring $3\frac{1}{2}$ mm., must be the first or second skin cast. The nymph is now 20 mm. long, and has cast since first observed seven skins, so that at 20 mm. long we may say that the nymph has cast eight skins *at least*, possibly nine or ten. The observation will, if possible, be completed next year; but I venture to give this information now, as, owing to a fortunate accident, these earlier changes, which are the only difficult ones to observe, have been recorded.

The two hundred nymphs referred to above, or rather those that remain uneaten by the survivors, now measure about 17–22 mm., will, I imagine, grow but little during the winter, and will be ready to come out next June or July, thus giving two seasons as the *normal* time for the growth of the nymph of *Æ. cyanea*. I have, however, one nymph almost full grown, which has been very slow in growing all this year, and which may, not improbably, be unready to change before the season is too far advanced; if so, it will no doubt come out very early next year, giving the impression that it belongs to a different hatching from those which came out last July, which it does not.

A very interesting point remains as to when the nymph $3\frac{1}{2}$ mm. long mentioned above was hatched. Unfortunately, I cannot say precisely when it got into my aquarium; it was certainly not *before* January of this year, and it may have been as late as June; in any case, the earliest stages of all must be extremely slow, *or* the eggs must remain unhatched for several months; possibly the eggs lie dormant from November or earlier, during the whole of the winter, and are hatched in spring.

Observations have been made on forty-six adult nymphs (all of *Æschna cyanea*) this year. All climbed out of the water to

make their final change to the perfect insect between 8.15 p.m. and 8 a.m., the greater number between 8.15 p.m. and 10.30 p.m. Of these, twenty-two were males and twenty-four females, and it was very noticeable how evenly the sexes kept pace with each other: at no time was one sex more than two or three in advance of the other in the order of their emergence. The earliest to emerge was one on June 13th, and the latest on August 17th; but one, as already stated, has still to change, having indeed not yet cast its penultimate skin. *Eschna cyanea* is an admirable nymph to observe, as it is of a very game and sporting nature; the manner in which it will tackle a worm many times its own length is indicative of very great tenacity of purpose. It has but little skulking in its composition; nothing which moves in the water, if not too enormous, comes amiss to it; but perhaps what is most tempting to a by no means fastidious appetite is the blood-red figure-of-8 worm, or the gnat larva of the domestic water-butt. If any brother odonatist wants specimens of *E. cyanea*, it will be a genuine pleasure to me to send them, and I have plenty wherewith to supply several to all who are likely to want them. This nymph is very hardy in the aquarium, and but seldom during the earlier stages of its existence comes to any misfortune, except, be it sorrowfully admitted, a violent end at the hands—or jaws—of its own kindred.

South Leigh Vicarage, Witney, Oxon.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

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

(Continued from p. 217.)

6. *J. Curtis*: 'British Entomology,' 1823–1840. [Neuroptera, three plates, 1836, 1838, and 1839.]

Curtis figures three species, and gives in the accompanying letterpress a full account of each. Following the notice, in each case, is a list of other species belonging to the three genera—*Libellula*, *Cordulia*, and *Agrion*—to which he assigns them; but these being without descriptions they can only be identified, in many cases, by reference to the authors which Curtis quotes in connection with them. The following list gives, in all probability, the names at present used for the insects which Curtis intended to enumerate.

GENUS LIBELLULA.

Sheet 712.

1. *depressa* = *Libellula depressa*.
2. *quadrimaculata* = *L. quadrimaculata*: *præubila* is mentioned as a variety of it.

3. **bimaculata** = *L. fulva*.
4. **conspurcata** = *L. fulva*.
5. **cancellata** = *Orthetrum cancellatum*.
6. **Sparshalli** = *Pantala flavescens*; but the report of the capture is considered to be erroneous (*vide* De Selys' 'Revue des Odonates,' p. 260).
7. **cœrulescens** = *Orthetrum cœrulescens*.
8. **vulgatum** = *Sympetrum striolatum*.
9. **Veronensis** = *S. scoticum*.
10. **flaveolata** = *S. flaveolum*.
11. **angustipennis** = *S. sanguineum*.
12. **Roeselii** = *S. sanguineum*.
13. **Scotica** = *S. scoticum*: *pallidistigma* is mentioned as a variety of it.
14. **rubicunda** = *Leucorrhinia dubia*. The female is well figured on plate 712, though the colouring resembles more that of the male. A full description accompanies the plate.

GENUS CORDULIA.

Sheet 616.

1. **metallica** = *Somatochlora metallica*. This seems to be given as British on the authority of Harris's figure, which there is very little reason for considering *metallica*, and which he himself calls *anea*.
2. **ænea** = *Cordulia anea*.
3. **Curtisii** = *Oxygastra curtisii*. The female is well figured on plate 616, and there is a full description in the accompanying letterpress.

GENUS AGRION.

Sheet 732.

1. **platypoda** = *Platynemesis pennipes*.
2. **Chloridion** = *Erythromma naias*.
3. **fulvipes** = *Pyrrosoma nymphula*.
4. **rufescens** = Probably *Ischnura elegans*, the variety with orange thorax.
5. **minium** = *P. nymphula*.
6. **annulare** = *Agrion puella*.
7. **furcatum** = *A. puella*.
8. **hastulatum** = *Enallagma cyathigerum*.
9. **Puella** = *Agrion puella*.
10. **pulchellum** = *A. pulchellum*.
11. **zonatum** = This is apparently given on the authority of Leach's MSS. What insect it represents I am not able to say.
12. **xanthopterum** = *Ischnura pumilio*.
13. **elegans** = *I. elegans*.
14. **ezonatum** = *I. elegans*.
15. **rubellum** = *I. pumilio*. Plate 732 has a fine figure of the female, var. *aurantiacum*, accompanied by a full description in the letterpress.

ON A SMALL COLLECTION OF LEPIDOPTERA FROM
PEMBA ISLAND.

BY W. L. DISTANT.

PEMBA is a small island situate a little north of Zanzibar, and, by the good offices of Mr. T. P. Newman, Mrs. Theodore Burt, whose husband is engaged in missionary work on that spot, has sent me a small collection of Lepidoptera. The seventeen species of butterflies are all old friends, being well known on the east coast, and many from the Transvaal. *Acraea zetes* is also a west coast species, and *Baoris mathias* is eastern in distribution, being also found in the Oriental and Malayan regions. The few moths call for little comment. *Pitthea trifasciata* was described by Dewitz from Zanzibar; and a species of *Syntomis* appears to be nondescript, and is here described.

RHOPALOCERA.

NYPHALIDÆ.

Acraeinae.

- Acraea zetes*, Linn.
A. natalica, Boisd.
A. acara, Hew.
A. neobule, Doub. & Hew.
A. buxtoni, Butl.
A. encedon, Linn.

Nymphalinae.

- Junonia cebrene*, Trim.
J. clelia, Cram.
Precis elgiva, Hew.
P. natalica, Feld.
Hypolimnna misippus, Linn.

PAPILIONIDÆ.

Pierinae.

- Terias zoë*, Hopff.

Catopsilia florella, Fabr.

Belenois mesentina, Cram.

Papilioninae.

Papilio demoleus, Linn.

HESPERIIDÆ.

- Gegenes hottentota*, Latr.
Baoris mathias, Fabr.

HETEROCERA.

SYNTOMIDÆ.

- Syntomis burtti*, sp. n.
Euchromia lethe, Fabr.

ARCTIADÆ.

Argina astrea, Dru.

GEOMETRIDÆ.

Pitthea trifasciata, Dewitz.

Syntomis burtti, sp. n.

Head and pronotum fuscous, anterior and lateral margins of pronotum broadly ochraceous; abdomen above ochraceous; body beneath ochraceous; antennæ, eyes, legs, and apex of abdomen fuscous. Wings fuscous; anterior wings with two subquadrate ochraceous spots near base, the first in cell, the second immediately beneath it; two large pale subhyaline spots on apical area each divided by a nervure, the upper spot longest and narrowest; posterior wings with a central ochraceous spot joined to abdominal margin, which is also ochraceous for about half its length from base. Exp. wings: ♂, 22 mm.; ♀, 24 mm.

Hab. Pemba Island (Mrs. Theodore Burt).

ON THE NOMENCLATURE OF THE GENERA OF THE RHYNCHOTA, HETEROPTERA AND AUCHENORRHYNCHOUS HOMOPTERA.

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

(Continued from p. 28.)

I have made free use of my friend Mr. C. Davies Sherborn's colossal 'Index Specierum,' &c., now in manuscript at the British Museum (Natural History) to check my results in some instances, and I am indebted to him for many valuable hints. My thanks are due also to the librarians of the Zoological and Entomological Societies, of whose kindnesses I have liberally availed myself.

In the immediately ensuing part, I have indicated from 1—4 sections under each work:—

(α) genera with valid types; (β) genera without types; (γ) fixation of genotypes; (δ) notes on emendations of names, invalid type-fixations, &c.¹ I have much abbreviated the titles, which can be easily identified from the usual sources; "t." signifies "type." "*" placed before an author's name signifies that I have not been able to examine that work.

1758—1843.

1758. LINNÆUS, Syst. Nat. x. 434—9. (β) *Cicada*; *Notonecta*; *Nepa*; *Cimex*.

1762. GEOFFROY, Hist. abrég. Ins. i. 401—82. (α) *Naucoris*, t. *cimicoides*, nec L. [= *maculata*, Fabr.]; *Corixa* t. *striata*, nec L. [= *geoffroyi*, Leach]. (β) *Tetigonia*.² (γ) *Cicada*, 1758, restricted. (δ) *Hepa* for *Nepa*, 1758.

1764. LINNÆUS, Mus. Lud. Ulric., 153. [(β) *Laternaria*.]³

1767. LINNÆUS, Syst. Nat. ed. xii. 1, 703—33^v. (β) *Fulgora*.

1775. FABRICIUS, Syst. Ent. 673—732. (α) *Sigara*, t. *striata*, nec L. [= *geoffroyi*, Leach].⁴ (β) *Membracis*; *Cercopis*; *Acanthia*; *Reduvius*.

1786. SCOPOLI, Delic. Faun. Insubr. i. 60—1. (α) *Ploiaria* t. *domestica*.

1787. SWEDERUS, Vet. Ac. Nya Handl. viii. 183—5. (α) *Macrocephalus* t. *cimicoides*.

1789. OLIVIER, Enc. Méth. iv. 24—5. (β) *Pentatoma*.

¹ When once a type has been fixed validly, I have ignored any subsequent invalid type-fixations.

² Not *Tetigonia*, as usually written; the latter is an orthopterous genus.

³ N.B. *Cicada laternaria*, Linn., 1758 = *Laternaria phosphorea*, Linn., 1764 = *Fulgora laternaria*, Linn., 1767; *Fulgora phosphorea*, Linn. 1767, is not a Fulgorid. The genus *Laternaria* is invalid, no description having been given.

⁴ Homotypical with *Corixa*, 1762.

1790. FABRICIUS, Skrift. Nat. Selsk. i. (1), 213-28. (β)

Ranatra.

1794. FABRICIUS, Ent. Syst. iv. 1-208. (α) *Coreus* t. *scapha*; *Lygæus* t. *valgus*; *Miris* t. *dolabratus*⁵; *Gerris* t. *lacustris*. (γ) *Notonecta*, 1758, t. *glauca*, L. [indirectly].

1796. SCHRANK, Samml. Naturh. Phys. Aufs. i. p. 121. (α) *Coriscus*, LATREILLE,⁶ Précis caract. gén. pp. iii, xii, 83-92 and 202. (β) *Asiraca*; *Hydrometra*; *Poekilloptera*. (γ) *Acanthia*, 1775, restricted.

1798. FABRICIUS, Suppl. Ent. Syst. 511-46. (β) *Flata*;

○ *Delphax*. (δ) *Notonectia* for *Notonecta*.

1800. SCHELLENBERG, Cimic. Helv. 1-25. (α) *Aquarius* t. *paludum*, nec L.⁷ (δ) *Sigera* for *Sigara*.

1801. LAMARCK, Syst. anim. s. Vertèbr. 289. (α) *Scutellera* t. *nobilis*, Sulz., nec L. [= *perplexa*, Hope]. (γ) *Fulgora*, 1767, t. *laternaria*; *Cicada*, 1758, t. *orni*, Fabr. nec L. [= *plebeja*, Scop.]; *Pentatoma*, 1789, t. *rufipes*; *Reduvius*, 1775, t. *personatus*; *Hydrometra*, 1796, t. *stagnorum*; *Nepa*, 1758, t. *cinerea*. ♂ (δ) *Tetigonia* restricted to *cornuta* and *spumaria*, 1758, but these were previously removed to *Membracis*, 1775, and *Cercopis*, 1775, respectively. SCHRANK, Faun. Boica, ii. 1, 44-101. (β) *Thyreocoris*. (γ) *Coriscus*, 1796 t. *dauci* [= *calcaratus*, Linn.].

1802. LATREILLE, H. N. Crust. Ins. iii. 240-63. (α) *Phymata* t. *crassipes*; *Galgulus*⁸ t. *oculata*. (β) *Neides*; *Nabis*; (γ) *Ranatra*, 1790, t. *linearis*? *Cercopis*, 1775, t. *spumaria*.⁹ *SCHWARZ, Vet. ak. Nya Handl. xiii. 180-1. (α) *Copicerus* t. *irroratus*.

1803. FABRICIUS, Syst. Rhyng. 1-292. (α) *Ledra* t. *aurita*; *Darnis* t. *lateralis*; *Lystra* t. *lanata*; *Derbe* t. *hæmorrhoidalis*; *Iassus* t. *neruosus*; *Issus* t. *coleopratus*; *Salda* t. *zosteræ*; *Aradus* t. *betulæ*; *Syrtsis* t. *erosa*; ¹⁰ *Tingis* t. *cardui*; *Canopus* t. *obtectus*; *Tetyra* t. *arcuata*; *Eidessa* t. *ceruus*; *Halys* t. *dentata*; *Cydnius* t. *tristis*; *Aelia* t. *acuminata*; *Capsus* t. *ater*; *Alydus* t. *calcaratus*;¹¹ *Emesa* t. *preparatorius*; *Berytus* t. *tipularius*; *Zelus* t. *longipes*. (β) *Centrotus*; (γ) *Flata*, 1798, t. *ocellata*; *Cimex*, 1758, t. *bidens*. (δ) *Tetigonia* (sic) t. *tibicen* does not accord with the diagnosis of the genus, 1762, and in *Membracis* 1775, t. *atrata*, F., the latter is not one of the original species.

1804. LATREILLE, Nouv. Dict. Hist. Nat. xxiv. Tabl. method.

⁵ Not "*doiobratus*," as saith Fabr.

⁶ For date of this work, see Latreille, Hist. Nat. Crust. Ins. iii. (1804), p. vi.

⁷ = *canalium*, Duf.

⁸ Preoccupied, Aves, 1760.

⁹ Stål (Vet. Akad. Handl. viii. 1, p. 11) states *C. carnifex*, Fabr., 1775, as the type. I am unable to discover any indication in the Syst. Ent. that this is so, and consequently have here fixed *spumaria* as the type (see Latreille); *Philænus*, Stål, thus is homotypical with *Cercopis*, Fabr. Latr.

¹⁰ Co-extensive with *Phymata*, 1802.

¹¹ = *dauci*, Schrank; homotypical with *Coriscus*, 1796.

163-8. (α) *Tetigometra* t. *virescens*;¹² *Cixius* t. *nervosa*. (β) *Velia*. (γ) *Acanthia*, 1775, t. *saltatorius*;¹³ *Neides*, 1802, t. t[r] *ipularius*;¹⁴ *Nabis*, 1802, t. *guttula*; *Membracis*, 1775, t. *foliata*; *Centrotus*, 1803, t. *cornutus*; *Poecilloptera*, 1796, t. *phalænoides*. LATREILLE, H. N. Crust. Ins. xii. 176-337. (δ) *Tyreocoris*, 1801; *Poecilloptera*, 1796.

(?) 1805-21. PALISOT, Ins. rec. Afr. Amér. 13-4, 204-5. (β) *Petalochirus*; *Acanthocerus*. (δ) *Coregus* for *Coreus*.

1806. DUMERIL, Zool. Anal. 260. (β) *Promecopsis*;¹⁵ (δ) *Ploiara* for *Ploiaria*.

1807. LATREILLE, Gen. Crust. Ins. iii. 112-68. (α) *Ochterus* t. *marginatus*; *Belostoma* t. *testaceopallidum*. (β) *Myodocha*.

1809. LATREILLE, Gen. Crust. Ins. iv. 34 and 384. (δ) *Ochterus*, 1807, altered to *Pelogonus* because the former is supposed to be preoccupied by *Ochthera*.

1810. LATREILLE, Consid. gén. anim. 250-64 and 433-4. (α) *Leptopus* t. *littoralis*; *Actalion* t. *reticulata*; (γ) *Velia*, 1804, t. *rivulorum*; *Asiraca*, 1796, t. *clavicornis*. (δ) *Myodocha*, 1807, t. *serripes*, invalid, not one of original species; *Delphax*, 1798, t. *striata*, not valid, not an original species.

1811. OLIVIER, Enc. Méth. viii. 105 et seqq. (δ) *Myodochus*, 1807; *Ochtherus*, 1807.

✓ 1811. LATREILLE, Humboldt's Voy. Ins. 147 et seqq. (δ) *Dedra* for *Ledra*, 1803.

1814. LEACH, Zool. Misc. i. 91. (α) *Mictis* t. *crucifera*.¹⁶ FALLEN, Spec. nov. hem. 1-26. (α) *Pyrrhocoris* t. *apterus*; *Corizus* t. *hyoscyami*. (β) *Anthocoris*, *Geocoris*, *Phytocoris*, *Ulopa*.

1815. LEACH, Brewster's Edinb. Encycl. ix. 120-5. (γ) *Petaloch* [e] *irus*, 1805, t. *variegatus*; *Myodocha*, 1807, t. *tipuloides*. (δ) [*Thyreocoris*, 1808, t. *globus*, not an original species]; *Myctis*, 1814; *Cetalion*, 1810.

1817. GERMAR, Reise nach Dalm. 280-90. (α) *Pygolampis* t. *denticulata*.¹⁷ LATREILLE in Cuvier's Règne Anim. iii. 384 et seqq. (δ) *Derba*, 1803; *Tetigometra*, 1803; HOFMANNSEGG, Wiedemann's Zool. Mag. i. pt. 1, 8-56. (β) *Hemityphlus*.^{18 19}

1818. GERMAR, Mag. Ent. iii. 177-227. (β) *Ricania*; LEACH, Trans. Linn. Soc. xii. 10-8. (α) *Plea* t. *minutissima*²⁰; HOFMANNSEGG, Wiedem. Zool. Mag. i. pt. 2, 92. (δ) *Aetalia*, 1810; KIRBY, Trans. Linn. Soc. xii. 474-5. (α) *Achilus* t. *flammeus*.

¹² = *zosteræ*, thus homotypical with *Salda*, 1803.

¹³ Thus homotypical with *Berytus*, 1803.

¹⁴ = *acephala*, Fourcr.

¹⁵ = ? *Lystra*, Fabr.; no species mentioned.

¹⁶ = *profana*, Fabr.

¹⁷ = *bidentata*, Goeze.

¹⁸ = *Pyrrhocoris*, 1814.

¹⁹ = Herrich-Schäffer states (Wanz. Ins. ix. Hist. übers. 27) that the genus *Notocyrtus* is to be found in this paper, but I have searched in vain. The learned rhynchotist of Regensburg had apparently, however, not actually seen it himself.

²⁰ = *leachi*, McGreg. and Kirk.

1819-21.²¹ KIRBY, Trans. Linn. Soc. xiii. 12-23. (a) *Anotia* t.

bonnetii. (β) *Otiocerus*.

1821. GERMAR, Mag. Ent. iv. 1-106. (a) *Cobax*²⁵ t. *winthemi*;²⁶

Penthimia t. *atra*; ²⁸*Gypona* t. *glauca*; *Eupelix* t. *cuspidata*. (β)

Aphrophora, *Cœlidia*. (γ) *Tet(t)igonia*, 1762, t. *viridis*.

1822. *THUNBERG, Hem. rostr. Cap. pp. ? (a) *Copius*²² t. *cornutus*; *Pendulinus* t. *hasticornis*. ESCHSCHOLTZ, Dorpat Naturw. Abh. i. 57-186. (β) *Halobates*.

1823. DUMERIL, Cons. gén. 215-20. (a) *Podicerus*²³ t. *tipulaire*.

1824. CURTIS [May 1st] Brit. Ent. 20. (β) *Acanthosoma*; [July 1st] 28. (γ) *Acanthosoma*, 1824, t. *hemorrhoidalis*; DESCOURTILZ, Ann. Soc. Linn. Paris, iii. 293-7. (δ) *Agenia* t. *lamii*.²⁷

1825. LEPELETIER & SERVILLE, Enc. Méth. x. 1-324. (a)

Holhymenia t. *latreillei*; ²⁹*Phlea* t. *cassidioides*; ²⁴*Holoptilus* t.

ursus; *Ectrichodia* t. *cruciata*.³⁰ (β) *Tessaratome*, *Pachylis*, *Pachy-*

merus *Astemma*. (δ) *Petalochere*, 1805; LATREILLE, Fam. Nat.

416-28. (a) *Heterotome* t. *spissicornis*; ³²*Tibicen* t. *plebeia*. (β)

Gonocere, *Syromaste*, *Anisoscele*, *Nematope*, *Stenoccephale*, *Lepto-*

corise.³³ (γ) *Tessaratome*, 1825, t. *papillosa*. (δ) *Scutellere*, *Aelie*,

Edesse, *Pentatome*, *Coree*, *Holhymenie*, *Pachlyde*, *Heteroscele*,

Alyde, *Neide*, *Lygee*, *Pachymere*, *Salde*, *Myodoque*, *Capse*, *Macro-*

cephale, *Phymate*, *Arade*, *Punaise*, *Holoptile*, *Redure*, *Petalochaire*,

Ploiere, *Leptope*, *Acanthie*, *Pelogonc*, *Hydrometre*, *Velie*, *Galgule*,

Naugore, *Belostome*, *Nepe*, *Ranatre*, *Notonecte*, *Corise*, *Fulgore*,

Flate, *Ricanie*, *Pœcilloptere*, *Listre*, *Tettigometre*, *Asiraque*, *Otioc-*

cere, *Centrote*, *Ledre*, *Cercope*, *Penthimie*, *Aphrophore*, *Tettigone*,

Gypone, *Cœlidie*, *Ulope* (1758-1825); LEPELETIER & SERVILLE,

Enc. Méth. x. 325-833. (a) *Eurymela*³⁴ t. *fejeestrata*; *Globiceps*

t. *capito*.³⁵ *Scaris* t. *ferruginea*; *Evacanthus* t. *interruptus*; *Dy-*

sodius t. *lunulatus*.³⁶ (β) *Ptyelus*, *Proconia*, *Monanthia*, *Piesma*.

(γ) *Aphrophora*, 1821, t. *spumaria*, Germ.³⁷ (δ) *Heterotoma*,

1825, *Pœcilloptera*, 1796; CURTIS, Brit. Ent. [Sept. 1st] 86.

(a) *Aneuris* t. *lævis*.

1826. *HAHN, Icon. Mon. Cimic.³⁸

²¹ =Erichson and Germar quote "1823."

²² =Some authors quote *Copium*, some *Copius*. I have not seen the book.

²³ =Cotyp. with *Neides*, 1802. ²⁴ =*corticata*, Drury.

²⁵ =*Otiocerus*, 1819-21. ²⁶ =*stollii*, Kirby.

²⁷ Genus and species remain unknown.

²⁸ =*nigra*, Goeze. ²⁹ =*clavigera*, Herbst.

³⁰ =*Crux*, Thunb. ³¹ Preocc. Thunb. 1805.

³² =*merioptera*, Scop. ³³ =*Myodocha*, 1807.

³⁴ Ascribed to Hofmannsegg, probably manuscript.

³⁵ =*sphægiformis*, Rossi. ³⁶ =*lunatus*, Fabr.

³⁷ =*alni*, Fall. ³⁸ Apparently no validly defined genera.

(To be continued.)

NOTES AND OBSERVATIONS.

“SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND TEMPERATURE MADE WITH LEPIDOPTERA UP TO THE END OF 1898,” BY PROF. DR. MAX STANDFUSS.—We regret that Mr. Dadd has been unable to continue the translation of this important paper, but we are pleased to add that Mr. Kirkaldy has been good enough to take up the work from the point where it was left by Mr. Dadd. An instalment, with plate, will be given in the November issue of the ‘Entomologist,’ and the remainder, with two plates, in the December number.

TRIECPHORA SANGUINOLENTA, &c.—Dr. Walker has fallen into some little confusion in his “Notes on *Triecephora sanguinolenta*, Marsh., Edw.” (Entom. pp. 236-7). The three species mentioned—viz. *mac-tata*, *sanguinolenta*, and *vulnerata*—are quite distinct, readily separable by structural characters, and, as there are six other palæarctic species, the records from Asia Minor, Spain, &c. do not necessarily refer to *vulnerata*. It may be noted that the correct name of our species is *Tomaspis vulnerata* (Germ.)* = *sanguinolenta* (Geoffr., nec Linné), the genera *Triecephora* and *Monecephora* being synonymous with the earlier *Tomaspis*.—G. W. KIRKALDY.

GYNANDROMORPHOUS ARGYNNIS PAPHIA.—Perhaps a variety of *Argynnis paphia*, which I have recently acquired, may be worth noticing in the ‘Entomologist.’ Right wings are those of a female, and of the *valesina* form of that sex; left wings ordinary type of male, with the exception of a black splash resembling *valesina* colouring on the fore wing. The specimen was taken on July 28th last near Lyndhurst.—W. F. URWICK; 34, Great Tower Street, London, E.C., Aug. 27th, 1900.

[This most interesting specimen appears to be very similar to an example captured in the New Forest in 1881, and figured in the ‘Entomologist’ for 1882 (Pl. I. fig. 5). The latter, however, is not marked with *valesina* colouring on the male side.—ED.]

MALE BUPALUS PINIARIA PARTLY OF FEMALE COLORATION.—On June 13th last I took a male specimen of *B. piniaria*, the left pair of wings of which are of the male colour, whilst the right pair of wings are of the colour peculiar to the female of this species.—D. CHITTENDEN; 98, Court Hill Road, Lewisham, S.E.

[We have seen this very interesting aberration, but under circumstances which did not admit of close examination. Except that the right fore and hind wings are of female coloration and their markings somewhat blurred, the specimen appears to be a male.—ED.]

ORTHOPTERA AT SUGAR. — On four previous occasions (Entom. xxx. pp. 28, 76; xxxi. p. 267; xxxii. p. 290) I have called attention to certain Orthoptera visiting sugar. During a recent stay in the New Forest, on two or three occasions the sugar was visited by females of our largest native cockroach, *Ectobia lapponica*: while one evening a fairly large green grasshopper, without doubt *Leptophyes punctatissima*, which appears to have been commoner than usual in the Forest this season, made good use of its long legs, and escaped in the process of boxing.—W. J. LUCAS; Sept. 8th, 1900.

* The reference to Illiger is only manuscript.

SATYRUS SEMELE. — At the base of a chalk cliff near Lulworth, in Dorset, on Aug. 18th, I came across a large number of *S. semele* on a patch of sea-lavender. They filled the air on my approach. One does not usually associate the grayling butterfly with a habit of this kind.—W. J. LUCAS; Sept. 8th, 1900.

CAPTURES AND FIELD REPORTS.

PAPILIO MACHAON AT RINGWOOD.—This morning, at about nine o'clock, I captured the finest and most beautiful specimen of *Papilio machaon* that I have ever seen. I was out in a clover-field on the look-out for *C. hyale*, *C. edusa*, and var. *helice*; also *Vanessa cardui*. My daughter Marjorie, who accompanied me, drew my attention to the insect, and I really thought at a little distance that it was a pale var. of *cardui*. It was lazily flying low amongst the clover-flowers, and when it alighted upon one I fortunately netted it. The specimen, which is a female, is in perfect and fresh condition, very pale yellow, the central band of yellow is scarcely divided with black lines, and there is not a trace of any red scales, except the usual two spots upon the hind wings; the body has the black dorsal streak, but the sides are nearly pure white. I have compared it with my Wicken Fen series, and if it were put amongst them it could be detected at a glance; it has a much greater yellow area.—J. HY. FOWLER; Aug. 31, 1900.

PAPILIO MACHAON IN SUSSEX.—I caught a specimen of *P. machon* at Hooe, near Pevensey, on Aug. 18th last. It was flying slowly from flower to flower in a field of red clover. The tail on the left hind wing was wanting, and also a piece of the right fore wing; but otherwise the insect seemed to be very fresh.—LEWIS L. TURNER; 131, Melbourne Grove, East Dulwich, S.E.

PAPILIO MACHAON IN KENT.—On Aug. 15th I captured, in a railway cutting near Hythe, a fine female specimen of *P. machaon*.—C. W. HUTCHINSON; 43, Fordwych Road, West Hampstead, N.W.

VANESSA ANTIOPA IN BERKS, KENT, AND SUSSEX.—For the following records of *V. antiopa* in England this year, published in the 'Times,' we are indebted to Miss Urquhart, of Maida Vale:—

It may be of interest to entomologists to hear that two specimens of that rare insect, *Vanessa antiopa*, have been captured in this neighbourhood during this week. One had been attracted to a bottle put out near some peach trees to attract wasps, containing beer and rum; the other was caught in a garden about two miles distant on a dahlia flower. This latter is a most perfect specimen. I should be interested to hear if any other specimens have been taken in this country during the summer.—PHILIP A. HOUGHTON; Lindfield, Sussex, Sept. 7th.

On Aug. 18th, at Herne, Kent, my son captured a very fine specimen, measuring $3\frac{1}{4}$ in. across the wings.—FREDERICK SINGLE; Fernside, Wimbledon Common.

My son caught a very perfect specimen of the "Camberwell Beauty" on a plum tree in the garden here on Sept. 5th, and saw another close by the garden on the same afternoon.—(Sir) W. CAMERON GULL; Yattendon, Berks, Sept. 11th.

On Aug. 26th last a fine specimen of *V. antiopa* was caught close by here on the borders of Sussex and Surrey at Newlands, while attempting to enter a glass trap baited for wasps, as in one of Mr. Houghton's instances.—(Major) R. H. BROWN; Crawley-down, Sussex.

VANESSA ANTIOPA IN BERKSHIRE.—On Aug. 30th I saw a fine specimen of *V. antiopa* in Berkshire, not far from Streatley.—(Rev.) ARCHIBALD DAY; The Vicarage, Malvern Link.

VANESSA ANTIOPA IN ESSEX.—On Aug. 31st my friend Robert Wedlake caught in our garden, and gave to me, a splendid specimen of *V. antiopa*.—HAROLD P. THOMPSON; Hornchurch, Essex.

VANESSA ANTIOPA IN HAMPSHIRE.—On Sept. 12th I took a worn specimen of *V. antiopa* in the New Forest; it was flying round a tree which had been sugared the night before.—A. MOLINEUX SMALLPEICE; Field Lodge, Burley, Ringwood, Hants, Sept. 14th.

VANESSA ANTIOPA IN KENT.—A specimen of *V. antiopa* was captured this morning in the garden of Vesey Holt, Esq., Mount Mascall, Bexley. It was sitting on the decayed stump of a tree, and was taken in a landing-net. It is rather small, but, despite the mode of capture, is in splendid condition.—T. B. ANDREWS; 276, Broadway, Bexley Heath, Sept. 11th.

VANESSA ANTIOPA IN SUFFOLK.—I captured a specimen of *V. antiopa* on Aug. 30th in the neighbourhood of Lowestoft.—E. J. SINGLETON SMITH; St. Margaret's College, Lowestoft, Sept. 1st, 1900.

VANESSA IO AT TOOTING.—On Aug. 31st I was agreeably surprised to see a specimen of *V. io* disporting itself in the garden here. It is the first example of the species I have ever seen in or near to London. It seemed to prefer the late blooms of a patch of red valerian to old sugar, which attracts *V. atalanta* so frequently.—E. SPARKE; 1, Christchurch Villas, Tooting Bec Road, Tooting, S.W.

PYRAMEIS ATALANTA SWARMING ON A COSSUS-INFESTED BIRCH TREE.—This morning, whilst strolling through a small clump of birches on Wimbledon Common, I was surprised at suddenly disturbing about twenty or thirty specimens of *Pyrameis atalanta*. As the only Lepidoptera observed during the whole morning were a few *Pieris rapæ*, one or two *Ceanonympha pamphilus*, and one *Chrysophanus phleas*, my curiosity was at once aroused, and I soon found that one particular birch-trunk was the centre of attraction for quite a swarm of wasps as well as the aforesaid butterflies. Closer investigation revealed the reason for this phenomenon, for while I was watching a nearly full-fed larva of *Cossus ligniperda* crawled out of the trunk, and made off at a rapid rate, apparently disgusted with the crowd of uninvited visitors. There were at least thirty specimens of *P. atalanta* in the immediate neighbourhood of the tree, and those which could not get on the trunk settled on the ground, or on the lower twigs of birch near by, and allowed me to take them with my fingers, though the sun was shining brilliantly. I have heard of this particular attraction for some butterflies, but it was my first actual experience of it. I may say that no other butterflies were present with *P. atalanta*.—E. B. BISHOP; 60, Griffiths Road, Wimbledon, S.W., Sept. 21st, 1900.

LYCÆNA BÆTICA BRED IN GUERNSEY.—I have succeeded in discovering larvæ of *Lycæna bætica* this summer, and I am now breeding some fine

specimens of this butterfly. — GEORGE BAKER; 11, Saumarez Street, Guernsey, Sept. 5th, 1900.

THECLA W-ALBUM IN THE MAIDSTONE DISTRICT. — On July 25th I was pleasantly surprised to capture a specimen of *T. w-album* in the garden. Unfortunately it was very worn, and minus a portion of the hind wing. — J. L. SAXBY; Larkfield, Maidstone.

LYCENA ARGIOIOLUS IN NORTH LONDON. — On Aug. 11th I took a male *Lycæna (Polyommatus) argiolus* in Haringay Park (about four miles from St. Paul's Cathedral). I also saw a specimen near the same spot the last week in July. — H. A. KING; 25, Haringay Park, Crouch End, N., Sept. 18th, 1900.

ACHERONTIA ATROPOS.

GLOUCESTERSHIRE. — Larvæ of this species have been extraordinarily plentiful this summer. Several have been brought to me from potato-fields, and I know of at least twenty others in the possession of gentlemen in the neighbourhood. — (Rev.) A. NASH; Standish Vicarage, Stonehouse, Gloucestershire, Sept. 19th, 1900.

HAMPSHIRE. — I took seven larvæ of *A. atropos* during one afternoon, and found several others, which I did not pick up. So many have been brought to me of late that I have had to refuse them. — J. HY. FOWLER; Ringwood, Sept. 3rd, 1900.

HEREFORDSHIRE. — The larvæ of *A. atropos* have been plentiful this year in the county. I have seen several specimens, and an example of the perfect insect was brought to me on the 18th inst.; it had just been captured in the Market Hall, situated in the centre of the city. — J. B. PILLEY; Hereford, Sept. 20th, 1900.

KENT. — While staying in Scotland last month, I received by post, from my aunt, Lady Naesmyth, a fine larva of *A. atropos*, which she had found in her garden at Tunbridge Wells. The insect was none the worse for its long journey, and has since pupated successfully. — H. W. SHEPHEARD-WALWYN; Glensyde, Bidborough, Tunbridge Wells, Sept. 2nd, 1900.

NORFOLK. — I beg to report the occurrence here of five full-fed larvæ of *A. atropos*. On Aug. 29th one was given me at noon, and another at night of same date. Both of these buried themselves at once. I have heard of other larvæ of same species this season; but these have not come under my own personal observation like the five mentioned above. — J. W. WOOLHOUSE; Summer Hill, Fakenham, Norfolk, Sept. 3rd, 1900.

A fine larva of *A. atropos* was brought to me during the first week in August, which has now safely pupated. According to reports sent to the local papers, larvæ of this species have been very abundant in Norfolk this year. — W. T. HARRIS; 17, Micheldever Road, Lee.

I have had two pupæ of *A. atropos* given me; the larvæ were found in the neighbourhood of Mundesley, Norfolk. — S. W. KEMP; 80, Oxford Gardens, Notting Hill, W., Sept. 17th.

On July 24th eleven fine larvæ of *A. atropos* were found feeding on potato in a garden at Norwich. One of these died shortly after; the remaining ten were full-fed, and had all gone to earth by Aug. 3rd. — R. LADDIMAN; 25, Drayton Road, Norwich, Aug. 24th, 1900.

OXFORDSHIRE. — I have received three larvæ and two pupæ of this moth

this August from Eynsham and Headington, Oxon — HAROLD THOMPSON ; 31, Beaumont Street, Oxford, Aug. 31st, 1900.

SUFFOLK.—While staying at Middleton, near Yoxford, in Suffolk, I had, on Aug. 4th, a full-fed larva brought to me, and, on investigating a patch of potatoes, I found two more; and my nephew writes that he added another from the same garden, making four in all.—HENRY A. KING ; 25, Haringay Park, Crouch End, N., Aug. 23rd, 1900.

SURREY.—Two specimens of *A. atropos* were taken in a garden here the other day.—HERBERT BEADNELL ; Fernside, Redhill, Surrey, Aug. 7th.

On Aug. 31st I had a fine full-fed larva of *A. atropos* brought to me from Church Lane, Lower Tooting, S.W. It burrowed in the earth of the breeding-box immediately. It was of a decided yellow colour. I have had the pupæ before from that neighbourhood.—E. SPARKE ; 1, Christchurch Villas, Tooting Bec Road, Tooting, S.W.

SUSSEX.—Several larvæ of *A. atropos* have been obtained in potato-fields at Hooe.—LEWIS L. TURNER ; East Dulwich, Sept. 20th, 1900.

WORCESTERSHIRE.—We have thirteen pupæ of *A. atropos*, and know of others ; the larvæ were all taken within a quarter of a mile of this vicarage.—(Rev.) ARCHIBALD DAY ; Malvern Link, Sept. 17th, 1900.

WESTMORELAND.—On Aug. 30th, hearing that a full-grown larva of *A. atropos* had been found crawling across a path in a small garden at Natland, two miles south of Kendal, I at once prosecuted a search through the potato-tops of the first field in that direction. I was rewarded by finding two larvæ almost full-fed. The next day I secured another in the same field, which went down at once. On Sept. 1st, at Low Foulshaw, lying south-west of Kendal, in the neighbourhood of the Witherslack mosses, I found two more, and the frass of a third. The ground colour of one of these larvæ was of a vivid yellow, and stood out in strong contrast to the dead brown potato-top to which it was clinging. They entered the soil to undergo pupation on Sept. 1st, 4th, 5th, and 6th respectively. As two other larvæ have been taken accidentally, there is ground for believing that the species has been more than usually abundant in the district this year. Imagines have from time to time turned up, but, though often searched for, I have never till this year taken the larva.—(Rev.) A. M. MOSS ; Kendal. P.S.—Since writing the above another larva, about to pupate, has been found in a small garden on Sept. 8th, and presented to me, bringing our total of captures up to eight.

DEILEPHILA GALII IN GLOUCESTERSHIRE.—I am very pleased to record the capture of *D. galii*. Towards the end of August my son, going round the vicarage garden at dusk, on the look-out for *S. convolvuli*, saw a large insect hovering over some phlox flowers, and promptly secured it. It turned out to be a very fine specimen of *D. galii*, an insect I had never seen alive before.—(Rev.) A. NASH ; Standish Vicarage, Stonehouse, Gloucestershire.

CHÆROCAMPA ELPENOR ON WILD BALSAM.—I wish to confirm my previous note of 1898 (Entom. xxxi. 243), in which I recorded *Impatiens noli-me-tangere* as a pabulum for *C. elpenor*. I have again, on Sept. 15th, taken a full-grown larva on the identical patch of balsam. Several others have this year, but earlier, been found feeding on the common *Epilobium*.—(Rev.) A. M. MOSS.

NOCTUA CASTANEA IN THE NEW FOREST.—It may be worth recording

that while sugaring in the New Forest, on Aug. 15th last, I took a specimen of the red form of *Noctua castanea*, of the same tint as those from the north. I am told that this form has not been previously taken in the forest. Perhaps this note may bring others to light.—(Rev.) W. CLAXTON; Navestock Vicarage, Romford.

[*N. castanea*, in its typical form, is red; the grey form is var. *neglecta*. We believe that the type is not altogether unknown in the New Forest, but it would be interesting to have more information on this point.—ED.]

APLECTA OCCULTA IN NORFOLK.—On Aug. 28th I had the good fortune to take a fine specimen of *Aplecta occulta* on sugar at Paston, near Mundesley, Norfolk. The specimen is of the light form, and the markings are extremely well defined. — S. W. KEMP; 80, Oxford Gardens, Notting Hill, W.

CATOCALA NUPTA ON TARRED POSTS.—While walking along the road through Bagley Wood, near Oxford, at the end of August last, I saw on two occasions a considerable number of specimens of *Catocala nupta* at rest on tarred telegraph-posts. Most were high up the posts, and all, I believe, on the southern aspect of them. The posts had not lately been tarred, and though black in some parts were in others, especially on the southerly side, brownish, and often with a marbled appearance, due to the grain of the wood showing. On the lighter parts of their resting-places the insects were not specially conspicuous, though generally quite easily seen. On one post there were six specimens, and on two others five each. In some cases, two or more individuals were quite close to each other.—W. J. LUCAS; Sept. 12th, 1900.

CATOCALA NUPTA.—The unwonted abundance of this species during the last two seasons in this neighbourhood has been very remarkable. In August, 1899, it was so common, that at sugar one out of every two or three trees displayed a specimen. But this year it has been still more plentiful; and the telegraph-poles along the high roads have been adorned with it, many possessing one, two, or even three specimens of this fine insect high up at rest—easy to see, but not so easy to take, as at the first approach of net or bottle away flew skittish *nupta*.—(Rev.) A. NASH; Standish Vicarage, Stonehouse, Gloucestershire.

ACRONYCTA ALNI IN HEREFORDSHIRE.—In the early part of August I received a larva of *A. alni*, which had been found on alder near here.—J. B. PILLEY; Hereford.

EPUNDA NIGRA IN KENT.—On Saturday evening, Sept. 15th last, I was sugaring in Barnet Wood, Bromley Common, Kent, with my friend Stanley Haines, of Bromley, when I had the luck to take *Epunda nigra* from the trunk of a pine which I had sugared. This is very uncommon, is it not, for this district, the insect being considered very local?—A. J. LAWRENCE; 8, Cross Roads, Bromley Common, Kent, Sept. 19th, 1900.

[We do not remember any recent record of the occurrence of *E. nigra* in Kent, but we believe that the species has been taken in the neighbourhood of Farnborough.—ED.]

PLUSIA MONETA AT NORWOOD. — I took a magnificent specimen of *P. moneta* in my house on July 10th. — H. WELLS; Hurstfield, The Avenue, Gipsy Hill, London, S.E.

CARADRINA AMBIGUA IN HAMPSHIRE. — This species has been so abundant in my garden lately that I made a selection of over fifty specimens in one evening. The moths came to the flowers of clematis, and were then boxed, but they were flying around me in scores. Since that particular evening the species has not been nearly so abundant, and I am at a loss to understand why it should have appeared in such numbers one night, and the next and following evenings suddenly become comparatively scarce. I may add that *C. ambigua* has occurred in my garden for the past four or five seasons. — J. HY. FOWLER; Poulner, Ringwood, Sept. 3rd, 1900.

COREMIA QUADRIFASCIARIA IN SUFFOLK. — I have taken this species, but not frequently, by beating the undergrowth of hedges in Westerfield and Barham lanes, near Ipswich. — E. SPARKE; 1, Christchurch Villas, Tooting.

COREMIA QUADRIFASCIARIA AND *MELANIPPE PROCELLATA* IN ESSEX. — By way of supplement to the records of the Rev. G. H. Raynor and Prof. R. Meldola, I would like to say that in June, 1863, I captured a fine specimen of *Coremia quadrifasciaria* on the outskirts of a wood close to the town of Braintree. As to *Melanippe procellata*, this in 1879 and 1880 was fairly common in a lane leading from Witham to Rivenhall Thicks. I have records of several specimens captured in those years, and in the latter year I bred a great number from larvæ taken in that lane on *Clematis vitalba*. — W. D. CANSDALE; Sunny Bank, South Norwood, S.E., Sept. 8th, 1900.

SPILODES STICTICALIS NEAR MALDON. — Whilst working for *Colias* in a lucerne field near here, about 3 p.m. on Sept. 10th, I noticed a small moth hovering round a lucerne-flower. My surprise may be imagined when I found it on capture to be a specimen of *sticticalis* in very fair condition. An hour's subsequent work produced one more specimen, which I walked up out of the lucerne. Can any of your readers tell me whether the larva of this species has been found in England, and, if so, on what food-plant? — (Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Sept. 14th, 1900. [The larva is stated to feed on *Artemisia vulgaris* in June and July. — ED.]

LIMENITIS SIBYLLA IN SURREY. — On July 22nd I saw a specimen of *L. sibylla* on the wing near Haslemere, and heard that several had been taken in the neighbourhood. — W. J. LUCAS; Sept. 8th, 1900.

SYMPETRUM FLAVEOLUM. — *Sympetrum flaveolum* has been taken in one or two places. Odonatists should look out for it. The large amount of bright yellow can be seen on the wings when the insect is flying. Its flight is different from that of *S. striolatum*, with which it is generally found. It does not hover, but flits from plant to plant or from flower to flower something like a butterfly does. *S. sanguineum* flies in the same way; but *S. sanguineum* is also a fairly good capture. I may add that *S. flaveolum* is again present on Ockham Common, Surrey, and has been taken by myself and H. E. Annett. So far as I know, no females have been secured. — W. J. LUCAS; 12, Caversham Road, Kingston-on-Thames, Sept. 8th, 1900.

COLIAS EDUSA AND *C. HYALE* IN ENGLAND, 1900.

It will perhaps be remembered that the abundance of *C. edusa* in the autumn of 1892 was foreshadowed by the occurrence of one or more examples of the species in various parts of the country at the end of May and the beginning of June of that year. In some of the localities *C. edusa* was accompanied in the autumn by *C. hyale*, but of this latter species very few specimens seem to have been noticed earlier in the year; only one record appears in the 'Entomologist.'

During the present year *C. edusa* was observed in June at Beachy Head, Sussex (12th); Devonport, Devon (22nd); Wiveliscombe, Somerset (23rd); Ringwood, Hants (23rd); and in a recent note Mr. H. O. Wells records a fine male specimen taken at Weston, Devon, on June 19th. Of *C. hyale* there is but one notice, but this mentions the capture of two specimens at Beachy Head on June 12th, and Mr. Colthrup informs us that he saw this species, as well as *C. edusa*, at Beachy Head about the middle of June last.

BERKSHIRE.—On Aug. 13th I captured three specimens of this butterfly at Cumnor, Berks, and since that date have taken twenty (nineteen males and one female) flying over clover and along the roadside. I also obtained two *C. hyale* at Wootten.—HAROLD THOMPSON; Oxford.

During August my son and I captured twenty specimens of *C. hyale* and two examples of *C. edusa* var. *helice* in Berkshire, not far from Streatley.—(Rev.) ARCHIBALD DAY; The Vicarage, Malvern Link.

BRECKNOCKSHIRE.—On August 18th I saw a specimen of *C. edusa* near Llangorse.—D. P. TURNER.

BUCKS.—I captured a female specimen of *C. hyale* and saw *C. edusa* in a clover field, also noticed a male of the first-named species on the railway embankment, at Chorley Wood, on September 13th last.—(Rev.) F. A. WALKER.

I captured two specimens each of *C. edusa* and *C. hyale* on August 25th in a field of lucerne at Chesham.—D. CHITTENDEN; 98, Court Hill Road, Lewisham, S.E.

On August 19th I counted six specimens of *C. edusa* flying over a field of lucerne near Beaconsfield. Not having my net, was unable to make any captures.—W. H. BASTOW; The Poplars, Spencer Road, Grove Park, W.

CAMBRIDGESHIRE.—On August 14th I saw near Pampisford Station a single *C. hyale* among a lot of *C. edusa*, and missed it. Returning to the same place next morning I had the pleasure of taking a fine male; and on the 17th saw three others, and took one, near Whittlesford. This locality yielded another on the 18th. Hitherto it has only appeared singly, but *C. edusa* has been fairly plentiful on the same ground.—E. G. ALDERSON; Pampisford Vicarage, Aug. 23rd.

CHESHIRE.—*C. edusa* has been fairly common about "The Cop" (river embankment) and adjacent clover fields on the right of the Dee below Chester. The first I saw was a fine female flying about a lucerne field, Aug. 17th. Up to to-day (Sept. 8th), when I obtained a male in very fair condition, quite a dozen, to my knowledge, have been captured, and others have been seen. The colleague of the butterfly, *Plusia gamma*, has been unusually numerous.—J. ARKLE; Chester.

I saw one male specimen of *C. edusa* here (Burton), on September 6th, flying along the roadside.—(Rev.) C. A. SLADEN; Burton Vicarage, Chester.

CORNWALL.—*C. edusa* was very abundant at Bude, males preponderating. Also at Boscastle and Tintagel.—L. G. S. RAYNOR; 22, Gordon Place, Kensington, Sept. 13th, 1900.

DEVON.—A fine male *C. edusa* was taken at Weston, near Sidmouth, on June 17th, 1900.—H. O. WELLS; Hurstfield, Gipsy Hill.

C. edusa common almost everywhere. Have seen no *C. hyale* in my district, but have taken fourteen fine specimens of *C. edusa* var. *helice*.—(Rev.) W. J. LEIGH PHILLIPS; The Cottage, Parkwood Road, Tavistock, Sept. 17th.

During a visit to South Devon, from Aug. 9th to 18th, *C. edusa* was abundant at the following places:—Newton Abbot, Bovey Tracey, Starcross, and Dawlish, and with it the var. *helice* occurred sparingly. *C. hyale* was not seen.—A. H. HAMM; 52, St. Mary's Road, Oxford.

My friend Mr. E. Hill, of Lee, spent a few weeks at Ilfracombe, and in the course of four mornings' collecting took twenty *C. edusa* (seventeen males, three females) and no *C. hyale*. He said *C. edusa* was very common, as were also *Vanessa io* and *V. cardui*, of each of which he showed me about twenty examples. *Macroglossa stellatarum* was also common.—F. M. B. CARR.

C. edusa was common near Clovelly, Holsworthy, Crediton, Honiton, and Axminster.—L. G. S. RAYNOR, Sept. 13th, 1900.

DEVON AND CORNWALL.—On July 24th I noticed a couple of fine male *C. edusa* on the Cornish coast, a few miles west of St. Ives. The insect was fairly common during the second and third weeks of August at Taunton, sufficiently so to seem to point to a *Colias* "year." With the exception of one specimen seen last September, I am not aware of its occurrence there for the last seven years.—J. B. TETLEY; 5, Wilkinson Street, South Lambeth, S.W., Sept. 13th, 1900.

DORSETSHIRE.—On August 16th I found *C. edusa* very common along the coast between Abbotsbury and Bridport. I took one example of var. *helice*, and saw two other insects, which were either *helice* or *C. hyale*.—W. J. LUCAS.

C. edusa was present in large numbers during the early part of this week at West Lulworth, Dorset, where I took a good series of both males and females, the former being, however, much more numerous. I also took in the same place one specimen of var. *helice*, and two specimens of *C. hyale*. This last was far from common.—T. GODDARD WILLIAMS; The Neuk, Danehill, Sussex, Sept. 18th, 1900.

C. edusa was observed near Weymouth, Bridport, and Dorchester; not common.—L. G. S. RAYNOR; Sept. 13th, 1900.

ESSEX.—These butterflies have appeared in the clover and lucerne fields here—*C. hyale* in considerable numbers, but *C. edusa* has been rarer. I took my first specimen of each on August 2nd, and they have occurred almost every day until the present date. My boys and self have captured about thirty *C. hyale* and ten *C. edusa*, including a fine primrose var. *helice*. I have a considerable number of eggs from two female *C. hyale*, laid on white clover.—EDWARD A. FITCH; Maldon, Essex, Aug. 25th.

My earliest date of capture for each of these species was Aug. 11th. Since then up till to-day, August 18th, I have taken in various lucerne and clover fields round here thirty-four *C. hyale* and ten *C. edusa*. Most of

them are in magnificent condition and evidently born on the spot, the only possible exception being a battered male *C. edusa*, which may have been "made in Germany." One of the *C. hyale* has two of its wings so deformed as to render its flight over here from the Continent quite out of the question; but its wings are not so badly deformed as in the case of one I took in 1875—within two hundred yards of the same spot—which could hardly fly at all. I have secured eggs of both species, *C. edusa* having paired in captivity.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex, Aug. 18th, 1900. P.S. (Sept. 14th).—On Sept. 12th I came across twelve specimens of *C. edusa* and four of *C. hyale* on the railway banks near Felstead, Dunmow, and Easton Lodge.

C. edusa occurred in Epping Forest on Sept. 14th; also *Thecla betulæ*. I should be glad to know whether the latter insect is still considered common in our forest.—ERNEST CORNELL; 6, Vernon Road, Leytonstone.

A young gardener of a relative of mine came across at least five or six specimens of *C. hyale* in the corner of a field at Hatfield Broad Oak, and he succeeded in capturing a couple. This was nearly three weeks since.—(Rev.) F. A. WALKER; Dun Mallard, Cricklewood, N.W., Sept. 7th, 1900.

GLoucestershire.—*C. edusa* has been fairly plentiful in Gloucestershire. I have seen many specimens in the Vale of Berkeley, and have heard of many others. I also had the great pleasure of seeing a pair of *C. hyale*, male and female, flying close to me in the parish of Standish the first week of this month.—(Rev.) ALEX. NASH; Standish Vicarage, Stonehouse, Gloucestershire, Sept. 19th, 1900.

Hampshire.—I took a specimen of *C. edusa* at Milton on the cliff, and saw another on the shore near, on August 11th. During the next day or two a few were seen near Brockenhurst; while at the beginning of this week the species was common at Christchurch.—W. J. LUCAS; Aug. 17th, 1900.

C. hyale and *C. edusa* are both common here; a few var. *helice* have also occurred. The weather, however, is so bad just now that it has quite stopped collecting them.—J. HY. FOWLER; Ringwood, Sept. 3rd, 1900.

C. edusa was plentiful at Sway, Hants, while I was there, August 11th to 14th, and several specimens of var. *helice* and *C. hyale* were also caught. (Rev.) C. A. SLADEN; Burton Vicarage, Chester.

Both *C. edusa* and *C. hyale* are abundant here this year, and, curiously, the pale variety of the latter seems more numerous than the ordinary sulphur yellow form.—ALBERT MAY; Hayling Island, August 21st.

Whilst at Calshot Castle, a friend, H. Harrison, and myself took nine specimens of *C. edusa* (five males and four females). These were captured as follows:—July 30th, one; Aug. 1st, one; Aug. 8th, two; Aug. 10th, five.—H. E. ANNETT; Church Street, Walton-on-Thames.

C. edusa was seen in the neighbourhood of Andover, but very sparingly.—L. G. S. RAYNOR; Sept. 13th, 1900.

HEREFORDSHIRE.—On August 14th I saw two specimens of *C. edusa* near Peterchurch. Single specimens were seen on the 15th and 16th near Bredwardine.—D. P. TURNER; Sutton, Surrey, 1900.

C. edusa has occurred sparingly; the cold and wet weather during the first fortnight of August is probably responsible for its limited numbers in this district.—J. B. PILLEY; Hereford, Sept. 20th, 1900.

HERTFORDSHIRE.—Both *C. edusa* and *C. hyale* have been abundant. Here at Watford, near Boxmoor, and at Tring (on the Aldbury side of the railway), I have taken both species. *C. hyale* has been the more numerous

of the two. In a clover field here I took one var. *helice*.—ARTHUR COTTAM; Eldercroft, Watford.

KENT.—I captured a worn specimen of *C. hyale* in the Warren at Folkestone on July 3rd last.—W. E. BUTLER; Hayling House, Oxford Road, Reading, Aug. 12th, 1900.

C. hyale is certainly much more common this year than I have ever known it to be before. for altogether, at different times, I have counted no less than twenty-seven on one small lucerne field, and eleven of these were netted. I have not seen *C. edusa* yet this season.—A. J. MANN; Lindenthorpe, Broadstairs, Aug. 13th, 1900.

My brother and myself were at Herne Bay the early part of this month, where we took *C. hyale*, which was in great profusion, and *C. edusa* in some numbers, flying over lucerne fields. It was surprising to see how the male *C. hyale* outnumbered its fellows. We only took eight females, although we could have captured any number of males; and out of a dozen or so of *C. edusa*, only two were females. We did not meet with var. *helice*, which we took here in 1892, when *C. edusa* was so abundant. My brother also captured a fine pair of *C. edusa* at Weymouth about June 15th.—G. ERNEST PEACHELL; High Wycombe, Bucks, August 26th.

On August 29th *C. edusa* were flying freely on railway banks at Whitstable, and on the same day I had the pleasure of taking eight freshly emerged *C. hyale* from a field of lucerne near Margate, where they were plentiful, but unfortunately kept to the centre of the field, and as a man was working there, I had to take them as opportunity offered. Journeying on to Folkestone, I found, on August 31st, that both *C. edusa* and *C. hyale* were plentiful, but worn. On Sept. 6th *C. edusa* and *C. hyale* were both flying on railway banks at Sidcup and Crayford; and on the 7th, when I went to the latter place specially to take them, not one was to be seen, although I saw them on the banks between Eltham and New Eltham Station as I passed in the train. By this it seemed they were gradually working up towards London. Railway banks seem to be a good medium for distributing them about the country.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E.

C. edusa is fairly common on the chalk-hills about Maidstone. *C. hyale* is very abundant, preferring the flowery meadows and waste places of the river valley (Medway).—J. L. SAXBY; Larkfield, Maidstone.

I obtained eight examples of *C. edusa*, six of *C. hyale*, and two of *Vanessa cardui* in a lucerne field situated between Hithergreen and Bromley on August 18th.—D. CHITTENDEN; Court Hill Road, Lewisham, S.E.

I noticed a male specimen of *C. edusa* in a railway cutting near Herne Bay on September 9th.—J. B. TETLEY; 3, Wilkiuson Street, South Lambeth, S.W.

On August 17th I saw a specimen of *C. edusa* flying along the roadside near Cranbrook; and on the 20th of the same month I had the pleasure of seeing two specimens of *C. hyale* at Horsmonden. One of the latter was disporting itself in a field of mixed growth, among which was a good deal of clover in patches; the other was in a partly cleared clover field on higher ground. They both managed to elude the net, and flew away into adjoining hop fields, and I saw them no more.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

C. edusa is now (Aug. 23rd) out at Folkestone, flying along the cliffs below the Lees and at the Warren.—GEORGE W. OLDFIELD; 21, Longridge Road, Earl's Court, S.W.

My brother, Mr. F. Barton, took a fresh specimen of *C. hyale* on August 9th at Whitstable, and observed two others near Ramsgate a few days later. All were flying over clover fields.—W. H. BARTON; The Poplars, Spencer Road, Grove Park, Chiswick.

While walking through a field yesterday near Hithergreen, I saw two specimens of *C. edusa*. I had not my net with me, or I could easily have captured them, their flight being very languid.—W. J. HARRIS; 17, Micheldever Road, Lee, S.E., Sept. 17th.

As far as I have had an opportunity of judging, I should consider this a *hyale* more than an *edusa* year. One *C. edusa* was seen at Chelsfield on August 31st, and on the same day eight *C. hyale* at Shoreham. On Sept. 5th a single *C. edusa* was seen on Blackheath; whilst two days later a trip to Birchington-on-Sea produced fifteen *C. hyale*, mostly more or less worn; about fifteen others were seen, but only one *edusa*. An excursion to Brasted, Sept. 11th, was not productive of *Colias*, a battered *C. hyale* being the only one seen.—F. M. B. CARR; 46, Handen Road, Lee, S.E.

Between August 11th and 17th last I captured at Hythe seventeen freshly emerged specimens of *C. hyale* and fourteen of *C. edusa*. Amongst the latter was a perfect example of var. *helice*, which fluttered up at my feet when I was crossing a stubble field. *C. hyale* appeared to be more plentiful than *C. edusa* in this locality. *Vanessa atalanta* and *V. cardui* were much scarcer than usual.—R. S. MITFORD; 35, Redcliffe Square, South Kensington, Sept. 18th, 1900.

MIDDLESEX.—Having heard that *C. hyale* and *C. edusa* were to be found at Chorley Wood, I went there on Sept. 7th, but failed in my quest. On nearing home, however, just before my train slowed previous to drawing up at Kilburn and Brondesbury Metropolitan station, I had the mortification to note first *C. hyale*, and a moment later *C. edusa*, both butterflies apparently in good condition, flitting along the north side of the railway embankment.—(Rev.) F. A. WALKER, D.D.; Dun Mallard, Cricklewood, N.W., Sept. 7th, 1900. P.S.—Three specimens of *C. edusa* were seen by me on Sept. 13th on the railway embankment between Willesden Green and Brondesbury.

During the last three weeks two of my friends and myself have caught, at Potters Bar, seventeen specimens of *C. edusa*, sixteen of *C. hyale*, and one *helice*.—T. H. GROSVENOR; Boundary House, Hadley, Aug. 26th.

NORFOLK.—During August I took two examples of *C. edusa*, and the same number of specimens of *C. hyale*, on the cliffs near Muudesley, Norfolk.—S. W. KEMP; 80, Oxford Gardens, Notting Hill, W.

OXFORDSHIRE.—*C. edusa* and *C. hyale* have appeared in some numbers this year near Oxford, and *Acherontia atropos* promises to be plentiful. Since August 17th I have netted eight specimens of *C. hyale* at Cowley, Oxon.—HAROLD THOMPSON; 31, Beaumont Street, Oxford, August 31st, 1900.

C. hyale is turning up in some abundance in this neighbourhood. I have myself taken four in a clover field at the foot of Watlington Hill on Aug. 17th. Six specimens were taken in the same field in 1893. I am not aware that the insect has been seen in the neighbourhood since; but this year I have seen it in three localities within five miles of this place.—(Rev.) JOHN W. B. BELL; Pyrton Vicarage, Watlington, Oxon.

C. hyale and *C. edusa* have been fairly common here during August and September; the latter species being the more numerous of the two. A. H. HAMM; 52, St. Mary's Road, Oxford, Sept. 17th, 1900.

SHROPSHIRE.—I have had the satisfaction of once more taking *C. edusa*, an insect which I last saw alive at Torquay in 1876. I saw three specimens within three miles of this place on August 16th, and managed—though without my net—to capture two of them, a male and a female, both in good condition.—(Rev.) CHAS. F. THORNEWILL; Calverhall Vicarage, Whitechurch, Salop.

SOMERSETSHIRE.—I saw a splendid female *C. edusa* at Weston-super-Mare in August last. It settled on a flower, but as I was without a net at the time, I was unable to secure it.—OSCAR WHITTAKER; Morelands, Heaton, Bolton.

The observations on the occurrence of *C. edusa* in Somersetshire were made either by my brother or by myself:—Two in the town, Weston-super-Mare, Aug. 17th and 27th; one near the top of Dunkery Beacon, Aug. 30th; one on Exmoor (Somerset side), Sept. 3rd; twenty seen from the train on the embankments between Minehead and Taunton, Sept. 5th. F. D. BLATHWAYT; Weston-super-Mare, Sept. 10th, 1900.

I spent the first three weeks of August at Bridgwater, and in a clover field near there we found *C. edusa* in fair numbers and very fine. Of ten females that we captured three were var. *helice*. We took only one *C. hyale*, and another was seen in the neighbourhood. *C. edusa* was also seen on the sand-hills near Brean.—ARTHUR COTTAM, Eldercroft, Watford.

On August 11th I captured thirty *C. edusa* near Pilning; and on the 15th obtained twenty-four, and saw perhaps another hundred. I also obtained one var. *helice* and three *C. hyale*. *C. edusa* has been very abundant in the neighbourhood, visiting suburban gardens, where heliotrope seemed to be its particular fancy.—H. S. BISHOP; 18, Cricklade Road, Bristol.

SUFFOLK.—My nephew took *C. hyale* on Sept. 4th at Southwold. HENRY A. KING; 25, Haringay Park, Crouch End, N.

SURREY.—On July 30th I saw, in a field at Worcester Park, Surrey, a specimen of *C. hyale*, but, having no net, I of course failed to catch it. C. W. COLTRUP; 127, Barry Road, East Dulwich, S.E., Aug. 1st, 1900.

On Sept. 5th I went to a clover field between Cheam and Ewell in search of *Colias*. Between about 12.30 and 1.30 I took six *C. hyale*, and saw several more. I stayed quite an hour after this, but did not see another specimen, nor did I see any *C. edusa*. On the 6th I went to the same field again for a short time in the middle of the day, the only result being the capture of one *C. hyale* and one male *C. edusa*. No other specimens of either were seen. On Sept. 11th, after trying another tract of clover without success, I returned to the same place; five *C. edusa* were captured, four being males, but no *C. hyale* were seen. Two of my specimens of *C. hyale* are very small. A friend took a specimen of *C. hyale* at Belmont in August.—D. P. TURNER; Sutton, Surrey, 1900.

I have seen a specimen of *C. edusa* flying in a garden here this season, and have captured a *Macroglossa stellatarum* in the same place.—J. C. WARBURG; Albury, Surrey, Sept. 9th, 1900.

I saw more than one example of *C. edusa*, on July 31st last, in a clover field some little distance behind Box Hill Station.—G. SPARKE; 1, Christchurch Villas, Tooting.

One example of each sex of *C. edusa* was taken on August 11th on the Hogg's Back, about half-way between Guildford and Farnham; and I know for certain that two specimens have been seen at Walton-on-Thames. H. G. ANNETT; Walton-on-Thames.

Within a two and a half mile radius of Newdigate I found *C. hyale* and *C. edusa* flying about over four clover fields; they were not plentiful, but they were in fair numbers. I caught about twelve *C. hyale* and twenty *C. edusa*. Some friends whom I took to the localities captured about five of each. I doubtless could have got many more had I had the time. I saw a few *C. edusa* on the road between Horley and Three Bridges. From August 10th to the 20th they were most plentiful; but I saw a few yesterday (Sept. 6th).—HERBERT BEADNELL; Fernside, Redhill, Surrey, Sept. 7th.

The only specimen of *C. edusa* that I have seen near here was one at Puttenham on Sept. 6th.—W. J. LUCAS; 12, Caversham Road, Kingston-on-Thames.

SUSSEX.—Whilst collecting at Arundel last Sunday, Aug. 19th, I saw four specimens of *C. edusa*, two of which I captured, both males; they are in beautiful condition. I also took one *V. cardui* the same day, and one *P. monacha* at rest on a beech-tree. On August 26th I took a fine male specimen of *C. hyale* flying by the roadside near Arundel.—HENRY E. GARRETT; 3, Brewer's Green Mews, Victoria Street, Westminster, S.W., Sept. 14th, 1900.

I saw ten examples of *C. hyale*, of which I took four very fine specimens (three males and one female), on the downs behind Gompting, between August 16th and 18th; they were confined to a small stretch of the downs, about two hundred yards long, bordered by a thick hawthorn hedge. *C. edusa* was very abundant in a cornfield, about a quarter of a mile away from the above locality. It also occurred plentifully in many localities within a five mile radius of Worthing.—H. WORSLEY-WOOD; 31, Agate Road, West.

C. edusa and *C. hyale* were common in clover fields around Hooe, near Pevensey, in the latter half of August. I took nine specimens of the last-named species, and one example of *C. edusa* var. *helice*. I may mention that last year I captured seven specimens of *C. hyale* near Broadstairs, and two *C. edusa* at Sidmouth.—LEWIS L. TURNER; 131, Melbourne Grove, East Dulwich, S.E.

C. hyale has been the butterfly of the year in this locality. My brother, Mr. Frederick Anderson, has taken many fine specimens, and three or four have also been captured by my friend Mrs. Fogden at Apuldram during the first fortnight of August. My brother also took a beautiful example of var. *helice* here on August 17th. Although *C. edusa* has been, and is, at the time of writing (August 20th), very abundant, some visiting the garden even, this is the only specimen of var. *helice* of which I have cognizance in this neighbourhood.—JOSEPH ANDERSON; Chichester.

I found both species very abundant near Littlehampton, August 10th to 20th, taking forty-eight *C. edusa*, one var. *helice*, and eighty-four *C. hyale*, besides seeing many more.—RUSSELL E. JAMES; 18, Onslow Gardens, Highgate.

WESTMORELAND.—I had already penned a note on *C. edusa* to the effect that five male specimens had been caught, and others seen, during the latter part of August; but I now have the pleasure of being able to record that it is being taken in considerable numbers amongst the clover and stubble of a cornfield recently cut close to Kendal. Though it is a revelation to me, there is not the slightest doubt that the specimens now being caught are the progeny of immigrant females, all being in perfect condition, and one or two having been taken with the wings still limp after

emergence. It is some years since the species has been noticed in the district. On Sept. 12th and 13th I caught thirteen at Ford, near Shrewsbury, but they were somewhat worn.—(Rev.) A. M. Moss; 12, Greenside, Kendal.

WILTS.—*C. edusa* and one specimen of *C. hyale* were seen near Salisbury.—L. G. S. RAYNOR; Sept. 13th, 1900.

RECENT LITERATURE.

Insecta Transvaaliensia; a Contribution to a Knowledge of the Entomology of South Africa. By W. L. DISTANT, author of 'Rhopalocera Malayana,' &c.; assisted by many Specialists. Published by W. L. Distant, Highfield, Upper Warlingham, Surrey. Part I. June, 1900.

DURING his four years' residence in the Transvaal—the preliminary results of the earlier part of which were published in one of his other works—Mr. Distant paid much attention to Entomology, and formed a considerable collection of insects. The work before us is expected to extend to twelve quarto parts, each containing twenty-four pages of letterpress, with two coloured plates; and three parts are promised annually till the whole is completed. It is proposed to enumerate all the species described from the Transvaal, and the book will contain descriptions and figures of a large number of new species. While not ignoring the work of others, it will be based chiefly on Mr. Distant's own collections; and the uniformity of the African Fauna, from the Cape to the Zambesi (and, Mr. Distant might have added, of all Eastern, Southern, and Central Africa, to Somali, Abyssinia, and the Lake District of Central Africa), will make the book of great value for the elucidation of the Entomology of Southern and Eastern Africa generally.

The first part contains the commencement of the *Orthoptera*, comprising the letterpress descriptive of the *Forficulidæ*, and the commencement of the *Blattidæ*; and two plates, one devoted to the two families already mentioned, and the other to the *Phasmidæ*. These have been carefully drawn by Mr. Horace Knight, under the supervision of Mr. Distant himself. There is a very full account of the habits, &c., of *Forficulidæ* and *Blattidæ* by Mr. Distant, and of the distribution of the Ethiopian species by Mr. Malcolm Burr. The systematic portion is by Mr. W. F. Kirby, and the descriptions of the new species have previously appeared in the 'Annals and Magazine of Natural History.' The *Blattidæ* figured exhibit a variety of form and colour which many people would hardly expect in "black beetles." The number of apterous species, or species with apterous females, is very considerable in Africa, and thus the dissimilarity of the sexes in African *Blattidæ* adds considerably to the difficulties of their study. The plate of *Phasmidæ* also exhibits a variety of interesting species, two of which are remarkable for the curious appendages on the head.

We believe that the second part of this meritorious work will be devoted to Moths.

W. F. K.

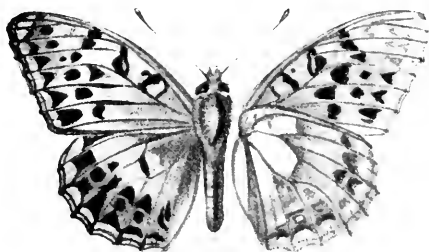
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[No. 450.

TWO ABERRATIONS OF BRITISH BUTTERFLIES.



Argynnis adippe, ♂ (upper figure).—Taken in Kent, on July 17th last, by Mr. R. S. Mitford, to whom I am indebted for the loan of the specimen to figure. Mr Frohawk's drawing so admirably exhibits the aberrant characters of this pretty variety, that it is only necessary to say that the under surface of the hind wings is buff in colour, and the submarginal series of spots reddish brown; the large spots on basal area are silvery, and there are two or three silvery markings towards the anal angle. A somewhat similar aberration of the female of this species (*A. aglaia* in error) is figured Entom. xv. pl. i. figs. 2, 2a, pp. 50, 142.

Lycaena bellargus, ♂ (lower figure).—Taken at Folkestone during July last. The under surface is whitish clouded with grey, and there are orange lunules at the outer extremities of

the black bars on hind wings. Mr. Sabine, who has kindly lent the specimen for figuring, states that it was captured by Mr. Barlow, whilst he was netting a few *L. bellargus* for a friend in London. This aberration is parallel with one of *L. icarus* figured by Newman, Brit. Butt. p. 128.

RICHARD SOUTH.

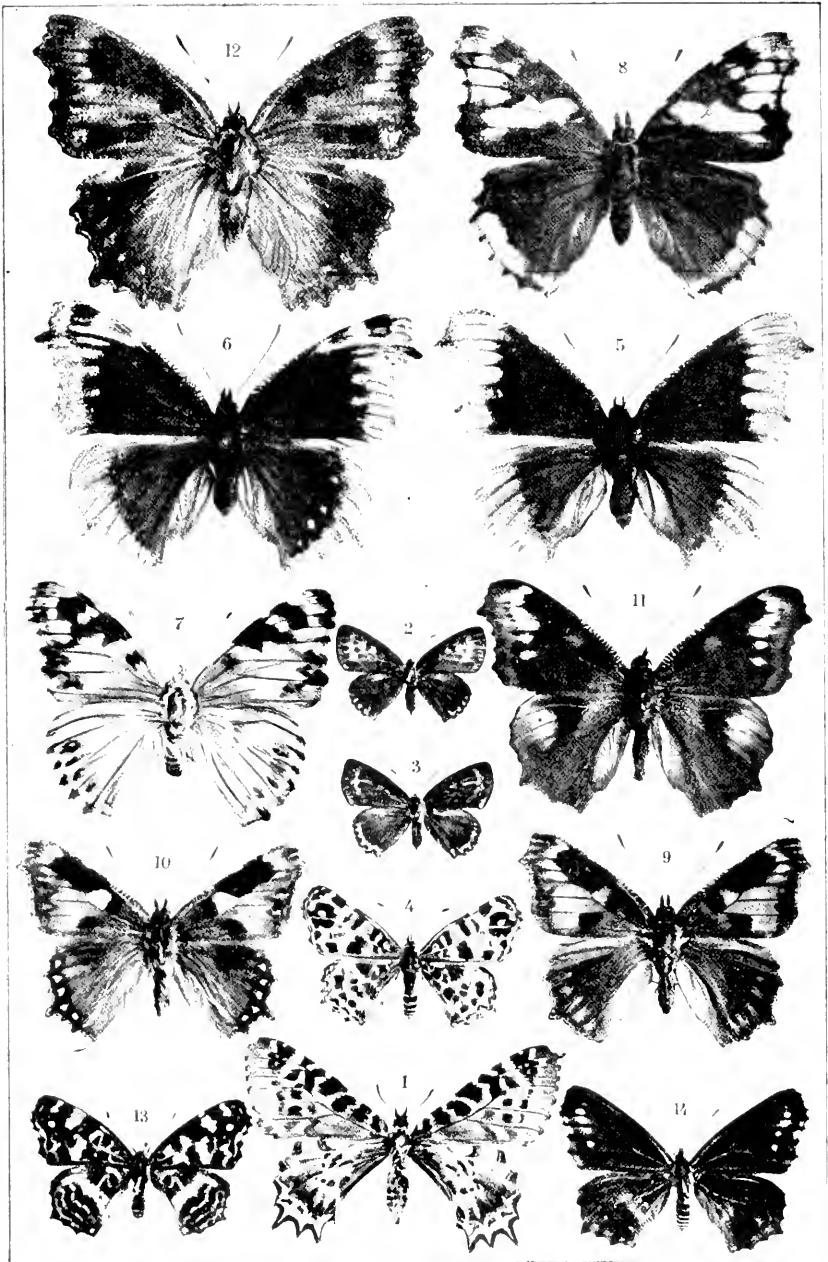
NOTE ON THE OVIPOSITION OF *PARNASSIUS APOLLO*.

By T. A. CHAPMAN, M.D.

THE keel or pouch of female *Parnassius* seems now to be well understood as a structure added by the male during pairing, but what its use is seems to be still quite unknown. At least, I can find no satisfactory observation or suggestion on the matter. One surmises that it must be of some use in ovipositing. I made a point on several occasions this summer of watching *apollo* to detect the mode of oviposition, if possible. I only succeeded in seeing one egg laid, and that I could not find on searching. The way in which it was deposited was, however, very suggestive. The butterfly alighted on a dead stalk, some six or seven inches above the earth, not on or very near any *Sedum*, and then ejected an egg in such a forcible way that it fell, perhaps, an inch and a half away from the spot immediately beneath the insect. A solitary observation is, perhaps, too small a basis to theorise on; but, as the egg lies unhatched all winter, the object would be to send it with some force, so that it would get into some sheltered corner. The mode by which the jerk is communicated would probably be by the egg being pressed against the pouch, the elasticity of which would give it a jerk when it slipped free. The egg has a flat base, by which it probably becomes attached when that surface touches any object.

In searching for any account of the oviposition of *Parnassius*, I find perfunctory allusions to it, implying that there is nothing unusual in method of egg laying. The fullest reference I find in W. H. Edwards's account of *P. smintheus*, where several different observers note the butterfly as laying freely on various objects, and especially on anything in preference to the food-plant. He quotes two observers who *saw* the butterfly laying eggs, and who note nothing peculiar about it. It may be, therefore, perhaps, that my observation was of an unusual occurrence—it suggests the desirability of further observations.

Betula, Reigate: Sept. 1900.



After Obernetter.

By permission of Frankenstein & Wagner.

SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND
TEMPERATURE MADE WITH LEPIDOPTERA UP TO
THE END OF 1898.*

BY PROF. DR. MAX STANDFUSS.

PLATE II. (Entom. Plate VI.).

(Continued from p. 167.)

5. On rare occasions aberrations were produced by these warmth and cold experiments, *i. e.* forms arose, which, although not confined to any particular season or locality, are found as great rarities in a state of nature sporadically all over the district inhabited by the species in question, either in similar forms or near approaches thereto; forms were also obtained by these experiments which should no doubt be included in this category, but which have not yet been discovered in a state of nature. We shall return to the nature of these forms later.

For example, by means of cold an eyeless form of *Vanessa io* was obtained; also characteristic aberrative forms of *V. urticae* and *V. polychloros*; and by warmth, *V. antiopa* occasionally developed a very much broadened yellow border, *V. cardui* and *V. polychloros* also giving rise to aberrations.

These aberrations were more generally obtained when the effect of the warmth and cold experiments were especially extreme; so that, on account of these observations, I came to the conclusion, as long ago as 1894, in my pamphlet, "The Causes of Variation and Aberration in the Imaginal Stage of Butterflies" (Ent. Zeitschr. Guben, 1894, Sept. 15th, pp. 102, 103):—"Therefore it is highly probable that a large number of the aberrations found in a state of nature, the reasons for whose occurrence has hitherto been unknown, have been caused by abnormal temperature conditions, which affected the pupal stage"; and that it would appear to be necessary to complete the former experiments by introducing temperatures of over $+40^{\circ}$ C. and under 0° C. In fact, the results of these further experiments were correctly foretold by me in the year 1895 in the large Handbook, pp. 291 and 292, before these experiments were in any way commenced. The results obtained confirm these predictions in the highest degree.

We now come to the second series of temperature experiments—heat and frost experiments.

The temperatures used, $+40^{\circ}$ to $+45^{\circ}$ C., on the one hand, and 0° to -18° —occasionally -20° C.—on the other, were, as

* Translation continued by E. M. Dadd.

already stated, only intermittently applied, as they could only be borne for short periods (in most of the many experiments for two periods per day of two hours each for three to six days); between the exposures and after same, and until emergence, the pupæ were kept at the ordinary daily temperature. In the heat and frost experiments the greater part of the material experimented with remained unchanged; only the smallest proportion of them departed in any way from the normal type, and, most curiously, this portion was of equal value in both heat and frost experiments. The same or almost similar forms were obtained at -15° to -20° C. as at $+40^{\circ}$ to $+45^{\circ}$ C., that is, in both aberrations arose. These strange results lead to the question—In what way do these frost and heat experiments work?

Observation shows that if a large series of pupæ be exposed for two hours twice a day for three days in the frost apparatus to a temperature of about -12° C., the imagines were not delayed only the six hours, during which the pupæ were in the frost apparatus, but were delayed days. It is also remarkable, that by substituting $+44^{\circ}$ C. for -12° C. analogous results were obtained. High temperatures by no means hasten matters, as one would be inclined to suppose, but mostly interrupt the development, often delaying the same long over the extent of the time of exposure.

This retarded development under very high temperatures was most noticeable when a species, whose one generation hibernates as pupæ, had the pupæ of its summer generation submitted to about $+44^{\circ}$ C. Then a certain proportion of the pupæ do not emerge as a second generation, but hibernate, and give the following spring imagines of the normal type of the first generation. This took place with broods, the remainder of which, left under normal conditions, emerged all in the second generation. The interruption in the development became in this case permanent, and the forced æstivation passed directly over into the normal hibernation of the following generation. It may also be mentioned here, which is under the circumstances more comprehensible, that in frost experiments with summer pupæ of species with two generations, a certain percentage according to the degree and length of the frost action do not reach a second generation, but hibernate.

We have thus to first answer the question—How do these frost and heat experiments work? They arrest development, and put the insect into a state of lethargy, whereas there were no such interruptions in the warmth and cold experiments.

But a further important difference exists between these two series of experiments. Cold and warmth experiments resulted in a change in the whole of the material under different treatment in different directions and degrees, whereas with uniform treat-

ment a certain line is always followed without much variation between individuals.

A specific line of development such as was obtained by cold experiments was never evolved by the same species by warmth experiments, nor was the obverse ever obtained. It was plainly a case of direct influence.

It was very different with frost and heat experiments. In this case the whole of the material experimented with was never influenced in one direction differing from the normal type. Firstly, it must be remembered that it was the rule for the greater part to remain unaltered in any way; secondly, among those that were influenced, even though, for certain individual groups, a number of regularities were observable in the variations, yet the one group as compared with another would often enough vary in an entirely different direction, even in one and the same experiment. Moreover, at minus temperatures, after a certain limit had been reached even at great divergences—for example, -8° to -18° C.—qualitatively the same variations were obtained, although not in the same percentage; this was also the case with extreme degrees of heat. In the cold and warmth experiments, on the other hand, a very few degrees were sufficient, if constantly applied, to create vastly different forms. We even find that the influence of heat on certain species of *Vanessa* will solely produce forms which are certainly equivalent to certain forms obtained by frost experiments, as the differences which up to the present could be detected between aberrations obtained by the influence of heat and certain aberrations obtained by the influence of frost are overborne by the preponderance of similarity in the structure of these two forms, and may perhaps be entirely removed by further studies.

From all these facts it follows that the second answer to the question, "In what way do these heat and frost experiments work?" is:

They have no direct influence, but indirect, owing probably to the fact that through the state of lethargy brought about by them, conditions act which cause a variation in the future insect in a particular direction; and it is quite immaterial for the setting up of this line of development whether the period of lethargy is caused by frost, by heat, and perhaps also by any other hindering influence.

Now, what deductions do we draw from the aberrations? What can we think of them? We have as yet given no explanation of them, but only indicated that they are forms which, although not confined to any locality or time of appearance, are found in a state of nature, generally as great rarities, here and there in the territory inhabited by the species. This says nothing as to their real essence.

If only certain species of the genus *Vanessa* had been used for analysing this problem, it would have been on a casual examination a tempting speculation to suppose, taking as a basis certain highly darkened aberrative forms resembling each other, that aberrations were retrogressions in the direction of an ancient type, having characteristics common to these species. There are, however, such important reasons against the acceptance of this view that it certainly cannot be correct. One of these reasons is that in these aberrations the males are not only much more numerous than the females, but are also inclined to the most extreme development; whereas we know by experience that the female sex is far more inclined to atavism.

The most important reasons which preclude the possibility of the variations being atavistic are grounded on phylogenetic considerations. In considering the genus *Vanessa* and the related nymphalids *Argynnis* and *Melitæa*, we must reach the conclusion that this is not a case of primarily black or dark-coloured ground colour and secondary light brown and yellow, which would be the result if we were to consider these darkened aberrations as atavisms, but, on the contrary, primarily yellow or light brown ground colours with secondary superposition of darker markings. We have right amongst palæarctic Vanessidæ two species which show the phylogenetic progress from light brown ground colours with dark markings to a predominating dark brown ground colour in a seasonal dimorphic form, viz. *V. levana*, L., and the related Siberian *V. burejana*, Brem.

If, however, the aberrations cannot be considered as forms tending in an atavistic direction, what are they?

Regarding the influence of the experiment, they cannot be considered as the direct result of this influence, but solely as a frequent but by no means constant accompaniment. The direct result of the experiments is lethargy, interruption of the development, at a stage of life-history when important changes in the structure of the body have naturally a fundamental influence on the colour garb of the imago. These interruptions destroy the continuity of the normal development, which holds, so to speak, the individual fettered, driving it forward in a certain direction; when the further development continues, a portion of the individuals—in fact, the majority—continue in the usual direction; a few, however, diverge from the normal direction of development, as if thrown off the rails by the interruption.

It is therefore a case of a relatively independent progressive development of the individual, and therefore with a stamp of great variation between individuals. The aberrations therefore indicate, firstly, individual colour anomalies in a new direction (at least in most cases).

But still another side of their character presents itself: if we

compare them with the types, which in the cold and warm experiments were proved undoubtedly to be the direct results of these moderate high and low temperature influences, we find that a considerable number of the latter actually exist as local or seasonal forms, or that the variation lies in the line of the phylogenetic development of these forms, backwards or forwards. This is quite the reverse of the aberrations: they diverge entirely from such lines of development, and—this seems to be the second peculiarity of the character—do not vary on the lines of the normal line of the phylogenetic development of the species.

It was certainly not the sole purpose of these heat and frost experiments to obtain aberrations, but by this means to follow up two questions of scientific interest, and if possible to answer same.

Firstly, what factors in nature cause the appearance of aberrations, which as to their appearance in free nature and characters form such obscure problems? And secondly, are these new forms; is the aberrative coloration transmitted to the progeny? In order to answer the first question, the experiments were conducted in a methodical manner.

Whoever carefully investigates large and the largest collections, cannot deny the fact that aberrations appear in years with many strong temperature variations, or from localities in which sharp changes are a common occurrence; for example, in certain mountain valleys, particularly in the Alps.

Perhaps the true reason is to be found in the important and lasting reduction of temperature caused by storms, especially when accompanied in flat regions by hail, and in mountainous regions by snow-storms; at least this appears to be the conclusion to be drawn on the one side.

Experiments were therefore made with 0° and -2° in various ways, so that the most extreme variations of temperature which could happen in such cases should be imitated; but the result of all these experiments was absolutely nil, in spite of the large number of individuals dealt with.

Only by the repeated application of -5° were a few aberrations obtained.

It is apparent that a repeated occurrence of -5° during the warmer portions of the year is out of the question. Still less a repeated occurrence of -8° , -9° , -12° C., &c., under which conditions experimental aberrations were constantly obtained, although only few in number. Another fact which must be well borne in mind, is that this result was only obtained with species whose whole life-history from ovum to imago is achieved during the warm portions of the year, and which hibernate as imagines; but this was not the case, at least as far as present

experiments have gone, with species which hibernate in the larval stage.

One must now consider the alternative as to whether the aberrations are caused by extreme high temperatures.

In these experiments, conditions which could possibly happen in nature were, as nearly as possible, adhered to, and in this case the experiments* were not without result, although much less material was used.

* In 1898 the heat experiments were continued in great numbers with + 42° to + 44° C.; firstly in January and February with hibernated pupæ of *Papilio podalirius*, L., *P. machaon*, L., *Thais cerisyi* var. *deyrollei*, Obthr., *Polyommatus amphidamas*, Esp., and *Vanessa levana*, L. I was successful in obtaining a few aberrations *sensu strictiori* of all these species. *Thais* v. *deyrollei* produced especially striking forms.

Plate I. fig. 7 shows an aberration of *Papilio podalirius*, L. (hibernated pupæ from Sitten, Canton of Valais) thus obtained, which shows an increase in the dark markings in some place on the fore wings in a blurred manner. The black markings both on the upper and under sides of the fine female *Thais* var. *deyrollei*, Obthr. (Pl. I. fig. 9), are also very much increased over the normal form. This aberration was frequently obtained by the heat experiments. The female of the Amasin local form of *Thais cerisyi*, B. (Pl. II. fig. 1), is not so much darkened, but still differs a good deal from the ordinary form. Pl. I. fig. 10, and Pl. II. figs. 2 and 3, show abnormal coloured specimens of *Polyommatus amphidamas*, Esp., from hibernated pupæ from Leipzig, also in increased darkening; the under sides of these individuals show a partial lengthening of certain rows of spots into rays.

In contradiction to the above-named aberrations of Papilios and *Polyommatus amphidamas*, a Lycænid; the nymphalid *V. levana*, L. (Leipzig), shows a reduction of the black brown markings; as will be seen (Pl. I. fig. 11, and Pl. II. fig. 4), at least as far as these heat experiments with hibernated pupæ go, I could not obtain opposite variations, or, in fact, variations in any other direction. The males of *Thais* var. *deyrollei*, Obthr., in apposition to their females, showed an inclination to a reduction of the dark markings, which will be seen by Pl. I. fig. 8).

These experiments filled up a considerable blank in the former ones.

From May until August a continuation of the heat experiments was made with summer pupæ.

V. antiopa, L., resulted in a number of ab. *hygiaa*, Hdreh., as well as intermediate forms; two characteristic specimens of these forms are shown (Pl. II. figs. 5 and 6).

According to present experience, these aberrations were most frequently attained by a temperature of + 42° to + 44° C. applied three to five consecutive days, four times a day, each application lasting one hour; the best result was seven aberrations among forty individuals. The change from daily temperature to heat, as in all these heat experiments, was sudden, as also the return to ordinary temperature at the conclusion of the application.

V. cardui, L., produced two ab. *elymi*, Rbr., one of which is shown (Pl. II. fig. 7); *V. atalanta* a typical ab. *klemensiewiczzi*, Schille (Pl. II. fig. 8), and an intermediate.

Several very extreme forms of ab. *ichnusoides*, Sel. Long., were obtained from *V. urticae*, L., as well as intermediates; a specimen of the first is figured (Pl. II. fig. 9), and an intermediate (Pl. II. fig. 10). *V. io*, L., produced a few ab. *belisaria*, Obthr., very highly developed from individuals of the second generation from Zürich (Pl. II. fig. 11). *Vanessa* var. *prorsa*, L., in all the large series exposed produced, first, as the earliest emergences of

It is sufficient for a pupa, of species not only hibernating as imagines, but also as larvæ, to be submitted to a temperature of $+42^{\circ}$ to $+45^{\circ}$ C for two hours, on two, three, or four consecutive days, while it is in a sensitive stage, to eventually produce an aberration.

This will most easily happen in steep mountain slopes or on the face of cliffs, but it might also happen on dark tree trunks, boards, stones, or under leaves, which lie close to a good heat conductor. In breeding, also, pupæ which are placed in a greenhouse or other outhouse, or even in a room, where the sun can reach them, may be subjected to a similar temperature, which is a very natural explanation of the extraordinary aberrations which are bred now and then to the great wonder of the entomologist.

One point which confirms the validity of this explanation of natural aberrations is, that the aberrations hitherto obtained by the heat experiments all correspond to those found in nature, whereas the aberrations resulting from frost experiments are often forms which have probably never been observed in a state of nature. In order to show the conformity of heat forms with those found on nature, compare the experimentally obtained aberrations figs. 2, 4, 6, 8, with the natural forms 1, 3, 5, 7, which are placed side by side on Pl. IV. of 'Experim. zoolog. Studien.'

The results of these heat experiments* allow the conclusion that the typical aberrations of the nymphalids, that is, about 80–90 per cent. of all known aberrations, are brought about in a state of nature by the occasional action of high degrees of heat, $+40^{\circ}$ to $+45^{\circ}$.

And now for the last question raised by these temperature

each brood, only normal v. *prorsa*, L., but later on ab. *porima*, O., and very sparingly, several aberrations in very different directions of development (see Pl. II. figs. 13 and 14). The original of fig. 14 is such an extraordinary individual that one does not know at first to what species to relegate it. Each series ended, generally after a pause, in several very large typical *levana*. A number of pupæ stood over and produced in the spring of 1899 thoroughly typical *V. levana*, L.

The experiments with *V. polychloros*, L., were not continued in 1898, as a number of fine ab. *testudo*, Esp., were produced in the heat experiments of 1897 (cfr. Exp. zool. Stud. Pl. IV. figs. 2 and 9). A female of the latter is shown (Pl. II. fig. 12), as females of this beautiful aberration are very hard to obtain through these experiments in faultless condition and in such extreme development can hardly be known in a state of nature.

* As the continuance of the heat experiments in 1898 shows (compare the previous footnote), the conclusion arrived at as to the cause of aberrations *sensu strictiore* in nature of the nymphalids is not only confirmed by further results, but is also shown to be true for a number of Papilionidæ and one Lycænid (*Polyommatus amphidamas*, Esp.), so that a general agreement seems probable.

experiments. Will the new forms which have been obtained by these experiments be capable of reproduction?

Qualitatively, the best material for this purpose would be the above-mentioned phylogenetic progressive forms obtained by these warmth and cold experiments. Their coloration has undoubtedly been directly influenced by the experiment, and the forms in question, having never been noticed in a state of nature, they are individuals with acquired new characters.

The use of these forms has, however, as far as the present experiments have gone, been prevented, as the individuals obtained have never shown sufficient energy; they had certainly suffered by the experiment.

Especially the most extreme forms, which would have been most fitted for these heredity experiments, had generally badly developed wings; blood oozed from several places, so that they were absolutely useless for the purpose of continuous flight. Besides the wings, the claws on the feet of the extreme forms were, as a rule, badly developed, and absolutely useless for holding on with. One was therefore reduced, on the one hand, to the coloration anomalies and aberrations, which were only an indirect result of the influences applied, but whose anomalies, on the other, never occur without such experimental influences amongst countless thousands of individuals, and which constitute, like the first, new forms, only with greater individual differences, and partly in quite different directions.

The experiments showed that only the frost experiments produced a great number of these forms with full energy, so that only material obtained by this means was used for the experiment. Further, it seemed advisable to first make these experiments with the *Vanessa* species feeding on nettle, on account of the comparative ease of cultivating large quantities of this plant in large pots. *V. c-album*, *V. urticae*, *V. cardui*, and *V. atalanta* were all equally serviceable; they all live, as a rule or occasionally, on nettle, and, moreover, these species were especially suitable, as in our latitude they constantly occur in two generations.

Finally, I was unfortunately only able to get a sufficient quantity of imagines for this experiment of *V. urticae*, in all from not less than 8231 pupæ.

Sufficient room for the experiment was kindly placed at my disposal by Herr Dr. G. Stebler, in a portion of a growing-house for the Seed Control Station. Good ventilation was assured by replacing some of the panes of glass by wire screens.

Four immense tubs and other articles containing full-grown nettles, which had been cultivated the previous year, as well as a lot of pots containing flowering pinks, completed the furnishing of the small room, to which the sun had good access. Arrange-

ments were also made for shading appropriately portions of the room.

On Whit Monday, June 7th, 1897, the first abnormal *V. urticae* were introduced, and so on until June 15th—in all forty-two specimens, thirty-two males and ten females.

The males were without exception very extreme forms, with entirely black hind wings on the upper side; only two females belonged to this form, the remaining eight possessed blue marginal spots, and partly also more or less brown ground colour at the anal angle of the hind wing; certainly a very small number of females, when one considers that they formed the entire female aberrations from more than eight thousand pupæ.

It was interesting to note during the following weeks how quickly the small creatures accustomed themselves to their keeper, and lost all their fear of him, and how in certain directions they exhibited intelligence and remembrance; for example, immediately on his entry into the breeding house they fluttered to the ground, as they had quite apparently noted that his entry was symbolical of a drink, as, to take care of their thirst, I was in the habit of sprinkling the ground with water.

The 25th of June had arrived, and, in spite of the most careful observation, no pairing was noted, but the room was only visited between the hours of 8.30 a.m. and 7 p.m.

All kinds of love-games were indulged in, but, as already said, no real pairing. It must, however, have taken place, as, on June 26th, I was pleased to see a cluster of eggs on the under side of a nettle-leaf, and during the following days eight females, amongst them the most abnormally coloured ones, were observed laying eggs. How many eggs were laid by each female on an average could not be ascertained, as for many days one after another they were laid on different leaves. It cannot, however, have been less than two hundred, as more than two thousand larvæ developed, in spite of the fact that two of the ten females met an untimely end through spiders. Among them, unfortunately, was the less extreme of the two extreme forms.

Probably she had laid no eggs, as the ovarium was full of eggs, and she was never observed ovipositing. From July 2nd the larvæ emerged, and at first were allowed to feed freely on the nettle, but were later on placed in airy breeding-cases. The brood of the most abnormal female was kept separate, and reared from the commencement by itself.

Unhappily, one of the many infectious diseases known under the collective name of *Flacherie*, shortly appeared, so that of all the broods only the strongest and most quickly developed individuals reached the pupal stage: in all, 493 specimens. These did not all produce imagines, as some were attacked by

ichneumons, *Pteromalus* sp., and others, died of the disease in this stage.

The brood of the most abnormal female, reared with the greatest care, produced only fifty-two pupæ, which are included in the 493 before mentioned.

On July 21st the imagines emerged till 27th, altogether two hundred specimens; amongst them the first specimens of the brood of the most abnormal female. All these specimens were entirely and thoroughly normal. On July 28th appeared one variety (*cf.* Exp. zool. Stud. pl. v. fig. 4), and on July 31st and Aug. 1st, each one more, differing from the normal form, but not very abnormally. On Aug. 5th, among the last imagines from this experiment, a very aberrative specimen emerged (*cf.* Exp. zool. Stud. pl. v. fig. 5), as the previous three, also the progeny of the most abnormal female. It was also a male.

The result of heredity experiments with abnormal forms obtained by the frost experiments—the whole material from emerged imago through egg, larva and pupa to imago being treated as far as is known to perfectly normal conditions—is as follows:—

1. Two of the ten females experimented with did not produce offspring.

2. The small portion of the broods of probably seven females which reached maturity reverted entirely to the normal form.

3. An eighth pair, from which only forty-three specimens were obtained, resulted in one well and three slightly developed aberrations, in the direction of the parental aberration.

4. These four individuals are all males.

5. Only the most abnormal female—the thirty-two males, as already stated, were about of equal merit as far as their abnormal characters are concerned—transmitted its newly acquired characters more or less to a small portion of its offspring. The possibility of transmitting these anomalies seems to be conditional on the extent of the anomaly.

6. As this experiment, on account of the outbreak of disease, was very incomplete, it is desirable to repeat same again, with plenty of material.

However, the facts obtained may be considered of great importance for estimating the influence which natural factors contribute to the alterations of living organisms, especially when one considers that the same individual which we have here produced from the brood of abnormal parents never occurs amongst countless thousands of creatures of normal parentage, which have been subjected to exactly the same conditions.

(To be continued.)

NOTES ON SOME SINHALESE RHYNCHOTA.

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

Fam. ^PTETIGONIIDÆ [=JASSIDÆ, auctt.].

✓ NIRVANA, gen. nov.

Belonging to subfam. Jassinæ. Head porrect, plane, nearly twice so long as pronotum, the lateral margins parallel so far as ocelli, subsequently very gently convergent, apex subangular. Eyes longer than wide, produced basally over the anterior margin of the pronotum, which is somewhat wider than the base of the vertex; ocelli small, indistinct, situated on the lateral margins of the vertex, at about half their length from the base. Posterior margin of head concave; frons slightly concave. Antennæ simple, very long. ✓ Scutellum slightly shorter than pronotum. Anterior coxæ free. Type *N. pseudommatos*, Kirkaldy.

The only example of the typical (and only) species that I have seen is macropterous; the tegmina and wings are longer than the abdomen, but the neuration is very feeble. The claval suture is well marked, though it ends abruptly just before it should reach the lateral margin of the tegmen; there are no other tegminal nervures except three indistinct longitudinal on the membrane (which is not sutured off from the rest of the tegmen). *Nirvana* may be placed provisionally near the American genus *Spangbergiella*, Signoret.

✓ N. PSEUDOMMATOS, sp. n.

Hyaline; eyes yellowish brown, pronotum and scutellum tinged with stramineous. In the middle line of the vertex, close to the anterior margin, is a large round blackish brown spot, from which proceeds a thin median line of the same colour, terminating at the base ("apex" auctt.) of scutellum; along the lateral margins of the head (except apically) is a line of the same colour, continued (in the same straight line) on the pronotum. Tegmina hyaline, sparingly punctured, the punctures scantily piliferous; membrane pale salmon-coloured, a large round submedian spot and the apical margin blackish brown; three faint fasciæ on the corium of the same colour. Ventral surface whitish; apex of posterior tibiæ and first segment of posterior tarsi blackish.

Length $4\frac{1}{2}$ mill. Pundaluoya (July, 1898, E. E. Green).

I have only one specimen, unfortunately, of this pretty but fragile little Tetigoniid, and have therefore not risked a detailed examination of the genitalia, &c., hoping to receive later a series. A coloured representation (as also of the other new species) will appear in another place; in the meantime the characteristic form—not unlike that of *Hecalus*, Stal—the feebly developed "nervural" system and the remarkable colouring, hyaline and

colourless with a membranal black spot encircled by pale salmon, will at once distinguish it from any of its allies.

♂ *TETIGONIA ALBIDA* (Walker).

Peradeniya, January, 1900 (E. E. Green). Reg. No. 102. "Makes itself a great nuisance, swarming round lamps in the rooms at night" (E. E. Green *in litt.* 5 (iii.), 1900).

This pretty little species, which has been kindly identified by my friend Dr. Melichar, is widely distributed, having been recorded previously from North Australia, the Philippines, "British India," Madagascar, Senegambia, Kaffraria, and Cape of Good Hope. It is figured by Signoret, 1853, *Ann. Soc. Ent. France* (3) i. pl. 21, f. 3.

♂ *TETIGONIA KALIDASA*, sp. n.

Belongs to subgenus *Diedrocephala*, Spinola. Head sub-acutely triangular, vertex slightly concave, basal half very narrowly sulcate. Pale green, an angularly arched fascia on the vertex, two concentric roundly arched fasciæ on the pronotum, each of which is continued on to the clavus, meeting the claval suture; two fairly straight fasciæ on the corium (sometimes a little irregular), bright scarlet (in one specimen orange-yellow). Membrane sometimes infuscate. Ventral surface pale yellowish green. Length $4\frac{3}{4}$ - $5\frac{1}{4}$ mill. Pundaluoya (April, 1898, E. E. Green).

This handsome little scarlet-and-green species is interesting as belonging to the subgenus *Diedrocephala*, which is mainly (if not even entirely) American.

THOMSONIELLA KIRSCHBAUMII (Stal), Sign., was omitted by Kirby in his Catalogue. It is figured in *Ann. Soc. Ent. France* (5) 10, pl. 1, fig. 44 (1880).

†*GYPONA STRIATA*, Kirby, 1891, *J. L. S.* xxiv. p. 171, and †*G. PRASINA*, Walker, 1858, *List. Hom. Suppl.* p. 258, do not conform to the genus *Gypona*, Germ., as restricted by recent authors. They are closely allied to *Titia*, Stal, but will probably require a new genus. Both specific names are preoccupied by Burmeister (*Genera Insect.* pl. 16), and as, according to the now generally accepted rule, "once a synonym, always a synonym," they are now invalid for any genus, I propose *KIRBYI* and *WALKERI*, nom. nov., respectively. As Kirby surmises, (*l. c.* p. 171), fresh examples of *Kirbyi* (*striata*) are grass-green in colour.

Fam. FULGORIDÆ.

†*EURYBRACHYS WESTWOODII*, Kirby, *l. c.* 146, is a *MESSENA*, Stål.

✓ *MELICHARIA*, gen. nov. ✓

Belongs to subfamily Poekillopterinae [= Flatidæ + Ricaniidæ auctt.], and is very closely allied to *Flata*, Fabr. and

Ormenis, Stål.* The general characters are those of *Flata*, but the single series of nervures dividing the membrane from the corium is much more regular, and there is no reticulation at the apex of the latter. There are also no transverse nervures in the clavus.

✓ Type M. SINHALANA, nom. nov.—This is the †*Poecilopectera quadrata*, Kirby, *l. c.* p. 154, pl. vi. f. 8, but not that of Walker from Jamaica (1850, List. Hom.), and, therefore, in accordance with the rule mentioned above, the name is now changed.

✓ SCARPANTA TENNENTINA (Walker) = *Scarpanta latipennis*, Kirby, *l. c.* p. 153. The unique specimen of *latipennis* appears to be founded upon a poor example of *tennentina*.

○ RICANIA FENESTRATA (Fabr.); Peradeniya, frequenting *Aristolochia*, sp. (E. E. Green).

Family GEOCORIDÆ [=Lygaidæ auctt.].

In employing remedial measures against insect pests, entomologists have often to guard against the destruction at the same time of certain natural enemies of these pests, owing to the general similarity in appearance, both in external structure and in colour, of the insectivores and their prey. Mr. Green has recently sent me two nymphs, one of *Antilochus coquebertii* (Fabr.), the other of *Dysdercus cingulatus* (Fabr.)—the dreaded “Oriental Cotton-stainer”—with the note that the former had been discovered with its rostrum inserted in the person of the latter; as these two species belong to the same subfamily, Pyrrhocorinæ [=Largidæ + Pyrrhocoridæ auctt.], all the members of which are reputed to be vegetable feeders, I wrote Mr. Green, querying the note; but, in a reply dated Sept. 13th, 1900, he observes: “I think *Antilochus coquebertii* normally preys upon *Dysdercus cingulatus*; I have repeatedly seen the performance. If the two individuals are put in a glass tube together, the *Antilochus* immediately pounces upon the *Dysdercus*.” As the two insects are, comparatively, very similar in appearance, the former being merely larger and more brightly coloured in all stages, this observation appears to be of distinct value in connection with the cotton-plant question.

Fam. CIMICIDÆ.

CANTHECONA COGNATA, Dist.

C. furcellata, Wolff, has been noted (Indian Museum Notes, ii. 165, and iii. (5) 56) as a destroyer of caterpillars; Mr. Green has now sent me specimens (imago and nymph) of *C. cognata*, Dist. [= *insularis*, Kirby] that were “doing really good service in preying upon a caterpillar that was ravaging some croton plants here” (Peradeniya, Reg. No. 302).

* A detailed description, with figures of neuration, &c., was in progress when I learned that Dr. Melichar has in preparation a monographic revision of the group: I have therefore given here only a brief diagnosis.

RHYNCHOTA MISCELLANEA.

By G. W. KIRKALDY, F.E.S.

□ Fam. TETIGONIDÆ.

○ *Tetigonia ferruginea* (Fabr.).—Chosen (Korea), Port Lazareff (T. B. Fletcher, R.N.). This fine species is very common throughout the Oriental Region from China to Tenasserim, and would indeed be included in the palæarctic fauna at Port Lazareff.

○ Fam. FULGORIDÆ.

GEISHA, gen. nov.

Subf. Poekillopterinae; the characters are those of *Flata*, but there are no transverse nervures in the clavus, while the transverse nervures on the corium are very irregular, so that there is no sutured-off membrane. The latter character will at once separate it from *Melicharia*, Kirk.

Type *Pœcilloptera distinctissima*, Walker, 1858. List. Hom. Suppl. p. 114 (China and Japan).

✓ ○ POEKILLOPTERA, Latr.

Fowler, who adopts the later spelling "*Pœcilloptera*," enumerates in the 'Biologia Centrali-Americana, Homoptera, I,' p. 50, some of the variations of the name; but, as one of the references is inaccurate, and others are not the earliest known, a corrected list is here appended:—

✓ *Poekilloptera*, Latreille, 1796, Précis, ex pp. 83–92; and 1804, Nouv. Dict. Nat. Hist. xxiv., Tabl. méth., ex pp. 163–8.

○ *Pœcilloptera*, Latreille, 1804, Hist. Nat. Crust. Ins. xii. 315.

✓ ○ *Fulgora*, subg. *Flata*,* Latreille, 1807, Gen. Crust. Ins. iii. 164–5.

✓ ○ *Pœcilloptera*, 1818, Germar, Mag. Ent. iii. 218; 1825, Lep. Serv. Enc. Méth. x. 168.

✓ ○ *Pœcilloptere*, Latreille, 1825, Fam. Nat. 427.

✓ ○ *Cenestra circulata* (Guérin), St. Thomas (Pavenstedt, Mus. Bremen).

✓ ○ *Phromnia flaccida* (Walker), Nias Island (Mus. Bremen).

○ *Cerynia deplana* (Walker) = *albata*, Stal, Sumatra (coll. Kirkaldy, ex coll. Seeldrayers).

✓ ○ *Pyrops* [auctt.] *tenebrosus* (Fabr.), Belgian Kongo (collns. Seeldrayers and Kirkaldy); Hinterland of Togo (Spiess, Mus. Bremen).

* Fowler incorrectly quotes this reference as "*Pœcilloptera*." That name was appended in brackets as a synonym of *Flata*, Fabr., subg. of *Fulgora*, Linn.

Fam. CERCOPIDÆ.

○ *Ptyelus flavescens* (Fabr.); Belgian Kongo (collns. Seeldrayers and Kirkaldy).

○ *P. grossus* (Fabr.) var. *eburneus*; Belgian Kongo (collns. Seeldrayers and Kirkaldy).

Fam. CICADIDÆ.

○ *Dundubia mannifera* (Linn.); Sumatra, Deli, Soekaranda Estate (v. Usler, Mus. Bremen).

○ *D. minahassæ* (Dist.); Celebes, Maros (Albrandt, Mus. Bremen).

○ *Pycna limbata* (Fabr.); Togo (Spiess, Mus. Bremen).

Fam. REDUVIDÆ.

Platyeris horrida, Stål; Belgian Kongo, Luvituka (collns. Seeldrayers and Kirkaldy).

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

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

(Continued from p. 260.)

7. W. F. Evans: 'British Libellulinae,' 1845.

Under this title we have a small book containing twenty-one plates, in which are figured fifty-two dragonflies, a brief notice of each being given in twenty-eight pages of letterpress. The author believes "that one good figure of an insect is better than the most elaborate description by itself." Acting on this belief, he states that he has drawn the plates with the greatest care from the insects themselves. In this, however, he has achieved but a very moderate degree of success, for the drawing of the figures is extremely poor, and the colouring worse. It is, in fact, with the greatest difficulty that several of the insects can be recognized at all, and the identification therefore of some of the figures is given with considerable diffidence. The first two plates are devoted to details and nymphs.

Agrion rubellum (pl. 3, fig. 1 ♂) = *Pyrrosoma tenellum* ♂.

A. xanthopteron (pl. 3, f. 2) = *P. tenellum* also, apparently; but McLachlan and Kirby take it to be *Ischnura pumilio*.

A. elegans (pl. 3, f. 3 ♂, 4 ♀) = *Ischnura elegans* ♂ ♀.

A. azonatum (pl. 3, f. 5) = *I. elegans* (♀ ?).

A. rubens (pl. 3, f. 6) = orange variety of ♀ of *I. elegans*, probably.

A. puella (pl. 3, f. 7 ♂, 8 ♀) = *Agrion pulchellum* ♂ ♀.

A. furcatum (pl. 4, f. 1 ♂, 2 ♀) = *A. puella* ♂ ♂.

A. lunulatum (pl. 4, f. 3 ♂, 4 ♀) = *A. pulchellum* ♂ ♀.

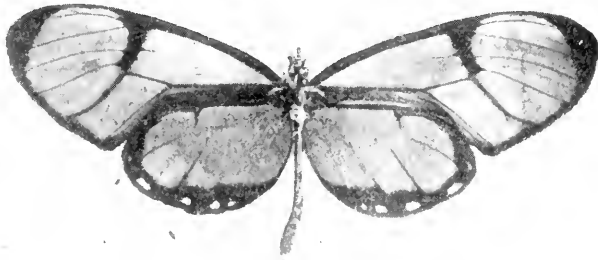
A. hastulatum (pl. 4, f. 5 ♂, 6 ♀) = ? This is one of those that it

- is impossible to identify satisfactorily; Messrs. McLachlan and Kirby set it down as *A. pulchellum*.
- A. cyathigerum** (pl. 4, f. 7 ♂) = *A. pulchellum* ♀.
- A. brunnea** (pl. 4, f. 8) = *Enallagma cyathigerum* ♀.
- A. annulare** (pl. 5, f. 1 ♀) = *A. puella* ♂.
- A. rufescens** (pl. 5, f. 2 ♂) = according to Kirby, *Ischnura elegans*, and possibly it may be the variety of this species with orange thorax.
- Pyrrhosoma minium** (pl. 5, f. 3 ♂, 4 ♀) = *P. nymphula* ♂ ♀.
- Erythromma fulvipes** (pl. 5, f. 5 ♀) = *P. nymphula*, ♂ with colouring somewhat immature.
- E. chloridion** (pl. 5, f. 6 ♀) = *P. nymphula* ♀ with colouring immature. The tip of the abdomen of a male, given with it, apparently belongs to *Erythromma naias*.
- Ischnura pumilio** (pl. 5, f. 7 ♂) may possibly be intended for *I. pumilio*, but the figure is most indefinite.
- Platynemis platypoda** (pl. 6, f. 1 ♂, 2 ♀) = *Platynemis pennipes* ♂ ♂.
- Lestes viridis** (pl. 6, f. 3 ♂) = *L. sponsa* ♂ [*L. nymphea* (unfigured) Evans considers to be a dark var. of this species].
- L. forcipula** (pl. 6, f. 4 ♂) = probably *L. sponsa* ♂.
- Calepteryx virgo** (pl. 7, f. 1 ♂, 2 ♀) = *Calepteryx splendens* ♂ ♀.
- C. Ludoviciana** (pl. 7, f. 3 ♂; pl. 8, f. 1 ♀) = *C. virgo* ♂; ditto ♀ with very dark wings [I judge that it is ♀ by the white pterostigma.]
- C. hœmorrhoidalis** (pl. 8, f. 2 ♂, 3 ♀) = *C. virgo* ♂ ♀.
- C. anceps** (pl. 9, f. 1 ♂) = *C. virgo*, var. *anceps*—the var. in which the blue pigment is wanting from the wings.
- Anax formosus** (pl. 9, f. 2 ♀) = *Anax imperator* ♂.
- Æshna rufescens** (pl. 10, f. 1 ♂) = *Æshna isosceles* ♀.
- Æ. grandis** (pl. 10, f. 2 ♂) = *Æ. grandis* ♂.
- Æ. maculatissima** (pl. 11, f. 1 ♂) = *Æ. cyanea* ♂.
- Æ. juncea** (pl. 11, f. 2 ♂) = probably *Æ. juncea* ♂.
- Æ. mixta** (pl. 12, f. 1 ♀) = probably *Æ. mixta* ♂.
- Æ. affinis** (pl. 12, f. 2 ♂) = probably *Æ. mixta* ♂.
- Brachytron vernalis** (pl. 13, f. 1 ♂) = *B. pratense* ♂.
- Cordulegaster annulatus** (pl. 13, f. 2 ♀) = *C. annulatus* ♀. The tip of abdomen of male is drawn at the side.
- Gomphus vulgatissimus** (pl. 14, f. 1 ♂) = *G. vulgatissimus* ♂.
- G. flavipes** (pl. 14, f. 2 ♂) = *G. flavipes* ♂.
- Cordulia ænea** (pl. 14, f. 3 ♂) = *C. ænea* ♂.
- C. metallica** (pl. 15, f. 1 ♂). By the build of the insect this may be *Somatochlora metallica*, but if so, the locality—round London—is at fault.
- C. Curtisii** (pl. 15, f. 2, ♂ 3 ♀) = *Oxygastra curtisii* ♂ ♀.
- Libellula depressa** (pl. 16, f. 1 ♂, 2 ♀) = *L. depressa* ♂ ♀.
- L. conspurcata** (pl. 16, f. 3, ♀) = *L. fulva* ♀.
- L. 4-maculata** (pl. 17, f. 1 ♂) = *L. quadrimaculata* (♂ probably) [*L. 2-maculata* (unfigured) is considered by Evans to be a var.].
- L. prænubila** (pl. 17, f. 2 ♂) = *L. quadrimaculata* var. *prænubila*.
- L. cancellata** (pl. 17, f. 3 ♂, p. 18, f. 1 ♀) = *Orthetrum cancellatum* ♂, ♀.
- L. cœrulescens** (pl. 18, f. 2 ♂, 3 ♀) = *O. cœrulescens* ♂ ♀.

- Diplax scotica* (pl. 19, f. 1 ♂, 2 ♀) = *Sympetrum scoticum* ♂ ♀.
D. rufostigma (pl. 19, f. 3 ♂, 4 ♀) = *S. sanguineum* ♂ ♀.
D. pallidistigma (pl. 20, f. 1) = *S. scoticum* (? ♂), immature.
D. angustipennis (pl. 20, f. 2) = *S. sanguineum*, probably.
D. vulgata (pl. 20, f. 3 ♂) = *S. striolatum* ♂, immature.
D. basalis (pl. 21, f. 1) = *S. sanguineum* ♂, immature.
D. flaveola (pl. 21, f. 2 ♂) = *S. flaveolum* ♂.
D. rubicunda (pl. 21, f. 3 ♂) = *Leucorrhinia dubia* ♂.

DESCRIPTION OF A NEW SPECIES OF *DIRCENNA*
FROM PERU.

BY WALTER DANNATT, F.E.S.



Dircenna barrettii, sp. n.

Male. Anterior wings transparent golden, with margins very dark brown (almost black), wider at apex. A broad dark band at end of cell, which is continued in a lesser degree down the second median nervule to the margin. Posterior wings have wide irregular margins with a submarginal series of five irregular white spots. Under side as above, but apex of anterior wing has three elongated white spots. Expanse, $3\frac{5}{8}$ in.

Hab. Perene, Peru.

This remarkable species, though believed by Dr. Staudinger to be a *Dircenna*, differs in some respects from hitherto known species in this genus (see fig.).

I have great pleasure in naming this insect after an American friend, Mr. Otis W. Barrett, to whom I am indebted for the addition of many beautiful specimens to my collection.

DESCRIPTION OF THE EGG OF *POLYOMMATUS CORYDON*.

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

As I believe there is no published description of the egg of this common butterfly, the following is a description taken down in my note-book on Aug. 16th last, after figuring the specimen. I should state that I examined several ova to check the one described.

On Aug. 13th, 1900, I watched several females in the act of depositing, on various stems of the usual stunted herbage to be found growing on chalk downs. They frequently crawled among the plants for a distance of about a couple of feet, occasionally curving the abdomen downwards among the small plant-stems and grasses, and here and there deposited an egg. I therefore dug up portions of the turf, potted it, and placed a couple of females on each lot; they deposited ova on the 14th and 15th, on the stems of the various plants; a few were laid upon the brown dead trefoil leaves, as well as on the living leaves; but the site generally chosen is the intermingled stems of both plants and grasses. Another female, placed upon a similar pot of plants, deposited about fifty ova on Sept. 10th, nearly all being placed upon the stems, and a few upon the under side of the leaves of rock-rose; in all cases the eggs are deposited singly.

“The egg is $\frac{1}{48}$ in. in diameter and $\frac{1}{30}$ in. high; it differs in shape from all the other eggs of the ‘blues’ which I have examined; instead of having a concaved surface above, it is flat, with merely the micropyle sunken; it is also higher in proportion, and the sides are almost perpendicular; the base is flattened, the micropyle is very finely punctured, an irregular network pattern covers the upper surface and gradually increases in size to the outer rim, where it develops into a beautiful lace-like pattern, which is considerably bolder than that of the other ‘blues’ eggs with which I am acquainted. The reticulations are united by very large prominent projecting knobs, and vary in number from five to seven. The sunken spaces between are very finely granulated. The colour when first laid is almost white, mainly caused by the whiteness of the glass-like reticulations and knobs, the colouring gradually changing to a slightly greenish grey hue.”

As the egg does not hatch until the following spring, the reason for no particular plant being selected as a site for the egg is at once apparent, as necessarily all the plants die off in the winter and become an entangled mass of withered stems. The young larva, upon emerging in the spring, must then search for the fresh growth of its proper food-plant.

September, 1900.

NOTES AND OBSERVATIONS.

ORTHOPTERA AT SUGAR.—Referring to Mr. W. J. Lucas's note (Entom. Oct. 1900, p. 266), I can add that during a collecting expedition to South Devon at the end of August and the early part of September last, Orthoptera were frequent visitors to my "sugar." No less than five species occurred, of which, next to *Forficula auricularia*, the most plentiful species was *Leptophyes punctatissima*, of which I saw as many as half a dozen or more on one evening; and very striking they appeared sipping the sweets among, and as greedily as, the Lepidoptera. Next in point of numbers came the fine *Locusta viridissima*, followed in smaller numbers by *Meconema varia* and *Ectobia panzeri*, of both of which there were at least several. The genus *Stenobothrus* was evidently not attracted, as, although *S. bicolor* abounded everywhere, I never saw one actually on the sugar. *Xiphidium dorsale* was not uncommon on marshy ground, and it probably would have been attracted if "sugar" had been used in its immediate vicinity, which it was not.—GEO. T. PORRITT; Crosland Hall, near Huddersfield, Oct. 5th, 1900.

VARIETY OF FORFICULA AURICULARIA.—Mr. F. B. Jennings has shown me a variety of *F. auricularia* which he took from under bark on an old hawthorn at Box Hill on August 5th last. It is small and very dark, almost as dark as *A. annulipes*. In the type the body is chestnut, the elytra paler, and the legs yellow. This one is almost unicolorous, the tint being a very dark brown-black.—W. J. LUCAS; Oct. 15th, 1900.

FLATOIDES, A REMARKABLE INSTANCE OF PROTECTIVE COLORATION. [RHYNCHOTA.]—In 1895 Brongniart called attention to a series of *Flatoides dealbatus* in the Paris Museum, from Madagascar,* as a remarkable instance of protective coloration. Among the more recent additions to the exponents of mimicry and protective resemblance arranged by Mr. Waterhouse in the Central Hall of the British Museum (Natural History) are some specimens of the above-mentioned species *in situ*. The harmony of these Fulgorids with their environment—lichens and mosses on the bark of certain trees—is admirable, and specially noteworthy are the apparent differences in the sculpturing of the elytra of various individuals—some quite smooth, others very rough, almost tuberculated—differences really due (as Mr. Waterhouse pointed out to the writer) to an optical illusion. This interesting genus occurs in Madagascar, New Guinea, and probably the greater portion of the Oriental Region.—G. W. KIRKALDY.

MONOGRAPH OF THE MEMBRACIDÆ.—Messrs. Lovell Reeve & Co. have in preparation a monograph of the *Membracidæ*, a remarkable group of Homopterous insects which have not received the attention their peculiar and diverse forms deserve. The author is Mr. George Bowdler Buckton, F.R.S., F.L.S., who will be glad to hear, through the publishers, from entomologists and others who have specimens which they have reason to believe are as yet unknown to science.

* "Note sur les Homoptères du genre *Flatoides*, Guérin" (Bull. Mus. Paris, No. 3, pp. 1-4 [2 sep.]).

FOOD-PLANTS OF HOMOPTERA.—Mr. E. D. Ball has lately been so kind as to identify a number of Homoptera for me, and it seems worth while to record the plants on which they occurred where these are known:—

(1.) *Idiocerus alternatus*, Fitch. Las Cruces, N.M., March 14th, on osage-orange. (Ckll.)

(2.) *Eutettix pulchella*, Baker. Mesilla, N.M., Aug. 26th, on *Populus*. (Ckll.)

(3.) *Ceresa turbida*, Godg. Rio Ruidoso, White Mts., N.M., Aug. 6th, about 7000 ft., on brake-fern. (Townsend.)

(4.) *Centruchus perdita*, A. & S. Rio Ruidoso, N.M., July 18th, about 6500 ft., beaten from *Quercus gambeli*. (Townsend.)

(5.) *Acutalis dorsalis*, Fitch. La Cueva, Organ Mts., N.M., Aug. 30th, about 5300 ft., beaten from *Quercus*. (Townsend.) I found this species at Dripping Spring, Organ Mts., and it lived, not upon the oak itself, but upon the *Phoradendron* growing on the oak.

(6.) *Thumnotettix coquilletti*, V. D. Mesa, Arizona, Oct. 17th, on a large-leaved *Acer*. (Ckll.)

(7.) *Deltocephalus fuscinervosus*, V. D. Rio Bonito, N.M., Oct. 17th, on *Solidago*. (Townsend.)—T. D. A. COCKERELL; E. Las Vegas, N.M., Sept. 1900.

ASPHONDYLIA MENTZELIÆ, n. sp.—At Raton, N.M., on Aug. 27th, I found that the ovaries of *Mentzelia multiflora* auctt. were considerably infested by a Cecidomyiid, which, breeding in them, caused the flowers to wither. The red-brown pupa-shells of the fly were seen sticking out of the sides of the flowers, and I had the good fortune, at about 6 p.m., to find a male fly which had just emerged from the pupa. It was a pretty insect, with the thorax and abdomen pale pink; abdomen with white hairs; legs whitish, tarsi more or less blackened; wings grey, hairy, second longitudinal vein reaching tip of wing, third longitudinal vein forked a little beyond its middle, fold in region of third longitudinal vein very distinct; antennal segments cylindrical, sessile, with sparse whorls of not very long hairs. Expanse about 7 millim. As usual in *Asphondylia*, the characters of the adult fly are not very distinctive, but the habitat in *Mentzelia* flowers will at once distinguish this insect from all others. There was a small lepidopterous larva also breeding in the ovaries of the *Mentzelia*, but it was not abundant.—T. D. A. COCKERELL.

CAPTURES AND FIELD REPORTS.

NOTES FROM NATAL.—Referring to my notes (*ante*, p. 229), I wish to say that the pupæ I found turned out to be those of *Zonilia accentifera*, and not of *Nephele hesperus*, as stated; also that I bred, from larva found on August 22nd, a slightly crippled female specimen of *Basiana postica*. This insect has the power of making a sound like that produced by *Acherontia atropos*. I have had two evenings' sugaring during this month (August), but so far as moths were concerned it was a failure.—GEO. F. LEIGH; Durban, Natal.

PAPILIO MACHAON IN SURREY.—One seen near East Grinstead about August 20th.—F. W. F.

PAPILIO MACHAON IN WORCESTERSHIRE.—A fine specimen of this butterfly was seen by Dr. Charles, of Grindrod, on August 31st, settled upon a thistle in the Teme valley, on a marshy spot of ground.—W. EDWARDS; Malvern.

One seen on August 31st near Martley.—F. W. FROHAWK.

LATE APPEARANCE OF EUCHLOË CARDAMINES.—While in North Cornwall, on July 10th last, I was surprised to see a male specimen of *E. cardamines* flying towards me down a lane, and just before it reached me it swerved to the left and disappeared over a high bank; it was then only about four yards distant. I had hoped to take it as a record specimen of late emergence. Previous to this the latest date that I have observed this species was on June 30th, 1885, when I obtained a female example near West Wickham, Kent. The earliest record I have is that of a male I captured on April 25th, 1880, at Norwood, Surrey; excepting the early and tropical summer of 1893, when I found *cardamines* out in numbers on April 22nd in Kent.—F. W. FROHAWK; October, 1900.

ARGYNNIS AGLAIA VAR. AT DOVER.—I received a very fine variety of this species from a Dover correspondent. It was taken by him on July 16th last, in the first hollow (Langdon Hole I think it is called) on the east cliff, and was posted to me, unset, soon after capture. It is a male, in very fine condition, and somewhat resembles the figure of *adippe* (Entom. xv. 49), but the black on the upper side is not quite so extended nor clearly defined, while on the under surface the fore wings have more black than said figure, but in the hind wings the silver spots are normal, except those along the outer edge, which are only faintly discernible.—E. SABINE; Erith.

[I have seen the specimen from which the figure (Entom. xv. 49) was made, and have no hesitation in saying that it is an aberration of *A. aglaia*. As the insect represented by figs. 2, 2a, Plate I., in the same volume, was stated in the remarks accompanying the plate to be an aberration of *A. aglaia*, and afterwards corrected to *A. adippe*, it would seem that some little confusion had occurred in the identification of these two aberrations.—R. S.]

APATURA IRIS IN NORTHAMPTONSHIRE.—Two specimens of *A. iris* have been captured in July within a few miles of Northampton.—W. BOSTOCK; Springfield, Northampton.

LYCÆNA BELLARGUS (ADONIS) IN HERTFORDSHIRE.—There is no record that I can find of this butterfly having been taken in this county until now. I have frequently looked for it on the chalk downs at Aldbury (where *L. corydon* is abundant every year), as *Hippocrepis comosa*, its food-plant, grows there abundantly, and I thought it ought to be found there. This month (September) I have found it on these hills, and have taken about a dozen specimens.—ARTHUR COTTAM; Eldercroft, Watford.

LYCÆNA ARGIOLUS.—This species has been even more abundant this year than it was last season, and I have taken and bred a very fine series, among them being a pale lavender-coloured male, three or four males exceptionally dark, another male having some of the colouring pigment absent on right fore wing, and a female (first brood) unusually suffused with black on all the four wings. All were captured in my garden, where it was

quite a common thing to net fifty or more in an hour or so of the forenoon.—E. SABINE; Erith, October, 1900.

VANESSA ANTIOPA IN HERTFORDSHIRE.—A fine specimen captured near Hatfield about October 10th.—[F. W. F.]

VANESSA ANTIOPA AT HUNTINGDON.—A fine specimen taken at Huntingdon on August 19th.—[F. W. F.]

VANESSA ANTIOPA IN KENT.—I took a perfect specimen of this species in an orchard at Beckenham, Kent, on August 31st last, at sugar.—G. HERBERT THOMPSON; Benhall Vicarage, Saxmundham, Suffolk, Sept. 24th, 1900.

VANESSA ANTIOPA IN NORFOLK.—One taken at sugar by Mr. Woodhall, near Holt, on August 30th.—[F. W. F.]

VANESSA ANTIOPA, &C., IN SOMERSETSHIRE.—Three *V. antiopa* have been seen in Bridgwater, but neither of them was captured. *V. atalanta* has been abundant and very fine. *V. cardui* has been more common than usual; also *V. io*, which had been scarce here of late years.—HENRY CORDER; Sunnyside, Bridgwater, October 9th, 1900.

VANESSA ANTIOPA IN SUFFOLK.—On September 4th a specimen of *V. antiopa* was captured by Lorimer Fison at Stutton Hall, Suffolk, in an outhouse, attracted by a bottle of syrup put there to catch wasps.—W. GIFFORD NASH; Bedford.

VANESSA ANTIOPA IN SURREY.—One captured in a garden at Beddington, Surrey, on August 31st.—F. W. F.

VANESSA POLYCHLOROS IN LONDON.—On July 21st my son caught a very fine female *V. polychloros* with his cap, close to South Bermondsey railway station.—D. CHITTENDEN; 98, Court Hill Road, Lewisham, October 10th, 1900.

VANESSA POLYCHLOROS AT HERNE, KENT.—On August 13th we captured two specimens of *V. polychloros*, which were flying round an oak tree in company with *V. atalanta*. They were attracted by the sap exuding from a wound in the trunk. We went again on the 14th, and succeeded in taking a third, which had settled on the trunk of another tree, also feeding on the sap. Although we have been collecting for ten years, we have never captured this insect in Bucks.—G. ERNEST PEACHELL; High Wycombe, Bucks, August 26th, 1900.

VANESSA IO IN YORKSHIRE.—On September 28th I caught a specimen of *V. io* near the house. According to best authorities it is over a dozen years since one was caught in this district.—ARTHUR ROBERTSHAW; Ellenrayde Hall, Luddeuden Foot, October, 1900.

ACHERONTIA ATROPOS IN LONDON.—It may be of interest to record the capture of a specimen of *A. atropos* this morning. It was taken while at rest on a street lamp a few yards from our place of business in the Strand.—WATRINS & DONCASTER; October 3rd, 1900.

ACHERONTIA ATROPOS IN WORCESTERSHIRE.—This species has been more than usually abundant this season in the Malvern district, nine coming to my share.—W. EDWARDS; Malvern.

MACROGLOSSA STELLATARUM.—*M. stellatarum*, which was abundant last year, has only been represented by an occasional specimen. I saw one this

morning hovering over flowers during a smart shower of rain.—WALDEGRAVE; The Priory, Chewton Mendip, Somerset, Sept. 24th.

DEILEPHILA LIVORNICA IN NORTH STAFFORDSHIRE.—The Rev. W. H. Heale took in his garden at Wolstanton Vicarage a male specimen of *D. livornica* in excellent condition, flying at pinks, on July 11th. This is its first recorded appearance in our district, and is a most welcome addition to our list.—THO. W. DALTRY; Madeley Vicarage, Staffordshire.

CHEROCAMPA NERII IN KENT.—A fine female of this rare species was captured by Master Guy Wickham, in his father's dining-room at Willow Grove, Yalding, about 6.30 p.m., on Sept. 18th last. The window of the room was open, and there was a lamp burning on a sideboard at the far end; there were some plants of *Nicotiana affinis* in the garden outside. Unfortunately it was very much damaged, as the boy had only a very small "sea-side" net and no killing-bottle, so the moth took a deal of hunting before it was caught, and had to be killed like a butterfly, by severe pinches under the thorax.—(Capt.) S. G. REID; Yalding, Kent, October, 1900.

NOTE ON A PUPA OF GONOPTERA LIBATRIX.—Both Newman and the Rev. Seymour St. John give as the food-plants of *G. libatrix* sallow and white willow only. This autumn I found at Hayward's Heath a pupa in a curled-up leaf of the black poplar, and from this a specimen of *G. libatrix* emerged a few days ago.—T. GODDARD WILLIAMS; The Neuk, Danehill, Sussex, October 15th, 1900.

NOTODONTA DICTÆOIDES DOUBLE-BROODED.—On June 6th last I took a pair of *N. dictæoides* on the bough of a birch. The female I sleeved on birch. She deposited eggs from which fifty-two larvæ resulted. These pupated, the last on August 4th. On the 28th of the same month four insects had emerged; and on the following day two more were out; the others are still in pupæ. On August 8th I took another pair, from which I obtained forty larvæ; the last of these pupated on October 5th. The earliest date I have taken the insect was June 6th this year; the latest I have taken it was August 31st, 1894.—C. HAMLIN; Forest Cottage, Balcombe, Sussex, October 9th, 1900.

XANTHIA GILVAGO IN SURREY.—I took a nice specimen of *X. gilvago* at sugar on September 26th last. I have not heard of the species being taken in this county before, and should like to know if this is so.—L. M. SETH-SMITH; Alleyne, Caterham Valley, Surrey, Oct. 5th, 1900.

[There are several records of the occurrence of this species in Surrey, some of them as recent as the year 1898 (*vide* Entom. xxxi. pp. 267, 293).—ED.]

PLUSIA MONETA AT MERSTHAM.—On July 28th of this year I took a specimen of *P. moneta* flying over *Nicotiana affinis* at Merstham, Surrey.—F. W. J. JACKSON, 2, Vicarage Gate, Kensington, W., Sept. 27th, 1900.

DIANTHÆCIA CUCUBALI IN AUGUST.—I took an apparently freshly emerged specimen of *D. cucubali* at sugar on August 14th at Merstham.—F. W. J. JACKSON, 2, Vicarage Gate, Kensington, W.

NOCTUA CASTANEA IN THE NEW FOREST.—With reference to the note on this species (*ante*, p. 271), it may interest you to hear that I took a fine specimen of the typical red form of *N. castanea* at sugar in the New Forest in August, 1895.—E. A. COCKAYNE; 6, Tapton House Road, Sheffield, October 6th, 1900.

LEUCANIA VITELLINA IN ESSEX.—I have the pleasure to record that I took a specimen of *L. vitellina* here at sugar on September 25th. As this is not altogether an abundant species, it may be as well to note that on the tree it looked very like a wasted *Xanthia ferruginea*. A more careful inspection of pale *X. ferruginea* therefore might possibly result in more *L. vitellina*.—(Rev.) W. CLAXTON, Navestock Vicarage, Romford.

CATOCALA FRAXINI IN NORFOLK.—One example taken on the sand-hills near Blakeney at the end of August.—[F. W. F.]

HELIOTHIS SCUTOSA (*Schiff.*) IN SOUTH DEVON.—On September 4th, whilst collecting with me in a clover-field near Dartmouth, my son, F. Capel Hanbury, captured a specimen of this extremely rare species. It flew rapidly when disturbed, and then buzzed at the clover-heads like *Plusia gamma*. The specimen is a male, but in poor condition. Mr. Eustace R. Bankes, who was staying with us at the time, saw the specimen alive, and concurred in the determination.—FREDERICK J. HANBURY; Stainforth House, Upper Clapton, N.E., September 24th, 1900.

CYMATOPHORA OCCULARIS AT CHINGFORD.—On May 27th I took a pupa of this species under a poplar tree in my garden. The perfect insect emerged on May 31st. I should add that a friend of mine has also taken this moth, once at sugar last year, and again this year at light, in this locality.—S. GRAHAM; Chingford, Essex.

ENNOMOS ALNIARIA AT BOGNOR.—In the course of a walk with my brother-in-law, Mr. Graham Davis, he called my attention to a moth caught in a spider's web on a gas-lamp in this town. On being captured and examined, it proved to be *E. alniaria*. I find this species is recorded by Mr. Alfred Lloyd in his list of the Lepidoptera of Bognor. Mr. W. H. B. Fletcher also informs me that it is known to occur at Chichester, some six miles from here as the crow flies.—R. MELDOLA; Bognor, Sept. 23rd, 1900.

LEUCANIA VITELLINA AND PLUSIA FESTUCEÆ AT BOGNOR.—Since sending the record of the capture of *E. alniaria*, I am able to add that, at sugar on September 28th, I took two very good specimens of *Leucania vitellina*. At Pagham, about the middle of the month, I saw at sugar, but unfortunately lost, a fine specimen of *Plusia festucæ*. Neither of these species is recorded in the local list.—R. MELDOLA; Bognor, Sept. 30th.

PIERIS DAPLIDICE, &c., AT BOGNOR.—Mr. H. L. F. Guermontprez, the well-known naturalist resident here, informs me that in many respects the season has been remarkable. I saw on his setting-board a beautiful *Pieris daplidice*, taken by him near Felpham on September 3rd. *Colias hyale* has been fairly common, and also *C. edusa* and the larva of *A. atropos*. It is noteworthy also that many species appear this year to have been made double-brooded by the fine September succeeding the wet and cold August. I took a good specimen of *Agrotis exclamationis*, for example, on September 21st, an unusually late date for this species.—R. MELDOLA; Bognor, September 30th.

EPUNDA NIGRA IN KENT: A CORRECTION.—In your last issue (*ante*, p. 271) I recorded the capture of *E. nigra* here. I should like to correct that statement. It was a mistake; the insect I took I afterwards discovered to be a very dark form of *E. lutulenta*. *E. nigra* has never been taken here or near here, as far as I can gather.—A. J. LAWRENCE; 8, Cross Roads, Bromley Common, Kent, October 19th, 1900.

MELANIPPE TRISTATA.—I should like to record the capture at Church Stretton, in this county, last month, of a goodly number of *M. tristata*. I found it on the Longwynd, at an elevation of at least a thousand feet above the sea, where alone it seemed to occur. I had previously taken it only in two North Derbyshire localities, both of which are also at high elevations. Is this the experience of others?—(Rev.) CHAS. F. THORNEWILL; Calvershall Vicarage, Whitchurch, Salop.

NOTE ON XANTHIA FERRUGINEA AND X. GILVAGO.—I have been breeding this year, from larvæ found in this parish, the two closely allied species, *X. ferruginea* and *X. gilvago*, the larvæ of which are practically undistinguishable. My first imago of *X. ferruginea* emerged on August 18th, while *X. gilvago* did not begin to appear till September 5th. Is this the experience of others, or is it merely an accident?—(Rev.) C. F. THORNEWILL; Calvershall Vicarage, Whitchurch, Salop, September 12th.

ALEUCIS PICTARIA IN KENT.—I have to record the capture of a specimen of *A. pictaria* on April 23th last near Ashford. It was flying after dark, and is the only example of the species that I have ever met with in the locality, although I have collected there for a number of years past.—D. CHITTENDEN; 98, Court Hill Road, Lewisham, S.E.

LIPARIS CHRYSORRHŒA ABUNDANT AT HOVE.—I was pleased to find the above-named insect very abundant in this neighbourhood this year.—ALAN W. CARDINALL; 18, Cromwell Road, Hove, July 29th, 1900.

ABUNDANCE OF PLUSIA GAMMA.—You published a note from me (*ante*, p. 129) to the effect that during the whole of last year I did not see a single specimen of *Plusia gamma* in Hayling Island. Although this is usually a very common species here, this year it is more abundant than I have ever known it. Hundreds are to be seen during the day-time flying from flower-head to flower-head in every clover field.—ALBERT MAY; Hayling Island, August 21st.

[*P. gamma* appears to have been generally abundant throughout the country this year.—ED.]

ODONATA IN KENT.—I took a female specimen of *Æschna mixta* at Ramsgate on September 19th. *Sympetrum striolatum* was swarming at Ramsgate on the same day, at Sandwich on Sept. 21st, and at Folkestone on October 3rd.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E., October 12th, 1900.

RHYPAROBIA MADERE IN LONDON.—I found an example of this species in my desk at Covent Garden this morning.—HENRY J. DIXON; 29, Sutherland Avenue, Maida Vale, September 25th, 1900.

SIREX GIGAS.—This sawfly seems to have taken up its quarters permanently in the neighbourhood. I have caught half-a-dozen specimens in Kendal and Windermere during the past three years, the most recent falling stunned by the blow of a straw hat in Stramongate, Kendal, on July 21st this year.—(Rev.) A. M. MOSS; 12, Greenside, Kendal.

COLLECTING AT SIDMOUTH.—A few days' collecting at Sidmouth, with Mr. B. R. Roberts, of Cornwall, during the latter half of June, were fairly successful, although the weather was so cold and wet. *Leucophasia sinapis* was abundant in its usual haunts on the cliff, and was in good condition. We found beating during the day far the most productive work, and took the following moths:—*Anticlea rubidata* (very abundant and in

grand condition), *Numeria pulveraria*, *Emmelesia affinitata*, *E. alchemillata*, *E. decolorata*, *Cidaria corylata*, *C. silaceata*, *Ligdia adustata*, *Melanippe rivata*, *M. galiata*, *M. ocellata*, *Coremia propugnata*, *C. unidentata*, *Corycia temerata*, *Ephyra trilinearia*, and *E. omnicauda*. Trunk searching was very tiring work, only one *Stauropis fagi* represented some hours' search. In the lanes, *Chelonia villica* was by no means scarce, and *Thecla rubi* were very plentiful. Sugaring was a failure; only a few *Acronycta rumicis*, *Agrotis exclamationis*, and *Xylophasia monoglypha* came to the bait.—H. O. WELLS; Hurstfield, The Avenue, Gipsy Hill, London, S.E., Aug. 24th.

NOTES FROM SOUTHEND.—At a distance of seven miles from here—a pleasant run over a good road for the cyclist—the asters made a fine show during September, and larvæ of *Cucullia asteris* were fairly common. Larvæ of *Spilodes palealis* occurred frequently in umbels of the wild carrot. Surely this species has been observed elsewhere this season. With us it seems to have reappeared in considerable numbers, after an absence of several years. A worn *Spilodes sticticalis* occurred at aster bloom, Sept. 15th, and a fine *Aplecta occulta* (typical southern form) came to sugared *Eupatorium* Aug. 18th.—F. G. WHITTLE; 3, Marine Avenue, Southend, Oct. 3rd.

NOTES FROM NORTH WALES.—While spending a fortnight's holiday at Barmouth, from the beginning of July, I had the pleasure of seeing *C. edusa* on two occasions: one specimen on the coast-road to Towyn, and another near Beddgelert. *Ino statices* was captured at an elevation of 1200 feet on one of the lower slopes of Cader Idris.—W. S. GILLES; Bocking, Braintree.

CATOCALA FRAXINI IN THE ISLE OF WIGHT.—On Sept. 19th last I had the good luck to capture a very fine specimen of this splendid moth at sugar on the trunk of an ash not far from this house, and another rather worn was taken close by three days later.—HUGO HARPUR CREWE; Spring Hill, East Cowes, I. W.

EPUNDA NIGRA, DASYCAMPA RUBIGINEA, &c., AT CAMBERLEY.—On Sept. 20th last I took *E. nigra* on the trunk of an apple-tree that I had sugared; on Oct. 10th, 1899, I obtained a specimen of the same species on ivy. In October, 1899, I took two specimens of *D. rubiginea*, and last week (Oct. 16th, 17th, and 19th) I took three more specimens, all on the same piece of ivy. I also took *Xanthia aurago* at sugar in September last. All the above were taken within a radius of ten yards, on the borders of Berkshire, less than a mile from both Hants and Surrey.—(Lieut.-Col.) A. F. MOCKLER-FERRYMAN; R. M. College, Camberley, Oct. 23rd, 1900.

MISCELLANEOUS NOTES.—On July 13th last I took a day on the hills from Betchworth to Box Hill; one *E. hyperanthes*, quite fresh, was taken: *Hesperia thaumas* was out in tolerable numbers; *E. ianira* in intolerable ditto; *Euchelia jacobæ* was to be found both in the larval and in the perfect stage; in a clearing in a wood near Box Hill I took a specimen of *Thecla w-album* and saw one or two more; *Macroglossa stellatarum* was fairly abundant. On July 15th I again went to Box Hill; a very fine specimen of *Vanessa cardui* provided some sport, but was not captured, and I took two more *T. w-album*; this time *M. stellatarum* was in great numbers. Nailed shoes are advisable for the Box Hill country. Stimulated by Mr. Lucas's note (*ante*, p. 202) on the abundance of larvæ of *T. w-album* somewhere near Ripley, I went over there yesterday, hoping to complete my series more easily than would be the case at Box Hill; in this I was disappointed, as I did not see a single specimen. On the road from Ripley to Cobham I saw one of the large fritillaries, *A. paphia*, I

think, but I could not say for certain. *Lycæna ægon* was abundant on the common on the east side of the road, and *Hesperia sylvanus* and *H. thaumas* were not uncommon. A female *Fidonia piniaria* was also taken. To-day I have seen a female *Lycæna argiolus* here (Sutton). Evidently the fine weather is bringing on second broods.—D. P. TURNER; Sutton, Surrey, July 18th, 1900.

COLIAS EDUSA AND C. HYALE IN ENGLAND, 1900.

(Continued from p. 280.)

COLIAS EDUSA AND C. HYALE IN CAMBRIDGESHIRE.—I saw two *C. hyale* and one *C. edusa*, flying in company, at Wisbech St. Mary, on Sept. 20th. I had no net with me, and when I visited the spot on the two succeeding days the wind was both cold and stiff, and *Colias* did not reappear. In "the great *edusa* year," in the seventies, they swarmed in that locality.—CHAS. OLDHAM; Chelmsford Road, South Woodford, N.E., Oct. 13th, 1900.

On Aug. 15th I took a specimen of *C. hyale* on the road between Soham and Wicken Fen.—W. GIFFORD NASH; Bedford.

COLIAS EDUSA AND VAR. HELICE IN CORNWALL.—Between Aug. 29th and Sept. 6th *C. edusa* was in great profusion near Falmouth. I first found them on Aug. 29th, on the clover in a stubble-field sloping sheer up from the sea-cliffs with an eastern aspect. I saw about twenty males, of which I captured six, but saw only one female. The next day was almost a repetition, except that I did not attempt any captures. The following day not a single *edusa* was to be seen in the field, although conditions of weather were just similar, and for a week after this I went daily to the field, but saw only a single female, which circumstance seems very unaccountable. However, on Aug. 31st I made tracks along the coast for about a couple of miles, and happened on a lucerne field where *edusa* simply swarmed. On this day females were much more abundant than males, but between Aug. 31st and Sept. 8th I found them about evenly distributed. This field was sloping sheer up from the sea-cliffs, and with both south and south-east aspects. My experience was almost a repetition of that recorded by Mr. Clogg in the second volume of the 'Entomologist,' page 338, and mentioned by Newman in his 'British Butterflies,' for between Aug. 31st and Sept. 8th I could have taken in this single field seven or eight hundred *edusa* without any difficulty. I daily took them freshly emerged from the chrysalis, and although I saw many before their wings were thoroughly dried, I was not fortunate enough to find a single pupa-case. Let it not be thought, however, that I am an "exterminator." I captured on an average about forty per day for the eight days (on the look out for vars., of course), but out of this number set only twenty-four males and twenty-four females (which a brother and a friend will share), releasing all the others. With delight I also record that from among the hundreds of *edusa* I saw, I captured eleven specimens of the beautiful female variety *helice*, all in grand condition, and of varying shades of colour, from the extreme variety. There are four distinct transitional shades of colour amongst them. With the exception of one morning, when I took four, a single *helice* only was taken each day, and these freshly emerged ones. From careful observations, *edusa* and *helice* were "at home" between the hours of 11 a.m. and 3 p.m.: either before or after, very few indeed were on the wing. I did not see a single *C. hyale*. In this same field *Plusia gamma* swarmed also; *Vanessa cardui* was fairly abundant, but a few only *V. atalanta* were seen.

The weather was beautiful all the time, with brilliant sunshine and light south and south-east winds. The memory of that field will ever give me delight, and, personally, I shall record the year as a *Colias* one. In and around Truro *C. edusa* has also been plentiful.—W. A. ROLLASON; The White House, Truro, Cornwall, Oct. 6th, 1900.

COLIAS EDUSA AND C. HYALE IN HAMPSHIRE.—With regard to the occurrence of *C. edusa* and *C. hyale* this year, I may mention that on Portsdown Hill the latter, during last July and August, has been as abundant as the former. On August 14th I captured two insects together, and, strange to say, they were both identified as *helice*. I have heard of a typical male and var. *helice* being captured together, but never two *helice*. The only difference between these two specimens is that one possesses a faint yellow tint, which is entirely absent in the other. Also the border of the hind wing in the whitish specimen is not so well defined as in the yellowish one. Indeed the border of the latter is darker and broader than any *helice* that I have seen. In my opinion the dark specimen is the male, and the pale the female. In *hyale* I find two distinct colours—a canary-yellow and pale greenish white—but they do not appear to be different sexes, as I have frequently taken two yellow together.—H. LA CHARD; 51, Powerscourt Road, Kingston, Portsmouth, Sept. 22nd, 1900.

Both *C. edusa* and *C. hyale* have been plentiful this year on the downs and railway embankments in the neighbourhood of Portsmouth. The two species occurred in about equal numbers. Between August 11th and Sept. 12th twenty-seven *C. hyale* were taken, of which eight were females. Others were captured and released after examination for var. *helice*, one of which was obtained. The latest date on which a specimen of *C. hyale* was seen was Sept. 24th; several specimens of *C. edusa*, however, were seen to be still flying on Oct. 12th. Single specimens of *C. edusa* were seen in different localities on June 12th, 13th, and 19th. The one seen on June 19th was a large, but rather worn female. It was full of eggs, and would evidently be the parent of an autumn brood.—G. M. RUSSELL; Oct. 15th.

COLIAS HYALE IN KENT.—In my recent note (*ante*, p. 277) on the occurrence of *C. edusa* and *C. hyale* at Hythe, I mentioned the capture of a specimen of *C. edusa* var. *helice*. The insect in question is a white form of *C. hyale*.—R. S. MITFORD; 35, Redcliffe Square, S.W., Oct. 7th, 1900.

COLIAS EDUSA IN LANCASHIRE.—I caught a very fine male *C. edusa*, a rather large one, at Grange-over-Sands, in North Lancashire, during the second week in September. It was flying over a field of ragwort, close to the sea-shore. I watched the field for many days after, but never got another, although others were seen before my capture, by other collectors. I am not aware that any specimens of *C. hyale* were seen.—R. C. LOWTHER; Fernleigh, Grange-over-Sands, North Lancashire, Oct. 14th.

COLIAS EDUSA AND C. HYALE IN LEICESTERSHIRE.—During the last week in August I saw several specimens of *C. edusa* and one of *C. hyale*, in the Charnwood Forest, near Loughborough.—W. GIFFORD NASH; Bedford.

COLIAS EDUSA IN LONDON.—A specimen of *C. edusa* was noticed in the Strand, making its way towards Charing Cross, about a fortnight ago.—WATKINS & DONCASTER, 36, Strand, W.C., Oct. 3rd, 1900.

COLIAS EDUSA AND C. HYALE, &c., IN NORFOLK.—On Aug. 13th I captured, at Honing, near North Walsham, a male and female of *C. hyale*, and a female of *C. edusa*, in a clover-field; all were fine specimens. *Cynthia*

cardui was abundant, and *Vanessa io* swarming, in the same field. I also took two fine specimens of *Catocala nupta*, on tarred wood, in the same place.—F. A. OLDAKER; Parsonage House, Dorking, Oct. 11th, 1900.

COLIAS EDUSA AND C. HYALE IN NORTHAMPTONSHIRE.—*C. edusa* has been fairly abundant in many localities in Northamptonshire, and *C. hyale* has been seen and captured frequently. My sons caught five of the latter, and altogether I have heard of some twenty more captures near Northampton. The appearance here of *C. hyale* is most unusual, and I have not seen it before over a period of twenty-five years.—W. BOSTOCK; Springfield, Northampton, Oct. 9th, 1900.

COLIAS EDUSA IN NORTH WALES—During a five weeks' sojourn in Wales, over an extensive tract of country, I was much struck by the comparative rarity of *C. edusa*, in what has evidently been "an *edusa* year." Starting at Aberystwyth on Aug. 9th, I went out in daily expectation of seeing *edusa*, especially as the weather was all that could be desired for entomology. No sign of it appeared, however, until Aug. 23rd, when a fine female was given to me on Constitution Hill, caught within a few yards of the turnstile at the top of the cliff tramway; and on the following day a second specimen was noticed, flying on the railway embankment between Aberystwyth and Clarach. On Sept. 3rd we left Aberystwyth for Barmouth, and though we explored the country in all directions, *edusa* was still scarce. On the 6th, 9th, and 10th, odd specimens were seen in Barmouth, probably the same insect, as all occurred within a few yards of each other and near the sea-shore, the last being seen on the station siding. On the 5th a single specimen was noticed, flying in some fields between Llanbedr and Harlech; and on the 7th another was observed, near the head of Tal-y-Llyn, close to the foot of Cader Idris. On Sept. 10th we moved into Snowdonia, and on the 11th saw three *edusa* within a few miles of Beddgelert. Another single specimen on the 14th, near the Fairy Glen, Bettws-y-Coed, completes the list—a very disappointing one for the large area comprised.—E. MAUDE ALDERSON.

C. edusa was abundant this year at a small place about two miles from Holyhead, in Anglesea. First seen on Aug. 26th, and in numbers during first week of September; I have seen as many as seven in flight at once; my daughter caught no less than eleven in about an hour and a half. I was unfortunately, lame, and could not join in the pursuit. We caught twenty-three, all, except one that was worn, fine fresh specimens; there were twenty males and three females. I also ascertained that some neighbours captured sixteen males and two females. I left on Sept. 10th, and do not know what was done after, No *hyale* seen.—T. ROMER; The Lings, Livingstone Drive, S., Liverpool, Sept. 22nd, 1900.

COLIAS EDUSA IN SOUTH PEMBROKESHIRE.—This butterfly has been quite common here this summer, chiefly males; but though a careful watch has been kept, we have not seen a single specimen of *helice*, nor of *C. hyale*, which I believe never comes so far west. There have been immense numbers of the common *E. tithonus*, both here and at St. Davids, but sugar and ivy have both been very unproductive this year.—J. S. PUCKRIDGE; Castle-martin Vicarage, Pembroke.

COLIAS EDUSA AND C. HYALE IN SOMERSETSHIRE.—I did not come here till Aug. 8th. I saw my first *C. edusa* on the 13th, and have observed stray specimens on most fine days since the 18th of that month, which, with very few exceptions, were males. The land here being nearly all grass,

there is not much attraction in the way of clover-fields.—WALDEGRAVE ; The Priory, Chewton Mendip, Sept. 24th, 1900.

You may perhaps have had reports as to *Colias* from this district. In August I saw, near Bridgwater, one specimen of *C. hyale* and a few *C. edusa*. Mr. Cottam, of Watford, took one *hyale*, three *helice*, and other *edusa*. I then went to Chelmsford, where *edusa* were decidedly scarce, only four or five being seen in a fortnight, but I took a nice series of *hyale*, in good condition, at the end of August. Returning to Bridgwater, could hear of no more *hyale*, but *edusa* was still to be found in clover-fields; females were rare, and no more *helice*.—H. CORDER; Sunnyside, Bridgwater, Oct. 9th.

COLIAS EDUSA, &c., IN STAFFORDSHIRE. — *C. edusa* has at length reappeared in North Staffordshire; on Aug. 27th my friend, Mr. W. H. Earl, of Newcastle-under-Lyme, saw one between Endon and Leek, and on Sept. 4th my son Harold found one asleep on a flower, in a cutting of the North Staffordshire Railway in this parish; it is a very fine female specimen, in perfect condition; two days later he saw two others in Swynnerton Old Park, My son also captured a fine male *Vanessa cardui*, flying at petunias close to my front door. This is an insect which has not been observed here for several years; I have never known it to be plentiful in North Staffordshire. Since his return to school I saw a male *Gonepteryx rhanni*, flying at flowers in the vicarage garden, on Sept. 23rd and 25th. This species is very uncommon here; I have only seen three or four specimens during the forty years I have been here, and I never saw it in the garden before. *V. atalanta* has been most abundant here all September; it chiefly affects the dahlia flowers, and I frequently observed from a dozen to twenty at one time on ours. A few *V. io* were also observed.—(Rev.) T. W. DALTRY; Madeley Vicarage, Staffs.

COLIAS EDUSA AND *C. HYALE* IN SUFFOLK.—On Aug. 13th the first specimens made their appearance in a clover-field at Stutton Hall, and during the month eighteen specimens of *C. hyale*, several *C. edusa*, and six specimens of the variety *helice* were taken.—W. GIFFORD NASH; Bedford.

COLIAS EDUSA AND *C. HYALE* IN SURREY.—The above have been very plentiful this year in Reigate district; eleven *C. hyale* and thirteen *C. edusa* have fallen to my net alone. I saw over three dozen of *C. hyale* on Aug. 27th.—W. FAIRCHILD; 5, Worcester Road, Reigate, Surrey, Sept. 30th.

COLIAS EDUSA IN SUSSEX.—Although not seen in sufficient numbers to be called abundant, *C. edusa* may fairly be said to have been tolerably common at Eastbourne in the later part of August and the first week in September last, I first met with it in one of the sheltered hollows under Beachy Head, on Aug. 24th, when a somewhat wasted female was taken. On the following day another example flew past me, too rapidly to admit of either condition or sex being ascertained, as I was on my way to the same spot, and on reaching there I secured a still more wasted female than the first, which, it is needless to say, I also turned adrift. I had no further opportunity of looking for the species until Sept. 3rd, when, on going to the same "hollow," I found *edusa* flying wildly on the down-sides, whether one or half a dozen I am unable to say, but I can honestly say that, in my endeavour to elucidate the question, I took more physical exertion in the course of an hour than I had done in a like space of time for many a long day. However, on the following morning the question was set at rest by the capture of some half-dozen individuals, comprising both sexes, and for the most part in fairly fresh order, and several others

being seen. Beyond this, some three examples, all males, were from time to time seen flying along the beach or parade, but I met with none in the surrounding country, although I traversed a good deal of it; nor did any *C. hyale* come under my notice.—ROBERT ADKIN; Lewisham, October, 1900.

COLIAS EDUSA AND *C. HYALE* IN WORCESTERSHIRE.—I have seen both species in various parts of this neighbourhood.—W. EDWARDS; Malvern.

COLIAS EDUSA IN YORKSHIRE.—A fine specimen of *C. edusa* was seen on the New Esplanade, Scarborough, on Sept. 25th.—JAMES H. ROWNTREE.

COLIAS HYALE IN MAY AND JUNE, 1900.—It is a regrettable fact that no notices of the earlier appearances of *C. hyale* have been published in the 'Entomologist.' I observe in the October number of the Magazine that only in one instance has the appearance been noted, that by Mr. Colthrup, at Beachy Head on June 12th. *C. hyale* was observed in some numbers during the earlier (and finer) days of June at Darenth, in Kent. Mr. Davis, of Dartford, reported its appearance in the last week of May. No fewer than a dozen were taken in the vicinity of Farningham during June. I myself observed the insect at Shoreham, Otford, Old Bexley, Uplands (Bexley Heath), and Crayford; and Mr. T. B. Andrews, of Bexley Heath, captured two fine specimens at Bridgen, on June 10th or 11th. Several were also observed on Plumstead marshes in late May. *C. hyale* has been particularly plentiful this season in this district, more so in fact than *C. edusa*, which may account for the fact that so few var. *helice* have been taken. Given a mild winter, I would venture to prophesy that 1901 will prove the "*edusa* year."—WM. A. CARTER; Burr Villas, Bexley Heath, Oct. 20th, 1900.

COLIAS HYALE IN JUNE.—Mr. H. S. Fremlin informs me that he saw a specimen of *C. hyale* at Mereworth, in Kent, in June last. He thinks the date was the 4th of the month.—RICHARD SOUTH.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—October 3rd, 1900.—Mr. G. H. Verrall, President, in the chair. Mr. E. A. C. Studd, Oton, Exeter Mr. H. Maxwell Lefroy, B.A., Barbadoes Economic Entomologist to the Imperial Agricultural Department for the West Indies; Mr. W. F. Urwick, 34, Great Tower Street, London, E.C., were elected Fellows of the Society.—Mr. G. C. Champion exhibited specimens of *Trogophleus anglicanus*, Sharp, found by Mr. Keys at Plymouth; *Pachyta sexmaculata*, L., found by Col. Yerbury at Nethy Bridge, and *Anchomenus quadripunctatus*, De Geer, found by himself at Woking.—Mr. M. Jacoby exhibited an ichneumon, *Rhyssa persuasoria*, taken by him at Blandford, parasitic on *Sirex*, and Col. Yerbury said that he had met with the same species in some numbers in Scotland. One female observed in the act of oviposition had thrust her ovipositor, which is about the consistency of a human hair, through an inch of fir trunk.—Col. Yerbury exhibited:—(1) a rare sawfly, *Xyphidria camelus*, taken in Scotland this year at Nethy Bridge. The species is mentioned in the old books as extinct in the United Kingdom, and Mr. Waterhouse said there were no modern specimens in the South Kensington

Museum collection. (2) Rare diptera from Scotland, including (a) *Laphria flava*, two males from Nethy Bridge; (b) *Chamæsyrphus scævoides*, new to the fauna of Great Britain, from the Mound, Sutherland, where it was common on Umbelliferæ under fir trees in a damp wood, one female also being taken on the path up Cairngorm, near Glenmore Lodge; (c) *Microdon derivus*; (d) *Chilosia chrysocoma* at mountain-ash blossom, Nethy Bridge; and (e) *Stomphastica flava*, two males from Golspie, September, 1900.—Mr. H. K. Donisthorpe exhibited (1) a specimen of *Drusilla canaliculata* with the dead body of a *Myrmica* in its mouth, captured at Chiddingfold on July 17th; (2) specimens of *Myrmedonia collaris* and its larva taken in Wicken Fen with *M. levinodis* in August, 1900.—The Rev. F. D. Morice exhibited a remarkable hermaphrodite of the bee *Podalirius* (= *Anthophora*) *retusus*, in which the male characters were confined to the left side of the head and genitalia, the right side of the thorax and the abdominal segments. The antennæ and hind (polliniferous) legs were those of a female, and the genitalia half of each sex.—Dr. Chapman exhibited beetles of the genus *Orina*, and remarked on the fact that while some were viviparous others were oviparous, in some cases of the former the larvæ being developed in the ovaries.—Mr. H. J. Elwes exhibited a collection of Lepidoptera from Greece, taken this season in conjunction with Miss Fountaine, in the Morea and in the Parnassus region. He remarked that the country about Athens was much dried up and overrun with goats and herds, and that therefore the lepidopterous fauna there was poor. On the south side of the Gulf of Corinth, however, the Pieridi were well represented, and out of eight European species seven were taken in three weeks. The spring and summer broods of *Pieris krueperi* this year were flying together—an unusual occurrence, possibly due to the rainy spring. Among other notable species, albinos of *Colias heldreichi* (female) were taken, *G. rhamni* var. *farinosa*, and *Lycæna ottomanus*, while Mr. Elwes further expressed his opinion that a *Lycæna* taken as a var. of *L. semiargus* was a distinct species. Miss Fountaine mentioned in connection with these exhibits that *Colias heldreichi* swarmed on Mount Kelmos from 4000 to 7000 feet; and Mr. Elwes remarked that Miss Fountaine was the first British collector known to have captured this insect.—Mr. H. H. May exhibited a variety of *Strenia clathrata* taken on the South Downs, in which the ground colour of the wings was of a uniform dark chocolate brown, not unlike *Syrichthus alveolus* on the wing.—Mr. F. Enock exhibited a male bee, *Stelis aterrima*, one of the bees parasitic in the nests of *Osmia fulviventris*, usually considered a rare insect. The specimen was taken on August 14th, 1900, in a garden at Holloway. Mr. Enock announced that he had also taken *O. fulviventris*, its host, in the same metropolitan locality.—Papers were communicated on “Descriptions of new species and a new genus of South American Eumolpidæ, with remarks on some of the genera,” by Mr. M. Jacoby; and on “Lepidoptera Heterocera from Northern China, Japan, and Corea” (Part IV.), by Mr. J. H. Leech, B.A., F.Z.S., &c.—C. J. GAHAN and H. ROWLAND BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—
June 28th, 1900.—Mr. W. J. Lucas, President, in the chair. Mr. Kemp

exhibited (1) a var. of *Bombyx rubi* in which the band on the fore wings was bifurcated; (2) a var. of *Polyommatus icarus* having a large bleached blotch on the fore wing; (3) several specimens of *Notonecta glauca* and of var. *maculata*. Mr. Main, the nest of *Polistes gallica*, a solitary wasp, and a living example, from Switzerland, where it was common on rocks. Mr. Lucas, specimens of the very rare dragonfly, *Ichnura pumilio*, and var. *aurantiacum*, from the New Forest, where Mr. Carr and himself had rediscovered it, it not having been recorded for many years. Mr. West, specimens of Heteroptera, *Monanthia amplicata* and *M. cardui*, from Lewisham.

July 12th.—The President in the chair. Mr. Adkin exhibited pupa-cases *in situ* of the four Sesias, *S. scoliiformis*, *S. asiliformis* (*cynipiformis*), *S. culiciformis*, and *S. ichneumoniformis*: a long discussion ensued as to the economy of the various species in the genus. Mr. Hall gave his experience with *S. spheniformis*. Mr. Tutt remarked how little was known of the egg stage, or even where the ova were laid. It was suggested that some were laid on the leaves. Mr. West, the uncommon hemipteron *Graphocærus ventralis*, taken in Lee by sweeping. Mr. Carr, (1) specimens of the dragonfly *Pyrrosoma nymphula* and vars., taken in the New Forest; (2) a very varied series of *Angerona prunaria*, from Hailsham; (3) a series of *Melitæa athalia*, also from Hailsham, where it was fairly common round the flowers of cow-wheat. Mr. Lucas, the rare dragonfly *Orthetrum cancellatum*, and a discussion ensued on the nature of the blue colour. Mr. Turner, a short series of a rare hemipteron, *Eysarcoris melanocephalus*, taken by beating and sweeping at Horsley on July 7th.

July 26th.—Mr. A. Harrison, F.C.S., F.L.S., Vice-President, in the chair. Mr. F. M. B. Carr exhibited a specimen of *Cosmia pyralina*, taken at Oxshott. Mr. Harrison, a series of *Nyssia zonaria*, taken on the golf-links at Wallasey, where it was common. Mr. West, the heteropteron *Mecomma ambulans*, from Lewisham. Mr. Ashby, a series and a living example of *Aromia moschata*, from Tottenham, where it was locally common. Several members recorded *Colias edusa*, *Plusia gamma*, *Pyrameis cardui*, and one *C. hyale*.

August 9th.—Mr. A. Harrison, F.L.S., Vice-President, in the chair. Mr. H. Moore exhibited specimens of *Sirex gigas* taken in Rotherhithe; and three species of Orthoptera taken by himself in Folkestone Warren, viz.:—*Leptophyes punctatissima*, *Thamnotrizon cinereus*, and *Platyplecis grisea*. Mr. Adkin, a series of *Melanippe fluctuata* taken this year, and commented on the three main types of variation in the central band. Mr. Carpenter, two nests of a leaf-cutter bee found in the folds of an old sack. It was remarked that all bees emerged about the same time; the inmates of last made cells first. Mr. Blenkarn, a very fine smoky variety of *Cosmotriche* (*Odonestis*) *potatoria*, bred, from Eastbourne. Mr. F. M. B. Carr, a long bred series of *Lymantria* (*Psilura*) *monacha*, and contributed notes. The larvæ were from the New Forest.

August 23rd.—Mr. A. Harrison, F.L.S., Vice-President, in the chair. Mr. R. Adkin sent for exhibition flower-heads of ivy from Eastbourne, and contributed notes on the eggs of *Cyaniris argiolus*; also flowers of the common *Euonymus* of the gardens. Mr. West, the following Hemiptera, all taken at Lee: *Oliarus panzeri*, on willows;

Idiocerus tremulae, on aspens; *I. vitreus*, on poplars; *I. albicans*, on white poplar; *I. confusus*, on sallows; *I. laminatus*, on Lombardy poplars; and *I. populi* on aspens; together with a larva of *Dicranura bijida*, from West Wickham. Dr. Chapman exhibited series of specimens of *Melanippe fluctuata*, from Red Hill and from the Southern Alps. They were almost identical. Mr. Blenkarn, specimens of *Cosmotriche (Odonestis) potatoria* and *Lasiocampa (Bombyx) quercus* var. *calluna* from Eastbourne; *Spilosoma lubricipeda* var. *radiata* from Yorkshire; *Mesotype virgata (lineolata)* from Margate; and *Triphosa dubitata* from East Dulwich.

September 13th.—The President in the chair. Mr. F. Noad Clarke exhibited a specimen of *Locusta viridissima*, taken at Deal. Mr. South, a bred series of *Zygæna trifolii* from marsh near Oxshot. The cocoons were found well up the stems, as well as near the base of the grass. The specimens were identical with those taken in a meadow near Northwood; Mr. Lucas, several specimens of *Thaumotrix cinereus*, an Orthopteron he has taken in the New Forest. Mr. Colthrup, a short series of *Lasiocampa (Bombyx) quercus*, from Margate. Mr. Kemp, a specimen of *Aplecta occulta*, taken at sugar near Cromer. Mr. Turner, series of the following Coleoptera, taken this year: *Crioceris asparagi*, from Petersfield; *Liopus nebulosus* and *Strangalia armata* from the New Forest; and *Clytus arietis* from Abbot's Wood. Mr. West, the Hemipteron *Derephysia foliacea*, beaten from ivy at Blackheath. Mr. Lucas, a series of the white variety of *Helix ericetorum*. Mr. Barnett, a specimen of *Polyommatus corydon*, of a curious brown coloration. Mr. Buckstone, a female specimen of *Æschna mixta*, taken at Shoreham in Kent, where he had met with a number. Mr. H. Moore, the following species of Lepidoptera, taken at Le Portel near Boulogne: *Colias edusa*, *C. hyale*, *Pyrameis cardui*, *P. atalanta*, *Vanessa io*, *Aglais urticae*, *Polyommatus icarus*, *Papilio machaon*, and read notes. Mr. Bishop read the report of the field meeting held at Horsley on July 7th.

September 27th.—The President in the chair. Mr. Ashby exhibited a fine variety of *Ithagium bifasciatum* taken at Rickmansworth, having a large yellow patch across the elytra in place of the usual spots; a series of *Sinodendron cylindricum* from a beech stump at the same place; a very small specimen of *Pieris rapæ*; and a var. of *Abraaxas grossulariata*, having the right wings typical, but the left wings much radiated with black lines. Mr. Adkin, short series of *Moma orion* from Essex and the New Forest. Mr. Carpenter, series of *Colias hyale* from Sheerness, including the pale form, and gave particulars as to the habits of the larvæ of both *C. hyale* and *C. edusa*. Mr. Montgomery, living larvæ of *C. edusa*, and commented on the long time taken in feeding up this year, owing, doubtless, to the want of sunshine. Mr. Lucas, the Orthoptera, *Platypleis grisea* from Lulworth, and *Tettix subulatus* from Milford. Mr. Main, specimens of Myriapoda and Arachnids from West Africa. Mr. F. M. B. Carr, series of dragonflies taken this year: *Sympetrum striolatum*, *S. sanguineum*, and *S. scoticum*, from Ockham; *Libellula depressa*, *L. quadrimaculata*, *Orthetrum cærulescens*, *Gomphus vulgatissimus*, *Cordulegaster annulatus*, and *Brachytron pratense*, from the New Forest; *Æschna grandis* from Wisley; and *Æschna mixta* from Loughton. Mr. Hy. J. Turner, *C. edusa*, taken at Dawlish, including var. *helice* and a small female with a pale yellow costa. He

also showed a pair of *Eschna mixta* taken with two others at Pitsea. Mr. Chittenden, a pale yellow var. of *Chrysophanus phleas* from Ashford; two very dark *Gnophos obscuraria* from Shirley; a specimen of *Bupalus piniaria* from West Wickham, having the right wings male and the left wings female; and a dark form of *Agrotis aquilina* from Shirley. Mr. Colthrup, on behalf of Mr. Hills, of Folkestone, a long series of *C. hyale*, showing pale forms of both male and female, and one specimen with dark hind wings closely resembling *C. edusa* var. *helice*. Mr. R. Adkin read the report of the field meeting held at Paul's Cray Common on September 22nd.

October 11th. — The President in the chair. Mr. R. Adkin exhibited series of the spring and summer broods of *Zonosoma porata* and *Z. punctaria* bred from Sussex ova, and pointed out their resemblances and differences. Mr. Lucas, on behalf of Mr. Jennings, the Hemiptera, *Ptilophorus perplexus* from oak at Edmonton, and the rare *Monanthia ciliata* from near Dorking, together with a very dark form of the common earwig, *Forficula auricularia*. Mr. B. Adkin, fine bred specimens of *Boarmia repandata* from the New Forest; bred *Cleora glabraria*, including a fine suffused variety; and various forms of *Noctua castanea* (*neglecta*). Rev. H. Wood, a specimen of the rare Longicorn, *Astynomus ædilis*, taken at Northampton. Mr. Jäger, short series of *Stilbia anomala*, *Lithosia caniola*, *Noctua castanea*, *Laphygma exigua*, and *Leucania putrescens*, with specimens of *Epunda lichenia*, *L. albipuncta*, *L. vitellina*, *Heliopsis armigera*, and *Colias edusa* var. *helice*, all taken in South Devon in August and September this year. Mr. Lucas, varieties of *Pyrrosoma tenellum* (1), a female, with bronze abdomen; (2) a female, with abdomen crimson, except black circlets at the junctions of the segments: both from the New Forest. Mr. Kaye, series of British Lycænids, and closely-allied species of Lycænids from Japan, including *Chrysophanus phleas*, British and Japanese; *Polyommatus argia*, Japan, to compare with *P. icarus*; *Plebius ægon*, British and Japanese; *Cyaniris argiolus*, British and Japanese; a Japanese *Everes argiades*; and contributed notes on the variations. Mr. Mason, a Phasmid from Borneo. Mr. McArthur, a long series of brilliant specimens of *Argynnis aglaia* taken near Brighton. Mr. West, a series of a Homopteron new to Britain, *Typhlocyba candidula*, beaten from white poplar on Blackheath. Mr. Turner, on behalf of Mr. Edwards, a long series of *Saturnia pavonia* bred from ova laid by a female captured in April, 1898, at Digne. The first portion, twenty-one males, emerged in 1899; the second portion, two males and seven females, emerged in 1900; and two pupæ remained over, but had since died. Mr. Blenkarn reported that he had taken the rare *Ischnura pumilio* in Abbot's Wood. Dr. Chapman, specimens of *Cnethocampa pityocampa*, prepared to show the frontal apparatus for forcing an exit from the tough cocoon, which process he explained was also assisted by the special development of the first pair of imaginal legs.—Hy. J. TURNER, *Hon. Report Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—July 16th, 1900.—Mr. G. T. Bethune-Baker, President, in the chair.—The Rev. C. F. Thornewill was elected a member of the Society. A letter was received from Mr. G. H. Kenrich, announcing his purchase of the late Mr. W. G.

Blatch's special collection of Midland Coleoptera for the City of Birmingham, and his intention of placing it in the charge of this Society until Birmingham had a museum to receive it.—Mr. R. C. Bradley exhibited a series of *Libellula depressa* taken at various places this year—Selsley, Glos., Moseley, London, &c.—and remarked that it appeared to have been exceptionally abundant and widely distributed this year.—Mr. C. J. Wainwright showed short series of *Trypeta onotrophes* from St. Ives, Cornwall, and *T. tussilaginis* from West Hide, Hereford.

August 20th.—The President in the chair.—Mr. R. C. Bradley exhibited *Cucullia chamomilla* from his garden at Moseley, and living larvæ of *Acronycta aceris* from North London.—Mr. G. W. Wynn exhibited a very beautiful and varied series of *Triphæna fimbria*, bred from larvæ found at Marston Green last April and May. The upper wings varied from a light creamy brown to a dark brown, nearly black, and one specimen was of the rarer mahogany colour. He also showed *Cucullia chamomilla* from Solihull.—Mr. G. T. Bethune-Baker mentioned that a friend had taken fifteen *Plusia moneta* in a garden in Surrey this year, an increase on the number of any former year, and tending to show that the species is becoming well established in England. All members remarked on the unusual abundance of *Plusia gamma* this year; the President and Mr. Bradley had specially noticed its great numbers locally, and Mr. Wainwright had seen it swarming on the north coast of Norfolk in clover fields; they all seemed to think, however, that the specimens were fresh and in good condition, scarcely suggesting immigration.—Mr. Bethune-Baker showed a drawer full of Palearctic *Pararge* and *Epinephete*.

September 17th.—The President in the chair.—Mr. R. C. Bradley mentioned the occurrence of *Colias edusa* (two specimens) in his garden at Moseley. A discussion followed on its occurrence this summer. Mr. H. Willoughby Ellis had seen it on the railway-bank near Wednesbury, and had heard of it at Bromsgrove. Mr. P. A. Jackson had met with it in great abundance in Normandy, and wondered whether it usually occurred there in great numbers, or if it were specially common there this year as well as here.—Mr. G. T. Bethune-Baker asked if members had noticed the *Vanessidæ* in unusual abundance this year; he had seen many more than usual at Edgbaston. Mr. W. Harrison thought they were more abundant than usual, and mentioned the occurrence of *Grapta c-album* at Harborne.—Mr. H. W. Ellis mentioned the finding of twenty-eight larvæ of *Acherontia atropos* in Bedfordshire; he also had it from Knowle, Warwickshire; and asked what the experience of others was. Other members had heard of its occurrence locally, and Mr. Wainwright had received a specimen from Cromer, Norfolk.—Mr. R. C. Bradley showed a series of *Dioctria atricapilla* from Stroud district; also a few *Leptogaster guttiventris* from same place, and *L. cylindrica* from Haywood, Warwickshire.—Mr. W. Harrison exhibited living pupæ of *Nemeobius lucina* from Witherslack, and mentioned its probable extermination there, as he had counted thirty-two entomologists hunting specially for that species and *Lycæna minima*.—Mr. H. W. Ellis showed a nice lot of Coleoptera collected in the Stroud district of Gloucestershire during the Society's visit there at Whitsuntide this year;

in five days he had taken ninety-four species, including *Oodes helopioides*, *Phytæcia cylindrica*, *Cryptocephalus bipunctatus*, *Chrysomela varians*, a pair of the green var. in cop., *Lochmæa cratægi*, *Cistela luperus*, *Magdalis armigera*, and *M. pruni*.—Mr. Bethune-Baker exhibited a pair of *Plusia moneta* taken by a friend in Surrey this year; also a series of *Pararge* of the *egeria* group, to show the difference between Continental *egeria* and our *egerides* and their allies *xiphiodes* from Canary Islands, and *xiphia* from Madeira.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The first meeting of the session of 1900–1901 was held on October 8th, 1900 (in the Free Library, Liverpool). The Vice-President, Mr. B. H. Crabtree, occupied the chair.—Dr. J. Cotton exhibited captures made on Simonswood Moss and at Llandudno during 1900. The former included a specimen of *Acronycta alui*.—Mr. B. H. Crabtree exhibited *Colias edusa* and series of *Agrotis cursoria* from St. Annes-on-Sea, also a curious variety of *Arctia caia*, in which the upper wings were almost unicolorous dark brown, and the under wings yellow with a dark brown mark at the base of each.—Mr. Crabtree also showed, on behalf of Mr. Harold Milne, two singular varieties of *A. plantaginis*, in which the black markings were replaced by a yellowish orange tint, thus causing them to appear almost unicolorous. These specimens were male and female!—To mention all the remarkable species in Mr. Day's interesting exhibit would take too much space; amongst them were the following:—a fine dark form of *Smerinthus tiliæ*, a series of *Cherocampa porcellus*, long and fine series of *Eulepia cribrum*, *Notodonta cucullina*, *Agrotis ripæ*, and *Anticlea sinuata*, the latter from Cambridgeshire larvæ.—Mr. Mason exhibited a magnificent series of *Pyrameis cardui*, *Argynnis aglaia*, *Bombyx trifolii* (bred), *Agrotis ripæ*, *A. cursoria*, and other coast species. Amongst his odd captures were *A. pyrophila* and *Colias edusa*, taken at Lytham.—Mr. Massey showed long series of the beautiful and local *Pachnobia alpina*, *Teniocampa gothica* and its mountain form *gothicina*.—Mr. Tait exhibited fine series of *Melitæa cinxia*, *Agrotis corticea*, *A. lunigera* *Acidalia humiliata*, and *Anticlea rubidata* from the Isle of Wight, also the living larva and imago of *Agrotis ashworthii*.—Mr. Thompson recorded *Colias edusa*, *Acherontia atropos*, and *Macroglossa stellatarum* from St. Helens, the latter abundant in the larval state in suburban gardens.—Mr. Pierce brought for exhibition a living *A. atropos*, which stridulated loudly on being disturbed.—Mr. Johnson exhibited bred series of *Notodonta cucullina*, and the lovely *Phorodesma smaragdaria*, also a specimen of *S. populi*, in which the pink of the under wings was suffused all over the insect. Amongst Mr. Johnson's other insects were *Zygæna minos*, *Sesia philanthiformis*, and *Carsia imbutata*.—Mr. Prince exhibited splendid series of *Erebria blandina*, *E. cassiope*, *Epinephele hyperanthus*, *Gonopteryx rhamnii*, *Leucophasia sinapis*, *Thecla quercus*, and *Lycæna ægon*. Besides these north country captures he showed long series of coast species.—Mr. Collins brought for exhibition a part of his collection of Geometrina. It included specimens of a large number of the British Eupitheciæ, whilst *Melanthia* and *Melanippe* were also well represented by their beautiful species *albicillata*, *hastata*, &c.—FREDERICK BIRCH, *Joint Secretary*.

RECENT LITERATURE.

RECENT WORK ON JAPANESE RHYNCHOTA.

- UHLER (P. R.). *Summary of the Hemiptera of Japan* (1896, Proc. U. S. Nat. Mus. 276-97).
- NAWA (Y.). *The Insect World*. A Monthly Magazine. Vols. I.-IV. (in part), 1897-1900.
- HORVATH GEZA. *Hémiptères de l'île de Yesso (Japon)* (1899, Termész. Füzetek, xxii. 365-74).
- MATSUMURA SHONEN. *Uebersicht der Fulgoriden Japans* (1900, Ent. Nachr. xxvi. 205-13 and 257-70).

The extraordinary interest attaching to the entomological features of Japan renders any precise and detailed information particularly welcome, especially to the student of geographical distribution. Explorers and passing travellers have rendered good service in making known its rhynchotal treasures, but the scientific study of any special fauna is scarcely placed on a satisfactory footing until native or foreign residents apply themselves to its elucidation in the country itself. Mr. Nawa, of Gifu, has been collecting the Japanese Rhynchota for some little time, and inciting his friends and neighbours to emulation in the same pursuit, though, unfortunately, Mr. Nawa's observations have, until recently, been published entirely in Japanese. The mere fact that his journal, 'The Insect World,' a monthly magazine of some forty pages a month, entirely (except the title) in Japanese, is now well towards the completion of its fourth year, is an eloquent testimony to the grip that entomology has taken of our far-eastern *confrères*, though the language in which it is couched must necessarily limit its audience in the west. We ourself can only say that notes of rhynchotal interest have appeared from time to time, as evidenced by the figures of *Coriaca substriata*, various Ricaniinæ and Cixiinæ, as well as of a number of others un-named. In the seventh number of the third volume (July 15th, 1899) two photographs are reproduced (plate vii.) of the *personnel* of an entomological expedition, numbering some forty individuals, a muster which puts to shame some of the field-meetings of our most flourishing London societies. Mr. Nawa is much to be congratulated and applauded for the excellent work he is doing in popularising the study of insects among his countrymen.

His collections have, in part, also lately been scientifically worked out by Dr. Uhler, the veteran rhynchotist of Baltimore, and by Dr. Matsumura. The bugs exhibited at the World's Columbian Exhibition in Chicago, and subsequently presented to the U. S. National Museum through Dr. Mizukuri of Tokio, were (we learn from Dr. Matsumura) collected by Mr. Nawa; six new genera and close upon fifty new species* were then added to science. Quite recently Dr. Matsumura

* "*Limnotrechus elongatus*," Uhler, does not belong to *Limnotrechus* (i. e. to the typical subgenus of *Gerris*); the descriptions of the antennæ and of the comexival spines proclaim it a "*Limnometra*" (or possibly a "*Limnoporus*"). There is probably a misprint in the first three ines of p. 275.

has given a memoir on the Fulgoridæ of Japan,* with four new genera and twenty-two new species (of which two genera and fifteen species are obscure Delphacinae [Asiracinae]). Lastly, the well-known and genial Director of the Budapest Museum has contributed a short paper on some bugs from Yesso, collected by Dr. Matsumura.†

Of the Fulgoridæ enumerated by Dr. Matsumura, only a single species [*Stenocranus minutus*, Fabr.] is also European or Siberian (although nine of the genera have a European distribution); on the other hand, of the fifty miscellaneous species mentioned by Dr. Horváth, thirty also inhabit Eastern Siberia; while only five genera are not represented in Western Europe, and only one genus (*Riptortus*) is non-palæarctic.

G. W. K.

E. P. FELT. *Fifteenth Report—Insects—State of New York, 1899* (Bull. N. Y. State Mus. VI. No. 31, June, 1900, pp. 531-653).

The present annual report (Dr. Felt's second) is of somewhat different nature to most of its predecessors, as "pressure of other work has prevented the preparation of the usual detailed notices of injurious insects observed during the year." These are promised at some future time. We may briefly note, among the more interesting entomological features, the excessive injuries occasioned by the forest tent caterpillars (*Climacocampa disstria*), the elm-leaf beetle (*Galerucella luteola*), and the "willow butterfly" (*Euvanessa antiopa*); and the occurrence in several counties of seventeen-year Cicada (*Tibicen septendecim*).‡

The stoppage of railway trains by hordes of caterpillars has been regarded usually with a good deal of scepticism; but an observer, quoted by Dr. Felt (p. 542), states that a train by which he was travelling was stopped three times between two stations about eight miles apart.

The principal feature of the report is an account of the work of a corps of forty-three voluntary observers (representing thirty-nine counties), established to bring "the entomologist into closer relations with the public, and also to facilitate the gathering of in-

* We would correct the synonymy of one species, viz. "*Pæciloptera distinctissima*, Walker," p. 213. The type of *Pæciloptera* [recte *Pækilloptera*, Latr., 1796] was fixed by the author himself as *phalænoides*, Linné, a very distinct neotropical species; in fact, the genus is (to our knowledge) not found in the Old World at all, although innumerable species under that generic name have been even recently described from India, Ceylon, Java, &c. *P. distinctissima* forms probably a new genus near *Flata* and *Ormenis*. Dr. Melichar, of Vienna, whose recent important 'Monographie der Ricaniiden' was noticed in the 'Entomologist' (1899, p. 263), is now engaged upon a monograph of the Flatidæ (more properly Pækillopterinae), so that numerous details, now obscure, in this group, will doubtless soon be elucidated.

† Dr. Matsumura has also published an account of the Cicadidæ of Japan (Annot. Zool. Japon. ii. pp. 1-20, pl. 1; see Zool. Record, 1898); but we regret that we have not yet been able to see a copy.

‡ Most American entomologists refer to this species as *Cicada septendecim*. It may well be termed the "seventeen-year Cicada"; but it is quite as incorrect (if not more so) to write of "*Cicada septendecim*," as it would be to speak of "*Argynnis cardui*" or "*Vanessa aurinia*."

formation." Twenty-five pages are occupied by the information thus gained.

Dr. Felt has worthily maintained the reputation of these reports, acquired during Dr. Lintner's tenure, of being among the most completely indexed of any entomological publications.

G. W. K.

The Lepidoptera of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, their Preparatory States, Habits, and Localities. By CHARLES G. BARRETT, F.E.S. Vol. vi., pp. 388. London: Lovell Reeve & Co. 1900.

IN this volume consideration of the Heterocera is continued up to the end of the Noctuina, and a commencement is made with the Geometrina. The names of genera in the Noctuina are but very little changed, and the only important alteration in the arrangement is the introduction of the Sarrothripidæ, which family is placed between the Trifidæ and the Gonopteridæ. In his treatment of the Geometrina our author adopts the classification used by Hampson in his 'Moths of India,' consequently the family first dealt with is the Boarmidæ, which, in the present instalment, includes the genera *Ouraapteryx* [*Uropteryx*], *Angerona*, *Rumia*, *Venilia*, *Cabera*, *Macaria*.

Among the Noctuina we note that *Acontia solaris*, *Catocala electa* ("casual migrant"), *Chariclea delphini*, *Cucullia abrotani*, *Plusia illustris*, *P. ni*, and *Thalpochares paula* are admitted as British; whilst *Acontia catena*, *Bryophila algæ*, *Calophasia linariæ*, *C. platyptera*, *Catocala elocata*, *Plusia aurifera*, *P. verticillata*, and *Hypena obsitalis* are regarded doubtfully, or at best as only accidental visitors.

Catalogue of Eastern and Australian Lepidoptera Heterocera in the Collection of the Oxford University Museum. Part I.—Splinges and Bombyces: by Col. C. SWINHOE. Part II.—Noctuina, Geometrina, and Pyralidina: by Col. C. SWINHOE. Pterophoridæ and Tineina: by the Rt. Hon. Lord WALSHINGHAM and JOHN HARTLEY DURRANT. (Oxford: Clarendon Press. 1892 and 1900.)

THE entomological collection of the Oxford Museum is the most important public collection in this country, after the British Museum, and contains a great number of types of moths, described by Hope, Westwood, Walker, and Moore. The whole collection has now been thoroughly examined, and the types, as far as possible, identified; and we have the result, so far as regards the Eastern species, in the two handsome volumes before us, each illustrated with eight coloured plates, though, for some reason or other, those in the second volume do not appear to us to be quite as good as those in the first. The book cannot fail to be of great value to all entomologists who are interested in foreign moths; and we can only regret that it has not been made complete by the addition of the African and American moths.

We should add that the new species and genera which the authors met with in the course of their work are fully described in its pages, thus bringing the catalogue of this part of the Museum up to date.

Transactions of the City of London Entomological and Natural History Society for the year 1899. Pp. 80. Published by the Society at the London Institution, Finsbury Circus, E.C. 1900.

THE entomological papers in this volume are as follows:—"Notes on *Spilosoma lubricipeda*," by A. W. Mera, pp. 29-32; "The Life-history of *Oporabia (Epirrita) autumnata*, Bkh.," by Louis B. Prout, pp. 42-52; "Notes on *Eupithecia coronata*, Hübn.," by L. B. Prout, pp. 52-54; "Variation in the broods of *Axylia putris*, *Cucullia umbratica*, *Spilosoma urtica*, and *Malacosoma castrensis*," by A. Bacot, pp. 54-58; "Some Marsh Beetles of the Lea Valley," by F. B. Jennings, pp. 59-65. Mr. Prout also contributes another instalment of the list of "Lepidoptera of the London District" (pp. 66-80), which had been commenced in this Society's 'Transactions' for 1898. The number of species enumerated, so far, is 369. Among other interesting matters contained in the "Reports of Meetings" (pp. 2-28), we note that, on January 3rd, 1899, Dr. J. S. Sequeira exhibited a specimen of *Catocala elocata*, "which had been recognised, by Mr. E. M. Dadd, in Dr. Sequeira's series of British *C. nupta*. The Doctor said he had no doubt that the specimen was set by himself, and that the insect was taken unawares in these islands. This would be the first record of the species in Britain." The latter remark is not correct, as this species has been previously recorded as British: Curtis, very nearly eighty years ago, figured, as a British insect, an example of *C. elocata*, which was assumed to have been captured in this country. It was afterwards discovered that this species had been received from Oporto by the owner of the collection of British Lepidoptera in which it was detected.

OBITUARY.

DR. OTTO STAUDINGER.—We have received intimation of the death of Dr. Staudinger, on Oct. 13th last, at Lucerne, in his seventy-first year. He was incontestably one of the best known continental lepidopterists, and, since the death of Herrich-Schäffer, the leading German authority on Palearctic Lepidoptera. His inaugural dissertation, 'De Sesiis agri Berolinensis,' which appears to have been also his first published work, is a quarto tract of sixty-six pages, with two plates, published at Berlin in 1854. Subsequently he travelled in Iceland, Norway, Sardinia, and Spain, and the results of his captures were published in the 'Stettiner Entomologische Zeitung' by himself and others. The most important of these early journeys was that which he undertook to Iceland, an interesting account of which was published in S. E. Z. for 1857.

In 1861 appeared the first of the great works which have made his name famous—the first edition of the 'Catalog der Lepidopteren Europas und der angränzenden Länder. I. Macrolepidoptera, bearbeitet von Dr. O. Staudinger. II. Microlepidoptera, bearbeitet von Dr. M. Wocke.' This was in double columns, and resembles in form Heydenreich's 'Systematisches Verzeichniss der europäischen Schmetterlinge,' the third and last edition of which appeared at Leipzig in 1851. The second revised and enlarged edition of Staudinger's

and Wocke's Catalogue, printed in single columns, appeared in 1871; and we may remark that Dr. Staudinger's portion of this work, though, of course, not absolutely free from errors, is far superior to that of his coadjutor, Dr. Wocke, especially as regards the completeness and accuracy of its quotations from English authors. The book, however, does not include the whole Palæartic Region; Japan, North China, Egypt, &c., not being included.

Dr. Staudinger took up his residence at Blasewitz, near Dresden, where he established, at first alone, and subsequently in partnership with his son-in-law, Bang Haas, a Swede, an enormous emporium for the sale of European and exotic insects, especially Lepidoptera, and issued a continuous series of price-lists for many years, which were circulated all over the world. He had been a great invalid for some years before his death, and this retarded the publication of the long-promised third edition of his great Catalogue of Palæartic Lepidoptera, undertaken with the co-operation of Dr. H. Rebel. We hope that this is practically ready for publication, and will shortly be issued; but even though this should be the case, and although we should not grudge an old man a well-earned holiday, we cannot help regretting that he was not able to see it through the press during his own lifetime.

Dr. Staudinger continued to travel much in various parts of Europe, and perhaps North Africa, but we are not aware that his travels led him further. He occasionally visited London, but only rarely, and at long intervals. He also issued from time to time most valuable papers on the Lepidoptera of the less-known parts of the Palæartic Region, founded on the extensive collections formed for him by various collectors. Among these were his "Beiträge zur Lepidopterenfauna Griechenlands," which fills the greater part of the seventh volume of the 'Horæ Societatis Entomologicæ Rossicæ' (1870), and numerous papers on the Lepidoptera of various parts of Northern and Central Asia, published in various periodicals, chiefly German and Russian, but which it would take up too much space to enumerate here.

But by far the most important work of the latter part of Dr. Staudinger's life, and also almost his only important publication relative to exotic Lepidoptera, was his 'Exotische Tagfalter in Systematischer Reihenfolge, mit Berücksichtigung neuerer Arten, unter technischer Mitwirkung von Dr. H. Langhans.' It is a thick volume in small folio, published at Fürth, in Bavaria, from 1884 to 1888, and illustrated by one hundred crowded plates of butterflies. Notwithstanding the title, European and Palæartic species are included in their places, making the book by far the most complete which has appeared on the subject of butterflies in general, though it is issued at a comparatively moderate price. It was accompanied by a second volume, by Drs. Schatz and Röber, with characters of the families and genera, illustrated by thirty-six plain plates of neuration. In this latter work, however, the genera of Hesperiidæ are not included.

We have spoken only of Dr. Staudinger's scientific work, but no doubt other obituaries will appear, written by entomologists who were more intimately acquainted with him than the present writer, and who may be able to supply particulars of general interest relating to his personal history.

W. F. K.

THE ENTOMOLOGIST

VOL. XXXIII.]

DECEMBER, 1900.

[No. 451.

EDITORIAL.

REFERENCE is made to the very liberal Plate illustration of the present volume only to afford me an opportunity of tendering my sincere thanks to Messrs. Adkin, Christy, Lucas, and Merrifield for their generous assistance, which has enabled me to add so much to the interest and scientific value of the contents of the 'Entomologist.'

The Special Index has become so voluminous that its publication in the last number of the year would cause considerable delay. I have therefore decided to issue this section of the Index in the January number of each year. Subscribers will receive it free as heretofore.

An Alphabetical List has been prepared of all the figures of varieties of British Lepidoptera published in the 'Entomologist' up to date. This was made for my own use; but, as I understand that a convenient reference to these figures would be useful to many, it will be presented with the Special Index in the 'Entomologist' for January, 1901. An Index of all the varieties described in the Journal since its establishment in 1840 will be published during the ensuing year.

In previous Editorials I have had occasion to acknowledge some kindly written criticisms, and equally kind advice given me from time to time by friends, concerning the subjects discussed or otherwise dealt with in this Journal. I am exceedingly obliged to all correspondents who during the past year have favoured me with suggestions which in their opinion would, if

acted on, largely conduce to the prosperity of the 'Entomologist.' I can assure them that, although I fully appreciate their good-natured intentions, I think that it would not be to the advantage of the Journal to very materially alter its present character. Since it has been my valued privilege to conduct the Journal, its pages have been open to entomologists of every degree; contributions of the field-worker are as welcome as those of the systematist or the specialist. Judging from the large measure of support that I have received during the ten years or more that I have discharged the duties of Editor, I am inclined to believe that the absence of exclusiveness in the policy adopted meets with general approval.

RICHARD SOUTH.

LEPIDOPTERA IN SOUTH DEVONSHIRE.

By J. JÄGER.

IN anticipation of a late emergence of insects in general during the past season, I did not set out for my usual South Devon expedition until August 1st. Arriving at Babbicombe, where I met the Rev. Dobrée Fox suffering from a severe accident to his knee, I soon learned that, so far as *Leucania putrescens* was concerned, my calculation was wrong, for this insect had been out for some time, and, judging by the large series Mr. Fox showed me, they must have been very plentiful. However, in spite of wind and occasional rain, Mr. J. Clarke, of Reading, and myself worked for the species at one of its usual haunts with tolerably good results, for among the worn majority many specimens were obtained in good condition. Whilst engaged examining the flowers one night, we had the unique experience of attracting towards us the search lights of several British warships which happened to be in the bay. This afforded us great amusement, especially as the moths, like ourselves, seemed quite to enjoy it. *Lithosia caniola*, of which species during the previous year many specimens were netted at dusk near the same spot, were scarcely seen; towards the end of the week, however, they turned up in another part some distance off. *Acontia luctuosa* likewise was scarce and worn, probably owing to the continued absence of sunshine. This insect hides during dull weather, and has been noticed creeping right down into the cracks in the earth.

After staying a week at Babbicombe I went back to Starcross, and was informed that *Callimorpha hera* had appeared as early as July 4th, but after the spell of very hot weather at that time their emergence ceased, and became again general about

August 10th, the predominating form being decidedly the orange one. Other local species, usually common—as, for instance, *Cidaria picata*, and several *Acidalias*—were conspicuous by their absence, but *Acidalia marginepunctata*, *Gnophos obscurata*, *Melanippe galiata*, *Aspilates citraria*, *Eubolia lineolata*, and *Larentia olivata* were abundant. *Bryophila muralis* was taken, in the pupa state, by several friends of mine near Dawlish up to nearly the end of August in large numbers; these produced many examples of the dark brown form.

As regards *Colias edusa*, I have never before seen the species in such profusion as during the week following August 15th, and, remembering the great *edusa* year of 1877, when I happened to be on the East coast, I think that the past season, at least in Devonshire, ran quite parallel with it. They were simply swarming in the clover fields and lanes, and I might have taken fifty in an afternoon had I so desired. I captured a few of var. *helice*, but I did not see any *C. hyale*, although three or four specimens were said to have been taken by a local collector.

On August 24th, Mr. Porritt arrived, and we left Starcross for another locality, to work for some of the rarer Noctuas. The weather had by this time become settled, but, although fine and sunny during the day, we found the nights cold, with a bright moon. Sugaring, therefore, proved less profitable at first than anticipated. The democratic *Triphaena pronuba* and *T. comes*, *Agrotis segetum*, *A. suffusa*, *A. puta*, *Leucania pallens*, *Noctua plecta*, *N. c-nigrum*, *N. xanthographa*, *Amphipyra trago-pogonis*, *Miana furuncula*, *Mamestra brassicæ* (second brood), and, somewhat later, *Agrotis saucia*, *Xanthia circellaris*, *Anchocelis rufina*, and *A. lunosa* were extremely common: likewise *Caradrina ambigua*, which continued on the wing quite a month. *Noctua castanea* var. *neglecta* also came freely to sugar. The first warm nights produced three *Leucania albipuncta*, singly, and on the evening of September 8th Mr. Porritt took five more, and one *Laphygma exigua* a few days later. One *L. albipuncta* had been taken on August 15th, and it was therefore a matter for congratulation that specimens of this species were still in good condition. Mr. Porritt had unfortunately to leave before me, and, working single-handed, I took five *L. exigua* on September 17th (a very warm and still night), and three more on the following nights. My other captures included *Leucania vitellina*, *Heliothis armigera*, *Epunda lichenea*, *Noctua glareosa*, *Nonagria lutosa*, *Hydræcia nictitans*, *Calocampa exoleta*, *Heliophobus popularis*, *Acronycta rumicis* (second brood), *Noctua rubi*, *Cosmia diffinis* and *affinis*, *Polia chi*, *P. flavicincta*, and females of *Stilbia anomala* at sugar as late as September 17th; whilst a few males of the latter were netted flying among the gorse close at hand. After my departure on September 22nd, I have been informed that *Epunda nigra* and *E. lutulenta* were taken as

usual at sugar on the ground I had left. As regards *L. evigua*, I should like to add that our specimens were all taken between 8.30 and 9 p.m., certainly not later. Mr. Woodforde's experience differs in this respect, for he says the insects appear mostly between ten o'clock and midnight. I have watched often until a late hour, but never took one later than nine o'clock, nor did I find any on very windy nights, although I do not maintain that they would not come on such nights. When once settled they are not at all shy, like many of their companions at sugar, but allow themselves to be easily boxed. The females lay their eggs readily, and I have at the present moment larvæ from four different parents. The ova, which were in batches completely enveloped in down, hatched within a fortnight, and the young larva took to knot-grass, leaving the reputed food-plant, plantain, untouched. They are now eating dock, but I question whether they will survive the winter, as they appear extremely delicate. The larva has been found in the wild state early in the summer on *Persicaria* near the coast. This would indicate that, as with *Caradrina ambigua*, there is an earlier brood of this insect.

65, St. Quintin's Avenue, North Kensington, W. :
November, 1900.

CATALOGUE OF THE LEPIDOPTERA OF IRELAND:
SUPPLEMENTARY LIST.

By W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

RHOPALOCERA.

PIERIS RAPE, *L.*, var. *METRA*, *Steph.*—A male taken at Clogher Head, Co. Louth, by Mr. Thornhill, in June.

P. NAPI, *L.*, ab. *FLAVA*, *Kane.*—A very deeply coloured example of this was taken at Magilligan, Co. Derry, by the late Mr. Curzon.

P. DAPLIDICE, *L.*—One captured, Aug. 18th, 1893, by Mr. Hind, at Courtown, Co. Wexford. A correspondent at Ferns also reports its occurrence there, but I have not seen the specimens.

LEUCOPHASIA SINAPIS, *L.*—Curraghmore, Co. Waterford (*Rev. W. F. Flemyng*); five miles west of Kildare (*Mr. Freke*); Mount Congreve, Tramore, and near the town of Waterford, and at Milepost, Co. Kilkenny (*Buonaparte Wyse*); Merlin Park, Galway, abundant.

COLIAS EDUSA, *Fb.*—Occasional immigrations of this butterfly have been recorded during the last few years, chiefly in the South of Ireland, and numerous in 1899; one or two also in the northern half of the island.

GONOPTERYX RHAMNI, *L.*—Broadford, Scariff (*Ir. Nat.* vii. 58), and Cratloe, Co. Clare (*F. Neale*). Also at Dalyston, near Loughrea, and Gort, Co. Galway (*R. E. D.*); Ballinrobe, and shore of L. Mask.

MELITÆA AURINIA, *Rott.*—This species seems to be very universally though locally distributed throughout Ireland. The following are some additional localities:—Milepost, Co. Kilkenny; Timoleague and Berehaven, Co. Cork; Birr, King's Co.; Merlin Park, Galway; Portlaw, Co. Waterford; Dalyston, near Loughrea.

VANESSA IO, *L.*—In 1900 not rare in many places in Ulster, as at Armagh, Derry, Donegal, Drumreask, Newry, and Tyrone.

EREBIA EPIPHRON, var. *CASSIOPE*, *Fb.*—Since writing my notice of this butterfly, and suggesting that the mountain range from Achill to Nephin might very probably yield habitats, I have been fortunate enough to meet with a few specimens on Nephin. The bad weather and subsequent engagements have prevented my investigating the locality further. One specimen, in a collection of the Rev. R. McClean, is believed to have been taken on the hilly slopes on the eastern shores of L. Gill, Sligo.

CENONYMPHA TYPHON, *Rott.*—Very dark forms about Clonbrock.

THECLA QUERCUS, *L.*—Cratloe, near Limerick (*F. N.*), Killarney, Timoleague, Co. Cork (*D.*); Killoughrim Wood, Enniscorthy (*M.*); Enniskillen, scarce (*P.*); Dalyston, Co. Galway (*R. E. D.*); Portlaw, Co. Waterford.

LYCÆNA ARGIOLUS, *L.*—Curraghmore, Co. Waterford, abundant (*B. Wyse*).

SYRICHTHUS MALVÆ, *L.*—Two taken at the copper mines, Killarney (*W. Salvage*),

NISONIADES TAGES, *L.*—Killarney (Mucross demesne), Enniscorthy (*M.*); abundant throughout the Burren, and the stony limestone pastures of Clare, from Dromoland, Kilfenora to Ballyvaughan.

HETEROCERA.

ACHERONTIA ATROPOS, *L.*—It would serve no purpose to chronicle the localities in which, in suitable years, this migrant or *Sphinx convolvuli* has been noticed. Being such strong fliers, the immigrants disperse themselves over every part of the island, sometimes in considerable numbers.

DEILEPHILA LIVORNICA, *Esp.*—One at Trim, in 1894, by Mrs. Cuppage; one at Howth (*G. V. H.*).

SMERINTHUS OCELLATUS, *L.*—Timoleague (*R. Donovan*), and Malloy (*Stawell*), Co. Cork; numerous at L. Iron, Westmeath; and locally at Enniskillen (*P.*).

S. TILIÆ, *L.*—One at Killarney, reported by *W. Salvage*.

MACROGLOSSA BOMBYLIFORMIS, *Esp.* — (The narrow-bordered bee-hawk). By an oversight *Ochsenheimer's* species appears in the Catalogue. It is referable to the above. Further localities are Clonbrock, Athenry, and Merlin Park, Galway; Mote Park, Roscommon; Cratloe Wood, near Limerick (*Neale*); Mallow (*Stawell*); Curraghmore, Waterford (*B. Wyse*).

TROCHILIUM CRABRONIFORMIS, *Lewin.* — Castle Bellingham, Clonbrock, Enniskillen, and Tempo.

SESIA SCOLIIFORMIS, *Rott.* — Since writing a notice of this species I have taken three imagines at Killarney, as well as the larvæ both there and near Kenmare. A *Pimpla* bred from one of the latter, *Mr. Bignell* states (*in litt.*), is a new British species of ichneumon not in *Marshall's* list. *Pimpla examiner* he had received from *Gregson*, out of the same host.

S. MYOPIFORMIS, *Bork.*—Clonbrock; Killarney (*W. Salvage*). I have found the larvæ and empty pupal cases of this or the following species in cherry-trees at Drumreaske, Monaghan. Its ravages produce serious damage in the stems, which swell out where bored into unsightly excrescences exuding gum.

SESIA CULICIFORMIS, *L.*—Two imagines taken at Clonbrock by *Mr. Dillon*.

S. MUSCIFORMIS, *View.*—Reported by *Dr. Greene* from near Ferns, Co. Wexford.

ZYGÆNA PILOSELLÆ, *Esp.*—On the Galway shore of *L. Derg*, a few (*Gleeson*), *Ir. N. viii. 250*. I have met with it over a wide extent of the Co. Clare, especially in Burren, and as far south as Dromoland. A unique variety, with yellow under wings, was taken by *Mr. Allen* near Galway.

(*Z. TRIFOLII*, *Esp.*—I am, on further examination of the question, inclined to delete this species from the Irish list. The few specimens relied on (since *Mr. More's* record at Castle Taylor) are worn and doubtful, and, having gained a considerable further experience of the Irish lepidopterous fauna, I am unable to substantiate with certainty the earlier records, which I believe must be referred to the following species.)

Z. LONICERÆ, *Esp.* — Roundstone, Connemara (*Walker*); Portora, near Enniskillen, abundant (*A.*); Dungannon (*T. Greer*); Clonbrock (*R. E. D.*); Belleisle, near Lisbellaw.

NOLA CONFUSALIS, *H.-S.*—Clonbrock; Timoleague, Co. Cork (*R. D.*); Enniskillen (*P.*).

NUDARIA SENEX, *Hb.*—One specimen taken by *Col. Partridge* near Enniskillen.

SETINA IRRORELLA, (*Clerck*). — Ardrahan, Co. Galway, and west through the Burren of Clare, widely spread.

LITHOSIA LURIDEOLA, *Zinck*.—Castle Bellingham and Clogher Head, not rare; Athlone (*Wilcox*).

GNOPHRIA QUADRA, *L.* — Killarney; Timoleague, Co. Cork (*R. D.*); Curryaghmore, abundant (*Rev. W. Flemyng*), and Lismore (*Neale*) Co. Waterford; Borris, Co. Carlow (*Freke*), and Clonbrock (*R. E. D.*).

G. RUBRICOLLIS, *L.* — Berehaven, Co. Cork (*Carpenter*), and Timoleague; Sligo (*McC.*); Belleisle, near Lisbellaw, Clonbrock (*R. E. D.*).

NEMEOPHILA RUSSULA, *L.*—Kenmare neighbourhood; Cappagh, and near Waterford (*B. Wyse*); Milepost, Co. Kilkenny (*B. Wyse*); Cratloe, near Limerick (*Neale*).

SPILOSOMA MENDICA *Clerck*.—A specimen of the dark typical male has been taken by the Hon. E. O'Brien at Dromoland, Co. Clare. One has already been recorded from Clonbrock in the adjoining county.

Var. RUSTICA, *Hb.*—This has latterly been taken in some fresh localities: Parsonstown, King's Co. (*Hon. G. Parsons*); Killarney; Lucan (*Halbert*), a very white male; Timoleague, Co. Cork, a similar one (*R. D.*).

S. URTICÆ, *Esp.*—One at Clonbrock (*R. E. D.*), May 16th, 1896, in a moth-trap.

HEPIALUS LUPULINUS *L.*—Pontoon on L. Conn, Mayo; Bragan, Co. Monaghan. Var. *fuscus*, Kenmare, Ir. N. vii. 210.

COSSUS LIGNIPERDA, *Fb.*—Between Baltinglass and Dunlavin, Co. Wicklow; abundant at Maganey, Co. Kildare (*Carpenter*).

MACROGASTER CASTANÆÆ, *Hb.*—No further capture of this insect in Ireland can be chronicled, and on examination of Lough-a-Callow, the locality in question, I can find no trace of *Phragmites communis*.

LEUCOMA SALICIS, *L.*—Abundant about Lough Doon, Mullingar (*Middleton*).

DASYCHIRA FASCELINA, *L.*—Tullamore (*Halbert*).

TRICHIURA CRATÆGI, *L.* — A blackish form was taken at Magilligan, near Derry, by W. Salvage. Its larvæ were feeding on blackthorn.

BOMBYX NEUSTRIA, *L.*—Dungarvan, and various localities in the south and south-west. Enniskillen, rare (*P.*); one at Galway (*A.*).

DREPANA FALCATA, *L.*—Enniskillen (*A.*).

DICRANURA FURCULA, *L.*—Drumreaske and Altadiawan, Co. Tyrone. Very abundant at Clonbrock.

D. BIFIDA, *Hb.*—Oughterard, one larva reported. Fairly numerous at Clonbrock.

STAUROPOUS FAGI, *L.*—Taken again at Ardtully, Kenmare, by myself. One very dark specimen at Clonbrock, and one at Merlin Park, Galway (*R. E. D.*). Larvæ reported from Belleisle, Up. L. Erne.

PTILODONTIS PALPINA, *L.*—Drumreaske; Tempo, near Enniskillen, Enniskillen (*P.*); Clonbrock, a few (*R. E. D.*); Sligo (*McC.*).

NOTODONTA DICTÆOIDES, *Esp.*—Howth (*G. V. II.*), and Clonbrock.

N. DROMEDARIUS, *L.*—Var. *perfusca* at Tempo (*Langham*).

N. CHAONIA, *Hb.*—Has occurred in considerable numbers at Clonbrock, when a moth-trap was placed in a ruin at some fifty or sixty feet from the ground. Two at Mallow, Co. Cork, by Mr. Millbank.

CYMATOPHORA OR, *Fb.*—Mr. Campbell's record from Derry must be deleted, the specimen turns out to be *Asphalia flavicornis*. Enniskillen (*Capt. Brown*); one at Clonbrock, of the ordinary English type, and at Pontoon on L. Conn, Mayo, I took a considerable series of fine specimens with dull ground colour shaded with brownish bands, but not showing any rosy tinge.

C. DUPLARIS, *L.*—Further investigations assure me that this species is almost universally distributed through Ireland.

C. FLUCTUOSA, *Hb.*—Ardtully, near Kenmare, not very rare.

ASPHALIA FLAVICORNIS, *L.*—Derry (*C.*), Enniskillen (*P.*), Clonbrock (*R. E. D.*); single specimens only, except at Enniskillen, where the larvæ only were taken.

ACRONYCTA TRIDENS, *Schiff.*—One larva was found at Enniskillen by Col. Partridge.

A. LEPORINA, *L.*—Cratloe Wood, near Limerick, and near Kenmare; Howth (*M. F.*).

A. ACERIS, *L.*—Enniskillen (*P.*); Timoleague, Co. Cork (*R. D.*).

A. MEGACEPHALA, *Fb.*—Castle Bellingham, Co. Louth.

A. MENYANTHIDIS, *View.*—Clonbrock, one (*R. E. D.*), Parsonstown, King's Co. (*Hon. G. Parsons*). I found the larvæ near Recess, Connemara, very numerous, feeding on *Myrica gale*, and rarely on *Menyanthes trifoliata*.

A. EUPHORBIE VAR. MONTIVAGA, *Gn.*—Dursey Island, a locality

very similar to Galley Head, Co. Cork; Killarney, and Kenmare; Pontoon, Co. Mayo; Dalyston, near Loughrea, and Clonbrock (*R. E. D.*).

DILOBA CÆRULEOCEPHALA, *L.*—Trim, Co. Meath (*Mrs. Cuppage*).

LEUCANIA TURCA, *L.*—Mr. Dillon reports having captured one at Clonbrock; and two at Merlin Park, Galway.

L. UNIPUNCTA, *Haw.* (*EXTRANEA, Gn.*).—One specimen at sugar, September 13th, 1896, taken by Mr. R. Donovan at Timoleague, Co. Cork. It is small, pale in colour, but a well-marked example (*Ir. Nat.* vi. 104).

L. LITTORALIS, *Curt.*—Dingle, and abundant on the sandhills of Tralee Bay, Kerry; as at Castle Gregory, where I took two examples with a red suffusion bordering the central white stripe of the fore wings.

L. STRAMINEA, *Tr.*—Dromoland, Co. Clare (*Hon. E. O'Brien*).

CÆNOBIA RUFA, *Haw.*—Two at Clonbrock (*R. E. D.*).

NONAGRIA (CALAMIA) LUTOSA, *Hb.*—Lough Erne, Belleisle, and Enniskillen.

GORTYNA OCHRACEA, *Hb.*—Dromoland, Co. Clare (*Hon. E. O'Brien*).

XYLOPHASIA SUBLUSTRIS, *Esp.*—Enniskillen (*A.*); Trim, Co. Meath, a dingy brownish form, not ruddy as the type (*G. V. H.*).

LAPHYGMA EXIGUA, *Hb.*—Mr. R. Donovan has added another rarity to the Irish list. He captured a very fine example of this species on September 8th, 1899, on honeydew on a lime tree at Timoleague, Co. Cork.

LUPERINA CESPITIS, *Fb.*—Trim, Co. Meath (*Mrs. Cuppage*); Enniskillen (*P.*); Cappagh, Co. Waterford (*B. Wyse*); Timoleague, Co. Cork (*R. D.*); Clonbrock.

MAMESTRA ABJECTA, *Hb.*—Since publishing, Mr. Thornhill, of Castle Bellingham, Co. Louth, has taken specimens of this moth on the adjoining coast.

M. SORDIDA, *Bork.*—One at Howth (*M. F.*).

M. ALBICOLON, *Hb.*—Rossbeigh, and Castle Gregory, Kerry.

M. FURVA, *Hb.*—Bundoran, Co. Donegal (*J.*); Magilligan, near Derry, several (*W. Salvage*).

APAMEA OPHIOGRAMMA, *Esp.*—Enniskillen (*P.*).

MIANA BICOLORIA, *Vill.*—Timoleague, Co. Cork (*R. D.*). Mr. Campbell writes that he has recorded this species from near Derry in error.

(To be continued.)

THE MORPHOLOGY AND CLASSIFICATION OF THE
AUCHENORRHYNCHOUS HOMOPTERA.

BY DR. H. J. HANSEN.

(Continued from p. 172.)

C. *Legs.*

These are best discussed when the coxæ, trochanters, and femora are considered together, and the tarsi separately by themselves; of the tibiæ, I have nothing new to say here. In connection with the posterior coxæ, I mention the ventral part of the third thoracic segment; this part is termed the *metasternum*, which is scarcely correct, but I have not been able to distinguish between sternum, epimera, and episterna, and therefore call attention to an observation by Schjodte in his celebrated work: * "Cryptocerata [in the Heteroptera] have undivided thoracic segments, like all other Rhynchota. A re-examination will certainly give the result that a veritable suture between sternum and epimera will in no case be found."

1. *Coxæ, Trochanters, and Femora.*

As regards the coxæ, authors have hitherto been content usually to describe their extension in breadth and length; but attention should also be directed to matters fully as important (as Schjodte has pointed out), *viz.* the movements they are able to perform in consequence of the form, and according to the quality of their articulation. The anterior legs present such strong agreement among all the families that they can be discussed under a single heading, but the other two pairs must be considered in each family separately.

a. *Anterior Legs.*

The coxæ are sometimes of considerable length, proportionately to their thickness or breadth (*Stridulantiæ*, *Fulgora*), sometimes tolerably short and broad (*Tettigometra*, *Aethalion*), scarcely, however, ever shorter than broad; but whatever their shape may be they are attached to the body only by their oblique basal part, so that an always considerable distal portion is entirely free; and, in the next place, they are always articulated more or less towards the sides of the prothorax, with the interior angles of their articulation *at least a very considerable space from the insect's middle plane*, and they are then directed backwards and inwards against the middle plane. The trochantins (pl. ii.

* "Nogle nye Hovedsætninger af Rhynchoternes Morphologi og Systematik" (Naturh. Tidskr. (3), vi. pp. 237-66, 1869), translated into English in 1870, Ann. Mag. Nat. Hist. (4), vi. pp. 225-49.—G. W. K.

f. 6 a) are very distinct on the anterior side of the basal portion. The articulating membrane is, with the exception of the spot on the proximal point of the coxæ, well developed, and is remarkably broad on the inner side of the articulation. Consequent on this articulation, the coxæ can perform two kinds of movements: in part they can turn on an axis, which forms a very acute angle with their own long axis, and with this turning the apices of the femora move in a part of a semicircle from behind forwards and inwards (and *vice versâ*); in part this distal portion is able to move, on turning around on an axis perpendicular to the longitudinal direction of the coxæ, somewhat backward and inward, somewhat forward and outward, (*adduction* and *abduction*), whence it follows that the tarsi are able to extend farthest outwardly, forward or behind, when the coxæ are "abduced."

In the *Stridulantia* the anterior femora are very thick, and generally toothed beneath; the trochanters are thick, supporting (*viz.* connected with) the femora by a very oblique articulation, which presents a very well developed see-saw movement. In the other three families the anterior femora are usually not very thick, and unarmed. Trochanters supporting, normal; only in *Darnis* have I found both anterior (and intermediate) femora strongly dilated.

b. Intermediate Legs. 1. *Stridulantia*.

The coxæ are moderately short, broad, and obliquely triangular at the base, with an articulation which is quite as long as the coxæ, and *the interior angle of the articulation is situated moderately near to the insect's middle plane*. The coxæ are sometimes in the middle plane contiguous at their moderately short, free, distal part; this is often, however, not the case, for in *Platypleura* the distance between them is somewhat considerable. The principal movement is rotary, to and fro on an axis from *the exterior angle of the articulation to its antero-interior angle*, almost perpendicular to the insect's longitudinal axis; moreover, a rather feeble adduction and abduction is possible, arising from the fact that the articulating membrane along the interior margin of the articulation is rather broad. A real "meracanthus" is not to be found, but the plate situated on the postero-exterior margin of the coxæ, from which it otherwise originates, is here well developed. The trochanters are supporting, and the femora normal as in the three families following:—

2 and 3. *Cercopidæ* and *Jassidæ*.—The coxæ have a form somewhat resembling that in the *Stridulantia*; they are, however, quite as transversely situated and placed close together, so that *their free apical parts are contiguous in the middle plane; their ad- and abductorial movements are only feeble*. A meracanthus is very considerable, and strong in all *Cercopidæ*; it is wanting in most *Jassidæ*, but is, however, strong, long, and broad at the

base in Hoplophorinæ (see Stål in 'Hemiptera Africana'), and I have also found it in a less strongly marked form in many other genera. For instance, it is shorter but broad at the base in some (all?) species of *Darnis*; in *Epiclines planata*, F., and *Petalocera bohemannii*, Stål, it is very long, but narrow; in *Proranus adspersipennis*, Stål, it is short; and in *Ledra aurita*, L., one can find no trace of it.

4. *Fulgoridæ*.—The intermediate coxæ are here, contrary to the foregoing families, formed and articulated like the anterior coxæ. In, for instance, *Fulgora*, they have a very important length (are something more than twice as long as broad), their rather short articulation is situated at a good distance from the middle plane towards the lateral margins of the body, and from this point their free good-sized distal part is directed inwards and backwards, where they, at the articulation of the trochanters, are almost contiguous at the middle plane. Trochantins are very distinct; the articulating membrane at the anterior angle of the articulation is considerable. A similar structure is found in most *Fulgoridæ*. In *Tettigometra* (pl. ii. f. 6) the coxæ are short, very broad towards the base, and the articulation is very long; but the interior angle of the coxa, which is connected with the articulating membrane, is nevertheless somewhat remote from that of the opposed coxa.

One may thus sum up the characteristics of this family, viz. that the intermediate coxæ have the interior angle of their articulation importantly remote from the middle plane; and, singularly, that their movements, like those of the anterior coxæ, are strongly marked double-acting, viz. rotation and important ad- and abduction; *Tettigometra* itself, which certainly most evidently points towards the *Jassidæ*, has, however, preserved the most characteristically *Fulgorid* trait in the form and situation of the articulation. A meracanthus is usually wanting; in *Aphana farinosa*, Weber, *Odontoptera spectabilis*, Carreno, and many forms, I have, however, found one, which is then short, or at least fairly short, sticking out near the exterior angle of the coxa.

c. Posterior Legs. 1. *Stridulantia*.

The metasternum is entirely firmly chitinised, is often short in the middle, but has also occasionally a very considerable longitudinal extension. The coxæ have the simplest form within the Auchenorrhyncha; they are of the size of, or a little larger than, the intermediate coxæ, and with a slightly longer articulation than the latter; they are basally contiguous in the middle plane, and, as they are not remarkably large, there is (as Stål has indicated) a considerable distance between their exterior angles and the lateral margins of the metathorax. On account of the quality of their articulation, especially the feeble development of the articulating membrane at the interior angles of their attachment,

they are *only* able to turn to and fro on an axis from the outer to the inner angles of the cotyla. The trochantins are well developed, long and moderately slender. A meracanthus is strongly developed in some forms, feeble or wanting in others. The trochanters are supporting, but however the articulations are, between them and the femora, almost perpendicular to the longitudinal axis of the latter, and present very strongly developed see-saw movements; the trochanters, moreover, are not broader than the femora, which are moderately slender and of normal appearance.

✓ 2. *Cercopidæ*.—The metasternum always has a considerable, sometimes (*Philaenus*) a very considerable, breadth (perhaps, one should say, a greater length, as the extension which shall be indicated is in the longitudinal dimension of the insect); along the middle line one finds a strip, which widens anteriorly behind the mesosternum to a plate, which is strongly chitinised, and on each side of this solid middle strip one finds a *very considerable membranous part*, which extends along the anterior margin of the posterior coxæ almost to their exterior angles, and proceeds thence more or less forward, and towards the lateral margin of the insect. *The posterior coxæ do not possess apparently broader articulation than the intermediate coxæ*, and as regards this are similar to the *Stridulantia*; but the attachments are—as the parts along almost the entire anterior margin of the coxæ are membranous—of another quality, and the true, more substantial articulation between the coxæ and thorax is found therefore along the peculiarly formed *exterior margin* of the coxæ, and at its lower interior angles situated at the base of the abdomen. *The movements are well developed, see-saw-like, as in Stridulantia*. The interior margins of the two coxæ are contiguous along the middle line; their free part extends backwards over the base of the abdomen, and is proportionately longer than in the preceding and following families. There is no meracanthus. The trochanters have a somewhat varying form, and are somewhat broader than the basal part of the femora (f. 5 b); the articulation between the trochanter and femur is not very oblique, and the segmental membrane is rather broad at the side facing the middle plane; so that the movements are more extensive than in the *Stridulantia* and *Jassidæ*. The femora are a little thinner at their base than a little way from it, and *on the side facing the abdomen is found, a little from its base, a good-sized oblique protuberance* (f. 5 d), the significance of which I do not comprehend; *but as it occurs in all the Cercopidæ I have examined* (even in *Machærota*), and *not in any other Auchenorrhyncha known to me*, it is probably a reliable family character. The protuberance and its environs have a peculiar scaly-like sculpturing; its interior is filled with a mass looking like connective tissue.

(To be continued.)

BRITISH DRAGONFLIES OF THE OLDER ENGLISH
AUTHORS.

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

(Concluded from p. 299.)

8. Dr. H. A. Hagen: 'A Synopsis of the British Dragonflies,' in the 'Entomologist's Annual,' 1857.

In this article Dr. Hagen has described shortly, and given a few notes on, all the species of British Dragonflies, and, in addition, has similarly treated the European species most likely to be found in this country. The list is nearly the same as that at present received; but six doubtful species, or extremely casual ones are included. The nomenclature also does not greatly differ from that at present recognised. The British species are as follow:—

1. *Libellula quadrimaculata* = *Libellula quadrimaculata*.
2. *L. depressa* = *L. depressa*.
3. *L. fulva* = *L. fulva*.
4. *L. cancellata* = *Orthetrum cancellatum*.
5. *L. cærulescens* = *O. carulescens*.
6. *L. flaveola* = *Sympetrum flaveolum*.
7. *L. Fonscolombis* = *S. fonscolombii*.
8. *L. meridionalis* = *S. meridionale*.
9. *L. striolata* = *S. striolatum*.
10. *L. vulgata* = *S. vulgatum*.
11. *L. sanguinea* = *S. sanguineum*.
12. *L. Scotica* = *S. scoticum*.
13. *L. dubia* = *Leucorrhinia dubia*.
14. ? *Cordulia metallica* = *Somatochlora metallica*.
15. *C. arctica* = *S. arctica*.
16. *C. ænea* = *Cordulia ænea*.
17. *C. Curtisii* = *Oxygastra curtisii*.
18. *Gomphus vulgatissimus* = *Gomphus vulgatissimus*.
19. *G. flavipes* = *G. flavipes*.
20. *G. forcipatus* = *Lindenia forcipata*.
21. *Cordulegaster annulatus* = *Cordulegaster annulatus*.
22. *Æschnia pratensis* = *Brachytron pratense*.
23. *Æ. mixta* = *Æschna mixta*.
24. *Æ. borealis* = *Æ. carulea*.
25. *Æ. juncea* = *Æ. juncea*.
26. *Æ. cyanea* = *Æ. cyanea*.
27. *Æ. grandis* = *Æ. grandis*.
28. *Æ. rufescens* = *Æ. isosceles*.
29. *Anax formosus* = *Anax imperator*.
30. *Calopteryx Virgo* = *Calopteryx virgo*.
31. *C. splendens* = *C. splendens*.
32. *Platynemis pennipes* = *Platynemis pennipes*.

33. *Lestes viridis* = *Lestes viridis*.
 34. *L. nympha* = *L. dryas*.
 35. *L. sponsa* = *L. sponsa*.
 36. *L. virens* = *L. virens*.
 37. *L. barbara* = *L. barbara*.
 38. *Agrion Najas* = *Erythromma najas*.
 39. *A. minium* = *Pyrrosoma nymphula*.
 40. *A. tenellum* = *P. tenellum*.
 41. *A. Pumilio* = *Ischnura pumilio*.
 42. *A. elegans* = *I. elegans*.
 43. *A. pulchellum* = *Agrion pulchellum*.
 44. *A. puella* = *A. puella*.
 45. *A. mercuriale* = *A. mercuriale*.
 46. *A. cyathigerum* = *Enallagma cyathigerum*.

In 1870 appeared 'A Catalogue of the British Neuroptera,' by R. McLachlan, published by the Entomological Society of London, and the list of works on exclusively British Odonata closes with the writer's 'British Dragonflies,' published in the present year. Omitting doubtful species, and casuals that have not occurred since long ago, the British list is as follows, McLachlan's names where they differ being given in brackets:—

1. *Leucorrhinia dubia*; 2. *Sympetrum striolatum*; 3. *S. vulgatum*; 4. *S. fonscolombii**; 5. *S. flaveolum*†; 6. *S. sanguineum*; 7. *S. scoticum*; 8. *Libellula depressa* (*Platetrum depressum*); 9. *L. quadrimaculata*; 10. *L. fulva*; 11. *Orthetrum cærulescens*; 12. *O. cancellatum*; 13. *Somatochlora metallica*‡; 14. *S. arctica* (*Cordulia arctica*); 15. *Cordulia ænea*; 16. *Oxygastra curtisii* (*Cordulia Curtisii*); 17. *Gomphus vulgatissimus*; 18. *Cordulegaster annulatus*; 19. *Anax imperator* (*A. formosus*); 20. *Brachytron pratense*; 21. *Æschna mixta*; 22. *Æ. cærulea* (*Æ. borealis*); 23. *Æ. juncea*; 24. *Æ. cyanea*; 25. *Æ. grandis*; 26. *Æ. isosceles* (*Æ. rufescens*); 27. *Calopteryx virgo*; 28. *C. splendens*; 29. *Lestes dryas* (*L. nympha*); 30. *L. sponsa*; 31. *Platynemis pennipes*; 32. *Erythromma najas*; 33. *Pyrrosoma nymphula* (*P. minium*); 34. *P. tenellum*; 35. *Ischnura pumilio*; 36. *I. elegans*; 37. *Agrion pulchellum*; 38. *A. puella*; 39. *A. hastulatum*§; 40. *A. mercuriale*; 41. *Enallagma cyathigerum* (*Agrion cyathigerum*).

* A casual only.

† Perhaps a migrant only.

‡ Absent from McLachlan's list.

§ Discovered in Scotland during the past summer.

SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND
TEMPERATURE MADE WITH LEPIDOPTERA UP TO
THE END OF 1898.*

By PROF. DR. MAX STANDFUSS.

PLATES III. & IV. (Entom. Plates VII. & VIII.).

(Continued from p. 292.)

SECOND, CROSSING, AND HYBRIDIZATION EXPERIMENTS.

THE increase in numbers of species is caused by the splitting up of a group of individuals which originally lay within the limits of a single species, the separated forms becoming more and more divergent till quite isolated. This is a generally accepted theory of zoology.

If we name the groups of individuals which are diverging A and B, this isolation manifests itself through the fact that neither A ♂ crossed with B ♀ nor B ♂ with A ♀ are capable of producing offspring which are sufficiently fertile to remain as an independent form, even for a—phylogenetically speaking—limited period.

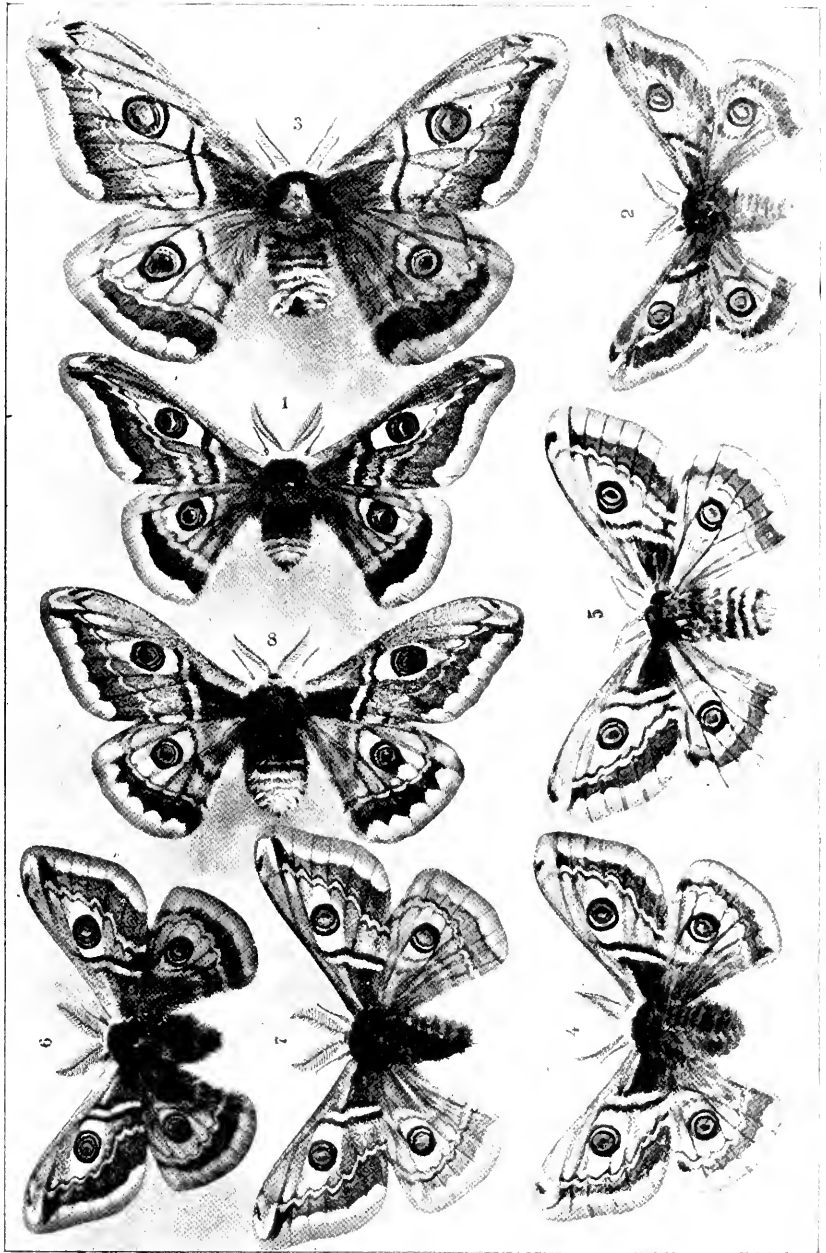
This isolation must be regarded as the final result of a continued increasing physiological divergence and difference, and we must accept this as the cause of creation of species for all geological periods of our earthly fauna and flora.

If this theory is correct, the artificial crossing experiments will indicate the present state of the physiological divergence and difference of the creatures and plants experimented with. The following hybridization experiments with Lepidoptera—which, by the way, are very difficult—were undertaken with this idea, and with this end in view; and to me it appears that none of the results obtained reduce this theory *ad absurdum*, but, on the other hand, prove its validity.

Of the numerous hybridization experiments made during the years 1873–1894, many had a constantly sterile result, in spite of frequent repetition.

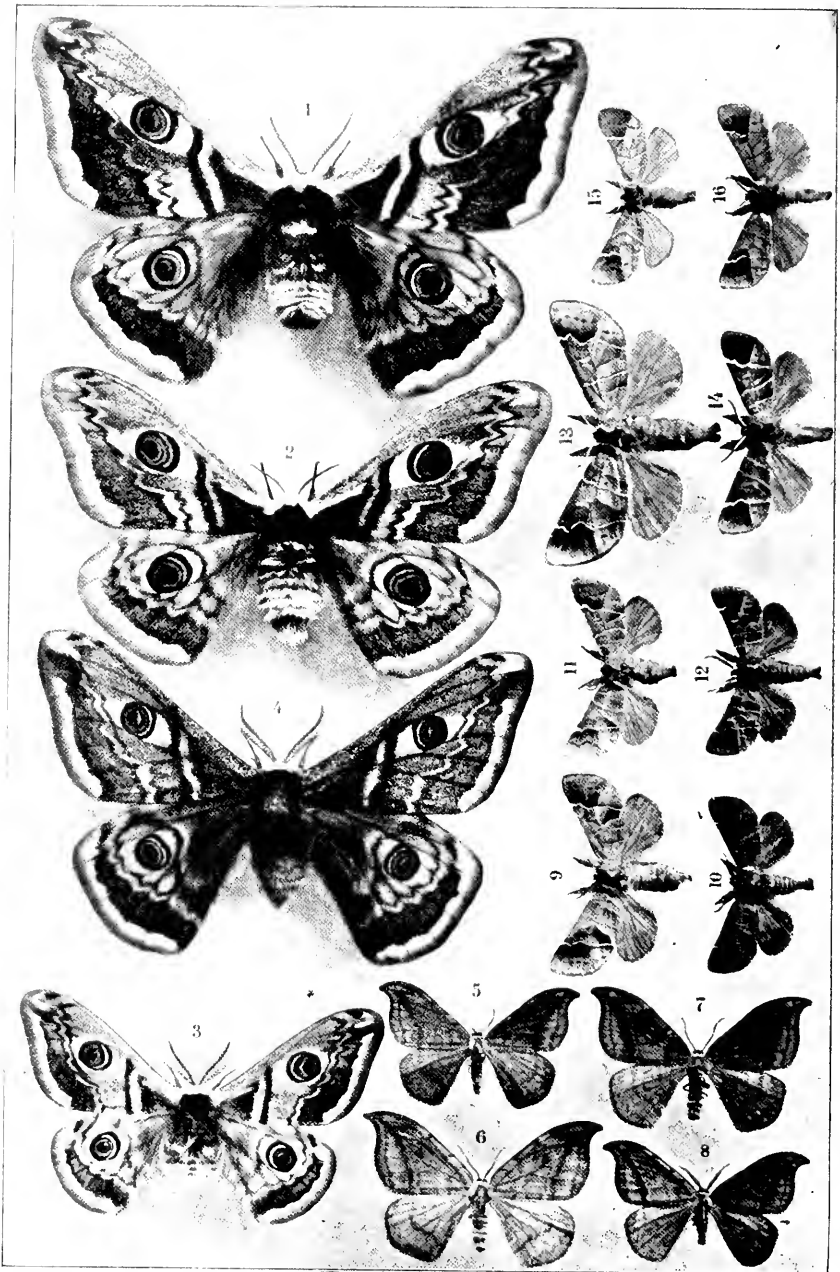
Nine different crossings of genuine species were fertile:—

1. *Smerinthus ocellata*, L., ♂ × *populi*, L., ♀.
2. *Zygæna trifolii*, L., ♂ × *filipendulæ*, L., ♀.
3. *Bombyx franconica*, Esp., ♂ × *castrensis* var. *veneta*, Stdfs., ♀.
4. *B. castrensis* var. *veneta*, Stdfs., ♂ × *franconica*, Esp., ♀.
5. *B. neustria*, L., ♂ × *franconica*, Esp., ♀.
6. *B. neustria*, L., ♂ × *castrensis* var. *veneta*, Stdfs., ♀.
7. *Saturnia pavonia*, L., ♂ × *Actias isabellæ*, Grælls, ♀.
8. *S. pavonia*, L., ♂ × *spini*, Schiff., ♀.
9. *S. pavonia*, L., ♂ × *pyri*, Schiff., ♀.



After Obernetter.

By permission of Frankenstein & Wagner.



After Obernetter.

By permission of Frankenstein & Wagner.

Nos. 4 and 7 of these nine crossings only produced a small number of larvæ, which were not successfully reared. From the remaining seven crossings imagines were bred. One (No. 5) only produced a few males, and two others (Nos. 3 and 6) only a few females, the latter always having the organs of reproduction undeveloped. No. 1 produced male imagines in numbers, but only a very few crippled females. Three crossings (Nos. 2, 8, and 9) produced males and females in normal proportions, but only one of these crossings (No. 2) produced females with the ovaries properly filled with eggs; the females of the other two crossings (8 and 9) possessed no germs, except a few females of No 8, which quite exceptionally had a few crippled and malformed ones.

The fundamental law to be drawn from these experiments, as indicative of the character of hybrids, is as follows:—

Primary hybrids—that is, the result of crossing genuine species drawn from nature—generally produce an individual (in most cases an intermediate form between the two parent species) which is relatively nearer to the phylogenetic older species than the newer. The older species enforces its biological, morphological, and physiological characters on its hybrid offspring to a greater degree than the younger. This law was proved in the following manner:—

The highly interesting fact was observed that the male of the small emperor (*S. pavonia*) had very little influence on a brood of eggs obtained by crossing it with a female *S. spini*, which is not much bigger than the small emperor; whereas the male *S. pavonia* had a great influence on the brood of the large *S. pyri*, which is about eleven times as big. Why does this same creature (*S. pavonia* ♂) so largely alter by crossing the brood of the giant *S. pyri*, when it has so little influence on that of *S. spini*, which is about as large as itself?

A comparison of the larval and pupal stages of the three species—*S. spini*, *pavonia*, and *pyri*—showed in several regards three different grades of protective resemblance respecting certain inimical factors of nature. On this genealogical tree *spini* always took the lowest place, *pyri* always the highest. On account of the extraordinarily close relationship, and the great similarity of the biological conditions of the three species, we are forced to the conclusion that *spini* is the phylogenetic oldest; *pavonia*, younger; and *pyri* the phylogenetic youngest form. (Further particulars can be obtained: Standfuss, Handbuch, 1896, pp. 100–107.) Applying this conclusion to the results of the crossing experiments: the oldest species (*spini*) was able to cling to its characters more strongly than the younger *pavonia*, and this latter again more strongly than the still younger *pyri*. A long genetic past thus strengthens specific characters.

A very striking example of this law is exhibited by the hybrid of *Deilephila euphorbiæ* ♂ × *D. vespertilio* ♀. All the individuals of this crossing which I have yet seen—about fifty specimens—are so near to *D. euphorbiæ* that one would suppose that they were an ill-characterized variation of the latter species, if its hybrid extraction were not known. The type of *D. euphorbiæ* is distributed over nearly the whole world in numerous species, and is therefore almost certainly the relatively older; whereas *D. vespertilio* is a solitary type of eccentric character, occurring over a very limited area, and therefore most probably newly formed. The reciprocal hybrids of *Smerinthus ocellata* × *S. populi* (both forms are known) illustrate the law in question very thoroughly. We have good grounds for believing that the type of *S. populi* is older than *S. ocellata*. The highly differentiated eye-markings on the hind wing indicate this fact very strongly.

The cross between *S. ocellata* ♂ × *populi* ♀ is in colour and markings nearer to *S. populi* than *ocellata*, and the reciprocal cross *S. populi* ♂ and *ocellata* ♀ exhibited among the specimens hitherto seen by me, even a specimen which could not be distinguished from the very variable *populi*.

Besides the evident predominance of the phylogenetically more ancient *populi* type on the part of the hybrids, this crossing showed another or second law very thoroughly, namely, that the male sex has a far greater influence on the resulting hybrids than the female.

In the reciprocal crosses between *Saturnia pavonia*, L., × *spini*, Schiff., of which *S. spini*, Schiff., is the more ancient type, the case was the same; the male element had more influence on the resulting form of the hybrid than the female (see Handbuch, 1896, pp. 66–76). The same fact has been noted by C. Oberthür in the third and last reciprocal hybrid as yet known (bred by O. Hüni-Inauen, Zürich); *Biston hirtarius*, Cl. × *pomonarius*, Hb., hybr. *pilzii*, Stdf., from a pairing of *hirtarius*, Cl., ♂ × *pomonarius*, Hb. ♀ (see Handbuch, 1896, pl. iii. figs. 1 and 2; and Oberthür. Bullet. de la Soc. Entom. de France, 1897, No. 15, pp. 256–259, and pl. 1); hybr. *hünii*, Oberth., from *pomonarius* ♂ × *hirtarius*, ♀ (see Bullet. de la Soc. Entom. de France, 1897, No. 15, pl. 2).

Of the reciprocal crossing of two local races of the same species, of which the author bred many examples, viz. :—

1. *Callimorpha dominula* ♂ × *dominula* var. *persona*, Hb., ♀.
2. *C. dominula* var. *persona*, Hb., ♂ × *dominula*, L., ♀.
3. *Spilosoma mendica*, Cl., ♂ × *mendica* var. *rustica*, Hb., ♀.
4. *S. mendica* var. *rustica*, Hb., ♂ × *mendica*, Cl., ♀ —

the reciprocal mixtures of *C. dominula*, L., and its var. *persona*, Hb., fell under this law, but the reciprocal mixtures of the small ermine (*S. mendica* and its var. *rustica*, Hb.) showed that the hereditary qualities of the female individual were apparently in

some respects stronger than the male of the same form (see Handb. 1896, pp. 220–226, and Pl. IV. figs. 5–17, and Pl. V.).

The following is shortly the result of the experiments made by the author up to the end of 1894:—

I. The biological character of the primary hybrids, as was very clearly proved in the habits of the *Saturnia* hybrids (see Handb. 1896, p. 83), is principally influenced by the special peculiarities of the phylogenetically older species.

II. The morphological character of these hybrids is determined by two factors.

The first and most important is the inclination of the offspring to follow the phylogenetic oldest form. As subordinate to this first law, the predominant influence of the male parent. (This, however, appears not always to be the rule.)

III. The physiological character in a sexual direction was shown by anatomical research to be as follows:—

The females of five of the hybrids obtained (a further sixth form yielded only males) possessed either none at all, or else very few degenerate egg-germs or eggs, and the latter have as yet never shown themselves capable of development.

All these hybrids were therefore, without doubt, incapable of reproduction.

Only the females of the seventh cross (*Zygæna trifolii*, Esp., ♂ × *filipendulæ*, L., ♀) constantly had in their ovaries a large number of apparently normally formed eggs, the powers of whose development have unhappily not yet been ascertained. The male hybrids, however, were no doubt all capable of reproduction; this was indicated by an anatomical dissection of the reproductive organs of a number of them.

The experimental test of the reproductive capabilities of male hybrids, when crossed back with females of both parent forms, showed that the fertility of these primary hybrids was greater when paired with the phylogenetic older form than with the phylogenetic younger; so that the physiological characters of the primary hybrid were nearer to the phylogenetic older form than the younger.

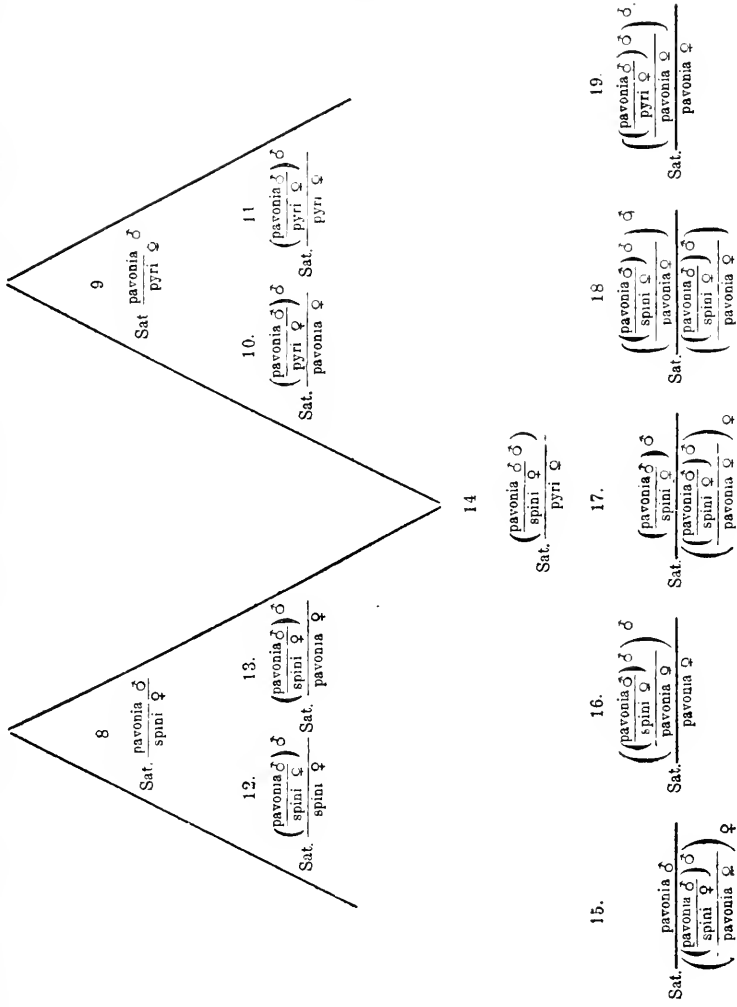
Further trials were made in the years 1895–7 in the direction of more thoroughly testing the characters of the various hybrid forms.

As previously, our three Central European Saturniids—*spini*, *pavonia*, and *pyri*, and their hybrids—were used.

The result is systematically shown on the accompanying plan. (See p. 344.)

As will be seen, not only the hybrid males of the crossing of *S. pavonia* ♂ × *spini* ♀ No. 8 (cfr. Handb. 1896, Pl. II. figs. 3, 4, 5), but also of the crossing of *S. pavonia* ♂ × *pyri* ♀ No. 9 (cfr. Handb. 1896, Pl. I. figs. 1–4) could be crossed back with the parent species, and imagines from all these four crossings

Saturnia pavonia L. Saturnia pyri Schiff



Note.—In order to avoid a constant repetition of this complicated designation of the various hybrids, here, as before, they are numbered in order, and these numbers will be chiefly used in the text for their designation.

obtained. No. 10¹ (Pl. III. figs. 1, 2, 3, and Handb. 1896, Pl. II. figs. 6 and 7); No. 11 (Handb. 1896, Pl. IV. figs. 1, 2, 3);

¹ The specimens figured (Pl. III. figs. 1, 2, 3) are from the same brood. They come from a large male of crossing No. 9 and a *S. pavonia* ♀ from Zürich. Only the gynandromorphic individual (fig. 3) developed to a large powerful insect; the male specimens (figs. 1 and 2) show the average size. Male specimens of this hybrid ranged in size between 66 and 78 mm.; gynandromorphic and female, from 75–87 mm.

No. 12² (Pl. III. figs. 4 and 5); No. 13³ (Pl. VI. VII. VIII; also Exper. zool. Studien, 1898, Pl. V. fig. 6).

But moreover all three *Saturnia* species were combined for making up a hybrid—the male hybrid from the crossing of *S. pavonia* ♂ × *spini* ♀—that, is, No. 8 being crossed with a female of the third species, No. 14⁴ (Pl. IV. figs. 1 and 2; also Exper. zool. Studien, 1898, Pl. V. figs. 7, 8, 9).

Even still more complicated hybrids were bred to the imago stage, No. 18⁵ (Pl. IV. fig. 3), and No. 19⁶ (Pl. IV. fig. 4); whereas from the hybrid crossings Nos. 15, 16, 17 only larvae were obtained, which, though in part nearly full-grown, died of an infectious disease.

When large Dalmatian *S. pavonia* females (received from Zara through Spada) were used for this experiment instead of the much smaller Zürich form, the resulting hybrids measured—the males from 83 to 95 mm., gynandromorphic and females from 84 to 97 mm.

² The hybrid figured (Pl. III. figs. 4 and 5) resembles *S. spini* in structure and coloration. The male differs from *S. spini*, however, in the single coloured dark grey-brown hairs of the upper side of the abdomen, while the female possesses the broken transverse band at the base of the fore wings, which is a peculiarity of *S. pavonia*.

³ The secondary hybrids (Pl. III. figs. 6, 7, 8) are also of one brood, from a strong hybrid male of No. 8 and a large Dalmatian *S. pavonia* ♀. Of this form (which I have named after the esteemed editor of our paper, Herr Director, C. Schaufuss, *S. hybr. schaufussi*), two males (figs. 6 and 7) and a gynandromorphic specimen (No. 8) are figured.

⁴ Of this highly interesting secondary hybrid of three species, which I have named *S. hybr. schlumbergeri*, in honour of Herr Staatsrath Dr. J. von Schlumberger, of Gebweiler, a pair is figured (Pl. IV. figs. 1 and 2). The female gives one the impression of a very large gigantic *S. spini*. The male also inclines mostly to a large male of this type, without, however, entirely discarding its connection with *S. pavonia* and *pyri*. Two male pupæ of this rarity have already gone over three winters without developing, and will probably go through a fourth without emerging.

⁵ I succeeded in rearing two males of the same brood of this crossing, the only pairing between true hybrid forms that I have yet obtained. One of these is shown (Pl. IV. fig. 3), and gives a very curious impression. At first sight it appears to be an old well-known form, and the next moment an entire stranger. The creature seems familiar when we simply regard the coloration, which first forces itself upon one's attention, as it agrees so entirely with a lightly coloured *S. pavonia* female that it could easily be mistaken for such. But the creature gives us quite a different idea when we notice that it is without doubt a well-developed male. In fact, this creature agrees entirely in structure with that of a *S. pavonia* male, but possesses the exact coloration of *S. pavonia* female.

By this crossing experiment the bright phylogenetically younger male coloration is thrown back to the phylogenetic older less brightly coloured female type. The second male is similar to this male in structure and size, but on the upper side, on the outer border of the hind wings, and in the centre of the fore wings, beneath the eye-spot towards the hind border, it possesses numerous rosy scales, and resembles the rare somewhat red type of *S. pavonia* female.

⁶ Of this also very complicated hybrid, three males of the same brood were successfully reared. The largest is figured (Pl. IV. fig. 4); the others measure respectively 71 mm. and 73 mm. The mother and grandmother of

The chief points noted by observing the development of these numerous hybrids were as follows:—

1. The secondary hybrids were not only produced by pairing primary male hybrids with females of the parent species, but also with the females of a third species.

2. A larger percentage of the broods of crossings of these primary hybrids with females of the phylogenetic oldest of its parents developed, than with the females of the younger.

The results concerning crossing with the third species are too incomplete to form any opinions as to fertility.

3. The resulting brood shows in general the same characters as in the primary hybrids, in biological and physiognomical respects, but with a larger individual variability.⁷ A tendency was shown to follow the line of development of the phylogenetic older form of the two, and in the three species the phylogenetic oldest form.

4. In a lesser degree there is to be found in some male individuals a capability and inclination to individual development in new directions within a narrow limit.

5. Besides males capable of limited and individually varying degree of reproduction, and females mostly sterile, or only fertile to a slight degree in the hybrid No. 13, there appeared among certain secondary hybrids a relatively large number of gynandromorphous specimens, in various crosses and in varying proportions (Pl. III. figs. 3 and 8).

6. The physiological affinity of the secondary hybrid males and also of the somewhat fertile females to the related types could not yet be ascertained, so that nothing definite can be said about it. An increase of fertility, compared with the male

these hybrids were both very large females of the Dalmatian type of *S. pavonia*. The great size of these insects is certainly due to the greatest extent to this origin, as only one-eighth of the *S. pyri* blood of the great-grandmother remains. In general all these creatures have the appearance of large light coloured *S. pavonia* males of the Dalmatian form.

⁷ In order to show these individual differences, we represent on Pl. III., figs. 1, 2, and 3, three insects of the same brood. Figs. 1 and 2, males; and fig. 3 a gynandromorphic specimen from crossing No. 10. They are bred from a large male of crossing No. 9 and a female *S. pavonia* from Zürich. The two males show great differences in wing structure and coloration.

When the much larger Dalmatian *S. pavonia* was used for crossing instead of the Zürich form, the resulting individuals of this brood, No. 10, showed still greater differences in wing measurement and coloration (see footnote 1), but they are such large specimens that it was impossible to figure them on account of room.

Further, Pl. III. figs. 6, 7, and 8 are also three brood companions, two males and a gynandromorphic specimen, from crossing No. 13.

Here also the two males, figs. 6 and 7, show great differences of size, also important differences in coloration. The original of fig. 6 has dull orange hind wings, whereas No. 7 has a pale rose colour tone, so that the colour differences of these two brothers are very great. For the gynandromorphic specimens, figs. 3 and 8, see footnotes 8 and 9.

parent, could not be ascertained in any of the numerous cases investigated, but, on the contrary, generally a decrease.

7. The broods of secondary hybrids, whether from an in-pairing of these forms (No. 18, Pl. IV. fig. 3 and footnote 5) or from crossing with a true *Saturnia* female (No. 19, Pl. IV. fig. 5 and footnote 6), produced up to the present only males, which were certainly capable of reproduction.

As already stated, among certain secondary hybrids are to be found relatively numerous gynandromorphic specimens. We say gynandromorphic and not hermaphrodite specimens, because the anatomy of a number of these forms shows (it is true only such have been investigated as tended more to the female type) the male-female characters only in secondary sexual characters, *i. e.* the antennæ, wing form, and coloration, and the outer organs of the genital apparatus, but not in the primary sexual characters, that is, the egg germs. The latter showed only a slight degeneration and malformation. In other respects they were entirely of one sex.

There is no question here of true hermaphrodites, as only those individuals are regarded as such which having partially male and partially female characters; this peculiarity is also to be found in the sexual organs.

In order to go thoroughly into this extraordinary fact, the results of our experiments were as follows:—

1. The male hybrid of *S. pavonia* ♂ × *pyri* ♀ crossed with *S. pyri* ♂ No. 11 resulted in no brood in more than 60 per cent. of the pairings, and in the best case only 1 per cent. of living larvæ, of which many died.

Of the eight imagines bred, five were gynandromorphic, probably resulting from four different broods.

2. The same male crossed with *S. pavonia* ♀ No. 10 resulted in no brood in 33 per cent. of the copulations; the fertile ones producing between 4 to 62 per cent.

The resulting larvæ were not very healthy.

Of fifty-four imagines bred up to now, twelve are gynandromorphic (Pl. III. fig. 3).⁸ Nine broods produced one gynandromorphic specimen each, and the 10th brood three.

3. The males of the hybrid *S. pavonia* ♂ × *spini* ♀ crossed with *pavonia* ♀ yielded without exception broods No. 13, amounting, in cases where an account was kept, to 16 to 84 per cent.

⁸ The gynandromorphic characters of the individuals of this hybrid form (Pl. III. fig. 3) can be easily seen from the figure. On the upper side, the right fore wing, the left fore and hind wings, and the abdomen are entirely of the female coloration, the right hind wing male. The antennæ are both nearly male, but with somewhat shorter feathering than usual. The male genital claspers are present in a rudimentary form at the end of the abdomen.

The under side of the wings and body show male and female characters mixed up with one another, except the right hind wing, which here again is entirely male.

Out of the two hundred and seven resulting imagines, there were only ten gynandromorphic specimens, all of which were not so characteristically developed in their gynandromorphic condition as the majority of the gynandromorphic specimens already mentioned (Pl. III. fig. 8).⁹ To how many broods these ten specimens belong, and how they are distributed among the broods, I cannot exactly say. The whole of the two hundred and seven specimens were reared from nine pairs.

4. With the male of the same hybrid, that is—between *S. pavonia* ♂ and *spini* ♀—only two back crosses with *S. spini* ♀ have succeeded. From these developed 94 and 98 per cent. larvæ, but, on account of bad weather, all died except four.

The four imagines—two males and two females—were sexually normal, without a sign of gynandromorphism (Pl. III. figs. 4, 5, and footnote 2).

5. The crossing of this same hybrid male with *S. pyri* ♀ No. 14, was in three cases infertile, most probably on purely mechanical grounds, on account of the great difference in size of the insects. Two other copulations resulted in 8 and 94 per cent. offspring (Pl. IV. figs. 1, 2, and footnote 4). Unfortunately, on account of bad weather, most of these died of infectious disease. Of the well-developed nine imagines, none were gynandromorphic.

It must be emphasized that the gynandromorphic specimens obtained were principally female in character.

(To be continued.)

NOTES AND OBSERVATIONS.

COLIAS EDUSA, *C. HYALE*, AND *ACHERONTIA ATROPOS* IN 1900.—The unusual occurrence in this country of several species of Lepidoptera during the year has furnished material for numerous communications to the 'Entomologist,' but I notice that as regards the visitation of *C. edusa*, *C. hyale*, and *A. atropos*, the bulk of these records are from correspondents who reside or have collected in the southern half of England. Reports on these species from northern sources have been few in number, and, as I think, very inadequately represent their actual distribution this year throughout the country. In a general way our northern *confrères* seem to be less desirous of exchanging ideas and experiences through the pages of entomological magazines than their fellow-students in the south, but it certainly is a matter of surprise to me that our north-country brethren have apparently

⁹ The gynandromorphic specimen of this hybrid shown (Pl. III. fig. 8) is on the upper side of wings and body predominately female, only on the right hind wing outside the eye spot is a bright orange-coloured patch, which changes in colour; and one can also be seen on the figure. The antennæ are almost entirely male, and the male genital claspers are well developed. Beneath, male and female characters are indefinitely mixed, only the right hind wing is entirely female (see footnote 7).

regarded the occurrence of the species mentioned as unworthy of special mention. That these species have only been observed in the few northern localities from which reports have been received is possible, but, I think, improbable. Perhaps someone in each of the northern entomological centres will be good enough to communicate whatever information he may be in a position to give touching the question now raised.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

ERETMOPTERA, A NEW DIPTEROUS GENUS.—V. L. Kellogg describes (1900, Biol. Bullet. i. 81-7) a new dipterous genus, *Eretmoptera*, from tidal pools in California, which is allied to the Nematocera, but apparently forms a new family. In both sexes the wings are strongly narrowed, while the halteres have somewhat the appearance of simple rudimentary wings. The antennæ have six segments in the male, four in the female.—G. W. KIRKALDY.

THE INSECT FAUNA OF HAMPSHIRE. — Vol. i. of the 'History of Hampshire,' one of a sumptuous series entitled "The Victoria History of the Counties of England," was published last October. It contains lists, and in some cases much useful information respecting localities, &c., of the species of all orders of the Insecta known to occur in the County of Hampshire. The editor of this division of the work is Mr. Herbert Goss, who is responsible for the Macro section of the LEPIDOPTERA. The list of Deltoides, Pyralides, and Crambites has been contributed by Mr. W. H. B. Fletcher; that of the Tortrices, Tineæ, and Pterophori by Mr. Percy M. Bright, with annotations by Messrs. E. R. Bankes and W. H. B. Fletcher. Capt. Savile Reid and Mr. C. G. Barrett have also assisted. The Lepidoptera take up twenty-four of the fifty-four pages devoted to these lists of insects. Other well-known authorities and specialists have furnished lists as follows:—ORTHOPTERA, Mr. Malcolm Burr; NEUROPTERA and TRICHOPTERA, Messrs. R. McLachlan, J. J. F. X. King, and Kenneth Morton; HYMENOPTERA ACULEATA, Mr. E. Saunders; HYMENOPTERA PHYTOPHAGA, Miss Ethel F. Chawner; COLEOPTERA, Rev. Canon Fowler and Mr. J. J. Walker; DIPTERA, Mr. F. C. Adams; HEMIPTERA-HETEROPTERA, Mr. E. Saunders; HEMIPTERA-HOMOPTERA, Mr. J. Edwards.

LOCAL SCARCITY OF *Tæniocampa incerta*, *Hufn.*—With reference to Mr. F. M. B. Carr's enquiry (*ante*, p. 204), called forth by his experience during two seasons in the New Forest, as to whether *Tæniocampa incerta (instabilis)* is at all local, I cannot say whether it is entirely absent from any parts of the country, but in some, at any rate, it is remarkably scarce. For many years I regularly worked the fallow-bloom in this district, which is no great distance from the New Forest, and shows a peculiarly close resemblance to it in its insect fauna, but have only taken eight specimens of *T. incerta*, all told! In 1892 I captured four examples of it, but in no other season have I taken more than a solitary individual, and it was some years before I ever met with it at all. *T. incerta* is hardly likely to be altogether absent from the New Forest, but perhaps it is equally scarce there: I have no list of New Forest Lepidoptera at hand to consult on this point.—EUSTACE R. BANKES; Norden, Corfe Castle, Dorset, November 4th, 1900.

MOULTS IN THE ODONATA.—A perusal of the interesting notes by the Rev. Arthur East, on the nymph of *Æschna cyanea*, in the 'Entomologist' for October, prompts me to make a suggestion *à propos* of his conjecture that "the smallest nymph skin measuring $3\frac{1}{2}$ mm. must be the first or second skin cast." A very few minutes after leaving the egg, some young nymphs moult. This I have observed in *Libellula quadrimaculata* (at Jena, Germany, in June, 1896), and in our American *L. pulchella* and *Sympetrum vicinum*. It is also mentioned for *Epitheca bimaculata* by Heymons (1896). It is likely that such a moult will be found to occur in *Æschna*. Previous to this first moult, the legs of the young nymph are adherent to each other and are not movable, so that Heymons says that we cannot yet speak of a larva, but of a hatched embryo. The first moult frees the legs, which are at once put into use by their possessor. — PHILIP P. CALVERT; Philadelphia, Pa., U.S.A., Nov. 5th, 1900.

ARGYNNIS AGLAIA var. CHARLOTTA, Haw.—Referring to the aberration of *Argynnis adippe* described and figured (*ante*, p. 281), it is not a little singular that the elongated silver blotches on the under side of the hind wings are precisely identical in form with those in the var. *charlotta* of *aglaia*, which Lang says used to be described by old English authors as a distinct species, and was supposed to occur nowhere else but in Britain. In 1884 I captured at Niederdorf, in the Dolomites, a fine male example of this variety; and Dr. Staudinger showed me two in his collection, taken in Germany.—R. S. STANDEN; Thorpe Hall, Colchester, Nov. 4th, 1900.

[In Mr. Leech's collection there are three modifications of the *charlotta* form of *A. aglaia*. These are labelled from the Engadine, and two of these are of the male sex. All three have the basal silvery spots on under surface of the hind wings confluent; but the female is fairly typical on the upper surface, and thus agrees with var. *charlotta*. The male examples, however, apart from the confluence of the basal spots referred to, exhibit different aberrational characters on both surfaces. There is a figure of an aberration of *A. aglaia* closely approaching var. *charlotta* in the 'Entomologist' for 1894, p. 182.—ED.]

UNIVERSAL LIST OF ENTOMOLOGISTS.—Entomologists of all countries are invited to send in their names, profession or business, order or orders studied, and full address, to Ag. W. Norbeda, Entomologist, Měhúk, Bohemia, who will be glad to insert such particulars, free of cost, in his forthcoming 'Catalogue of the Entomologists of the World.'

EPINEPHELE TITHONUS IN LARGE NUMBERS.—On July 30th last, while wandering among the sandhills near Christchurch in Hants, I found *E. tithonus* swarming on the bramble-bushes. The wind was rather high, and they were generally on the protected side of the bushes. On one fairly large clump I could probably have counted, would they have remained still enough, a hundred specimens. This butterfly seemed to be specially plentiful in the New Forest and neighbourhood at the end of July and beginning of August.—W. J. LUCAS; Sept. 12th, 1900.

CAPTURES AND FIELD REPORTS.

EPINEPHELE (HIPPARCHIA) HYPERANTHES IN FIFESHIRE. — As the ringlet is not a common butterfly in Scotland, it is perhaps worthy of notice that in the first week of July last a number of specimens were on the wing between hawthorn hedges near Cupar. They were of the variety which has only two spots on the under sides of the anterior wings.—HENRY H. BROWN; Cupar, Fife.

LYCENA ARGIOLUS AND MACROGLOSSA STELLATARUM.—*L. argiolus* has been very common this year, and I have seen it at Keston, Purley, Hove, and in considerable abundance round the ivy-clad walls of Pevensey Castle. I have only seen one example of *M. stellatarum*, and that at Hove.—LEWIS L. TURNER; 131, Melbourne Grove, East Dulwich.

EARLY AND LATE DATES FOR EUCHLOE CARDAMINES AND OTHER BUTTERFLIES.—I think the occurrence of this butterfly in July is not at all an unusual one. Dr. Buchanan White used to take it in Kircudbrightshire in June and July (see Newman's 'British Butterflies,' p. 158). I have also the following late dates for it: July 6th, 1833; July 1st, 1875; July 16th, 1888. One was even taken in September, being a male in splendid condition, in the neighbourhood of Plymouth, by Mr. Dell (see 'Weekly Entomologist,' vol. i. p. 108). I have late specimens of a much richer and yellower white than the early ones. I do not know whether this has been previously noticed, but Newman states that he had a specimen of a beautiful canary-yellow. I have also the following early dates for it:—April 7th, 1835; April 2nd, 1854; April 15th, 1868; April 6th, 1893.

Pieris rapæ. The last I have seen this year was on Oct. 27th. In 1873 I saw it still later—on Oct. 29th. It is the first butterfly to emerge in the new year; I have taken it myself on Feb. 17th, and it has even been known to do so in the end of January. *P. brassicæ* I once met with on Feb. 22nd, 1893. On the other hand, I have no earlier record for *napi* than April 6th, 1893, although in 1830 it appeared as late as Oct. 31st.

Chrysophanus phlæas. In my experience this is the last butterfly to be seen on the wing, if we exclude the hibernating species. The last dates I have for it are Nov. 5th, 1803; Nov. 8th, 1876. The earliest dates I have for it are April 2nd, 1833, and April 22nd, 1893.

For *Pararge egeria* my dates are March 15th, 1830; March 25th, 1868; Nov. 2nd, 1866.

Vanessa cardui on Dec. 31st, 1868, and Feb. 18th, 1869. *V. atalanta* on Nov. 18th, 1824, and March 29th, 1819. *Io* on Dec. 13th, 1842; Jan. 30th, 1824; Feb. 22nd, 1825. *Grapta c-album* on Nov. 6th, 1820.—C. W. DALE; Glanvilles Wootton, Nov. 3rd, 1900.

ACHERONTIA ATROPOS IN HAMPSHIRE. — Two pupæ of *A. atropos* were sent to me from Hampshire this year, one in August and the other in September. The gardener who sent them said he had not seen any for thirty years.—ROBERT SCHAW MORE; Woodcote End House, Epsom.

ACHERONTIA ATROPOS IN OCTOBER.—A specimen of *A. atropos* was taken by Mr. Bunce, at the Round Oak Inn, Padworth, on Oct. 9th, at rest inside the bar. I saw the moth alive the same evening, at the above-mentioned inn.—HENRY GARRETT; Padworth House, near Reading, Berks, Oct. 25th, 1900.

MACROGLOSSA STELLATARUM.—This species has been observed here much less frequently than last year.—W. T. HARRIS; 17, Micheldever Road, Lee.

Although not quite so abundant as last year, this species has been very common in my garden all the summer, and I have this year noticed the insect, on warm evenings, visiting the flowers at dusk, a circumstance I never observed before.—(Rev.) A. NASH; Standish Vicarage, Stonehouse, Gloucestershire.

CHEROCAMPA NERII AT TEIGNMOUTH.—A fine specimen of *Cherocampa nerii* was taken alive on Myrtle Hill, a street bordering on the G.W.R. station, Teignmouth, on October 23rd. The gentleman who picked it up brought it to me, and made me a present of it. As I have a small collection he thought I should value it, although I make no claim to be a naturalist. But, on showing the fly to Dr. W. C. Lake, a retired practitioner, I was told that I was the lucky owner of a very rare catch. The doctor had a note, in his copy of Kirby's 'Butterflies and Moths of Europe,' to the effect that a similar insect was caught in the gardens of Trafalgar Cottage, in this town, about fifty years ago. Other specimens have been taken at Brighton and Dover. Mr. A. G. Butler, of the British Museum (Natural History), says that the Museum has one taken at St. Leonards. Since this, a gentleman of Dawlish tells me that another was found at Street, near Dartmouth. Later still, a writer in a local paper claims to have seen one feeding on geraniums in his garden, also in this county. My specimen measures $4\frac{3}{4}$ inches from tip to tip of wing, and the body is $2\frac{1}{4}$ inches in length. The colours, in sunlight, are a velvety olive-green, graduating into greys, and the pink marking is distinct. The condition is very good: the only injury is a short tear in the left hind wing. Many ladies and gentlemen of this and neighbouring towns have called to inspect the moth; and would-be purchasers have written from various parts of England (a notice of the capture having appeared in the newspapers). It is my intention to offer it to the Albert Museum, Exeter, in a short time. There it may be seen by ardent admirers of moths.—J. J. O. EVANS; Teignmouth.

LYCENA BELLARGUS IN HERTFORDSHIRE.—Mr. Arthur Cottam (*ante*, p. 303) records *Lycena bellargus* as new to this county. I took the insect last year on Aldbury downs in September. The butterfly also occurs about two miles from Tring, just beyond the Hertfordshire border, though it is always rare.—N. CHARLES ROTHSCHILD; Tring Park, Tring, Herts, November 2, 1900.

COLIAS EDUSA IN OCTOBER.—I saw a few specimens of *C. edusa* in good condition at Kingsdown, on September 30th and October 1st. Several *Pieris rapæ* were also seen, but not a single example of *P. brassicæ* was observed.—G. W. KIRKALDY.

I took, freshly emerged, *C. edusa*, in rides of the New Forest, on October 17th last.—C. W. COLTHRUP; 127, Bary Street, E. Dulwich.

I took a specimen of *C. edusa* here on October 31st last. It had but recently emerged, and, although able to fly, the wings were still slightly crumpled and soft.—PERCY E. FREKE; 7, Limes Road, Folkestone.

COLIAS HYALE IN ESSEX.—*Colias hyale* has appeared here (Walthamstow) for the first time in my experience, the first specimen being taken on August 26th, in a small field of lucerne near Larks Wood; and I have

taken occasional specimens since in the same place, the last on the 23rd inst. At Upminster, Essex, six were netted on the 9th inst., and two on the 11th. They were curiously local here, being confined to a railway bank over a length of about two hundred yards; some clover and patches of lucerne, apparently wild or self-sown, were growing on this bank, which may account for the insect being confined to this particular spot where I found them. At Stanford-le-Hope, in the same county, seven were secured on the 17th inst., in a large field of lucerne close to the railway station. My opportunities for collecting during the last fortnight in August—which is, I think, the best period for *C. hyale*—were very limited; otherwise I believe a large number could have been taken. The insect has evidently occurred in some plenty and over a wide area in Essex.—G. HAROLD CONQUEST; 58, Hatherley Road, Walthamstow, September 26th, 1900.

COLIAS EDUSA AND *C. HYALE* IN HERTFORDSHIRE.—Both these species were fairly common here in August and September, and especially so in Bucks. One example of the var. *helice* was also taken.—N. CHARLES ROTHSCHILD; Tring Park, Tring.

COLIAS HYALE IN KENT.—This species has been fairly common in most of the lucerne fields at Erith and the surrounding district. I also met with it at Folkestone, where I heard a good number had been captured, and at Dover also. I found nothing specially striking, but a female from Folkestone is of a very vivid yellow, and the spots on the hind wings are large and highly coloured. The “whites” seem to have a great antipathy to this species, and hardly let them have any peace, and sometimes render their capture tedious and difficult, often preventing it altogether. *C. edusa* has occurred also, but, as far as my experience goes, much more sparingly than its congener.—E. SABINE; Erith, October, 1900.

COLIAS EDUSA AND *C. HYALE* IN NOTTINGHAMSHIRE.—On August 18th I took a large number of *C. edusa* in splendid condition, and saw others frequently up to September 6th. On August 30th I obtained two *C. hyale*, both of which were of the pale form.—A. SIMMONS; Rutland House, West Bridgford, Nottingham.

Between August 12th and 24th last, six specimens of *C. hyale* were taken by myself and two friends. I also took, within the dates mentioned, twenty-four examples of *C. edusa*, and my two friends more than double this number between them. I believe that *C. hyale* has not been recorded from the county for thirty years.—G. HENDERSON; Arnold Road, Old Bashford, Notts.

COLIAS EDUSA AND *C. HYALE* IN SOMERSETSHIRE.—On August 18th my aunt and myself captured six *Colias edusa*, one var. *helice*, and two *C. hyale* at Huish Champflower, Wiveliscombe. During the following two days we secured eighteen *C. edusa*.—W. H. TAPP; The Hill, Bromley, Kent.

COLIAS EDUSA IN SURREY.—One morning in August my sister saw a *Colias edusa* on Epsom Common. She caught it, and I find it is a female specimen.—ROBERT SCHAW MORE; Woodcote End House, Epsom.

COLIAS EDUSA AND *ACHERONTIA ATROPOS* IN KENDAL DISTRICT.—Since my contributions to the October ‘Entomologist’ on the above species, further records have come to hand. During the latter half of September and the first part of October the weather in this locality was

unceasingly wet and wild. Notwithstanding this, fresh *edusa* were found day after day settled on clover, stubble, and cut oats (which by the way has been entirely ruined owing to the prolonged wet). Careful searching has revealed two empty pupa-cases, and many must have perished in the mouldering corn. The last specimens taken were on September 28th and 30th; and the total number of captures so far ascertained is one hundred. Both males and females were very fine, and, though the latter were somewhat variable, nothing approaching var. *helice* was taken. One is reported to have been seen, but not captured, near Witherslack. Having read Mr. Frohawk's excellent articles in the 'Entomologist,' vols. xxv. and xxvi., every effort was made with the last pair captured to continue the brood, but without success—the sun absolutely refused to shine, with the result that they would not copulate; and, after living for a fortnight, the female deposited three infertile eggs, and died. With regard to *A. atropos*, the species seems to have been abundant and widely distributed in the district this season, especially in the neighbourhood of the moss lands. Pupæ are still being dug up with the potatoes; and the number of specimens traced has almost reached thirty.—(Rev.) A. M. Moss; Kendal, October 24th, 1900.

P.S.—Several of the pupæ obtained have recently died, some owing to malformation, others having sustained injury in their rough handling by potato-diggers. Two, however, have emerged, both males, of moderate size, and perfect in every respect; the first on October 30th, nearly two months from date of pupation, only slightly forced; the second on November 9th, a case of quick development, produced in a fairly constant temperature of 90° F., and plenty of moisture.—A. M. M.; Nov. 9th, 1900.

COLIAS EDUSA IN SCOTLAND.—I saw a specimen of *C. edusa* flying over a turnip field at Inverary, Argyllshire, on or about September 10th last. I succeeded in boxing it, but it escaped before I could get the box closed. I saw no other specimens.—JOHN A. NIX; 20, Hans Place, S.W., November 2nd, 1900.

VANESSA CARDUI IN BUCKS.—I took two specimens of this insect on August 19th. Both were in good condition, and were flying along the roadside near Beaconsfield.—W. H. BARTON; The Poplars, Spencer Road, Grove Park, Chiswick, W.

VANESSA ANTIOPA IN ESSEX.—On September 20th, G. Ruffel, one of the boys at the Countess of Warwick's School at Bigods, near Duunow, captured a butterfly which he reported at the time to be a Camberwell Beauty, and stated that he had seen another the same day, but failed to catch it. I have been waiting to verify the record before publication, and have just received the specimen taken, which is *V. antiopa*, and I have no doubt that the captor was correct in his recognition of the other specimen.—R. MELDOLA; November 8th, 1900.

SIREX JUVENCUS AT CHICHESTER.—A fine female of this giant sawfly was taken here on Sept. 28th, in the office of Mr. J. Loder Cooper, the town-clerk, by whom it was given to me. A few days later another was seen by my brother, on the pavement of one of the streets. *S. gigas* is of frequent occurrence in this locality.—JOSEPH ANDERSON; Chichester.

NEUROPTERON (*Linn.*) AT SUGAR.—In the New Forest, at the beginning of August last, several lace-wing flies were taken at sugar. One brought away and identified was *Chrysopa flavifrons*.—W. J. LUCAS; Kingston-on-Thames.

LATE GRASSHOPPER.—A single female of *Stenobothrus bicolor* was taken on Esher Common, on Nov. 4th. This is much later than I have ever noticed the species, or any of its congeners, before.—W. J. LUCAS; Kingston-on-Thames.

CIRRHÆDIA XERAMPÉLINA.—I took forty-three specimens of *C. xerampelina* on Aug. 23rd, 1900, all on ash-trunks and twigs around, drying their wings. I consider the scarcity is on account of entomologists in general not knowing when and how to find it.—G. HENDERSON; Arnold Road, Old Basford, Notts.

NOTE ON GONOPTERA LIBATRIX.—With reference to the note (*ante*, p. 305) on the finding of pupæ of *G. libatrix* on black poplar, I may say that here the larva is regularly beaten from both sallow and black poplar. On sallow it spins the "oval white cocoon" mentioned by Newman, but on poplar makes no cocoon, simply curling over the end of a leaf, or drawing two leaves together and fastening them with a few silken threads, the pupa itself being perfectly visible between the leaves.—FRANK LITTLEWOOD; Lynn Garth, Kendal, Nov. 8th, 1900.

CARADRINA AMBIGUA AT PAGHAM.—When at Bognor, in September, I took a doubtful-looking *Caradrina*, at sugar, at Pagham, and have now been enabled to identify it as *C. ambigua*. In view of the remarkable spread of this moth round the South Coast, it may be of interest to add this capture to the records.—R. MELDOLA; Nov. 8th.

GERRIS LACUSTRIS NYMPH IN OCTOBER.—On Oct. 14th last I was rather surprised on picking up out of a dyke on the sandhills at Deal a nymph of *Gerris lacustris*—rather late for nymphs, I thought.—G. W. KIRKALDY.

SUGARING IN A GARDEN.—Sugaring in the garden here during October proved rather attractive. Between the 9th and 17th the following species occurred:—*Agrotis saucia*, *Orthosia lota*, *Anchocelis pistacina* (very common), *A. litura*, *Cerastis vaccinii*, *C. ligula* (*spadicea*), *Xanthia ferruginea* (common), *Polia flavicincta*, *Miselia oxyacanthæ* (including a good many *ab. capucina*), *Phlogophora meticulosa*, and *Hadena protea*.—PHILIP J. BARAUD: Bushey Heath, Herts.

NOTES FROM THE LAKE DISTRICT.—In June I took a three weeks' holiday, from the 7th to 28th. I stayed at a place in the parish of Setmurthy, but the station, which was quite close, was labelled Bassenthwaite Lake, and was situated in the parish of Wythop. The village of Wythop was on one side of Wythop Fells and the church on the other, and the village of Bassenthwaite is on the opposite side of the lake to the station of Bassenthwaite Lake. The weather was all that could be desired, which is not always the case in the English Lake District. I did not sugar; in fact, I only took such insects as came directly under my notice. The following is a list of the Lepidoptera which I either took or saw:—*Pieris brassicæ*, *rapæ*, and *napi*; all these were very common, but in poor condition. *Euchloë* (*Anthocharis*) *cardamines*, common, and in good condition; exceedingly variable in size, some males being the smallest I have ever seen, and others the largest. *Argynnis selene*, very common and in splendid condition. *A. euphrosyne*, only caught a few, which were very worn. *Vanessa urticae*, larvæ common everywhere, especially near Crossthwaite church and in the Vale of Newlands. I took about forty, which soon turned, and are small, but dark, with very distinct markings. *V. atalanta*,

saw a few very fine specimens near Wythop church and Buttermere. *V. cardui*, saw a specimen at Braithwaite, and another in the Vale of Newlands. *Epinephele ianira* (*janira*), only saw one male. *Cænonympha pamphilus* and *Polyommatus phleas*, both common. *Lycana icarus* (*alexis*), caught six males, but did not see a single female, in a field off the Udale road. *Nisoniades tages*, very common and in excellent condition near Isel, and on the Udale and Aspatria roads. *Spilosoma menthastri*, one male near Ouse Bridge, and a pair near Higham. The female, taken at Higham, laid about a hundred ova, which I have fed on elder, as both dock and nettle are difficult to get at Bolton. *Hepialus humuli*, saw one male. *Phalera bucephala*, one specimen, at rest on a leaf, near Higham. *Acronycta leporina*, one specimen at rest on a willow-trunk behind the Pheasant Hotel. *Xylophasia monoglypha* (*polyodon*), made the acquaintance of one in my bedroom. I was fortunate enough to see no more. *Euplexia lucipara*, caught one in bedroom. *Plusia pulchrina* and *P. gamma*, one of either kind. *Euclidia glyphica*, saw one or two on the Udale road, along with *selene*, *pamphilus*, and *tages*. *Rumia luteolata*, very common after dusk along the lane hedges. *Boarmia repandata*, one very dark specimen in woods on Armathwaite estate, off the Udale road. *Geometra vernaria*, one specimen at Higham. *Iodis lactearia*, one specimen off Udale road. *Cabera pusaria* and *exanthemaria*, both exceedingly plentiful. *Abraxas* (*Zerene*) *grossulariata*, only saw one larva by the roadside near Cocker-mouth. *A. sylvata* (*ulmata*), very common near the Wythop Estate Woods; took over sixty one afternoon, at rest on low plants. *Lomaspilis marginata*, common everywhere. *Larentia viridaria* (*pectinitaria*), took one specimen resting on an ash-trunk by Wythop Estate Woods. *Thera juniperata*, fairly common. *Melanthia ocellata*, *Melanippe sociata*, *M. montanata*, and *Campptogramma bilineata* were all common. *Bupalus piniaria*, males common everywhere, but did not see any females. *Eubolia plumbaria* (*palumbaria*), fairly common off the Udale road. *Tanagra atrata* (*chærophyllata*), common in the same places as *E. plumbaria*. *Botrys urticalis*, saw a left primary of this species on a nettle, COLEOPTERA.—*Cicindela campestris* var. *funebri*, caught one specimen near Crummock Water, where it seemed common. *Melolontha vulgaris*, common. *Phyllopertha horticola*, very common on bracken near Buttermere, and in the Vale of Newlands; less so on Lattrigg. *Corymbites æneus* and *cupreus*, one specimen of the former; the latter was common on Lattrigg. *Lampyrus noctiluca*, four males flew in at the bedroom window about 11 p.m., evidently attracted by the candle. *Rhagium inquisitor* and *bifasciatum*, one specimen of each; the former on the boat-house, the latter flew out of some pine woods.—OSCAR WHITTAKER; Morelands, Heaton, Bolton, Aug. 21st, 1900.

THREE DAYS' COLLECTING AT DEAL.—Three days is not a long time to work up a strange locality, but having nothing else to do from July 31st to August 3rd, I determined to run down to Deal, my principal object being to try and obtain a series of *Lithosia pygmaeola* and *Liparis chrysoorrhæa*, the former of which I understood to be getting very scarce, and the latter very common in this particular locality. I was also anxious to see the old place again, as in my early school days I had spent three summer holidays there, and had then collected butterflies in a more or less casual way; in 1886, the last of these three years, capturing, and recording in this magazine, *Colias edusa*, var. *helice*—this record, by the by, being my earliest effort in print, being then only twelve years old. It is curious that this my next visit should again be during a "Colias" year.

I put up at a boarding-house in the Sandhills, "Martinsfield" by name, and I may say that anyone working Deal could not do better. The catering is very good, the rooms comfortable, and the position is close to the best treacled ground; there are also two bungalow bedrooms, one of which should be secured beforehand, as one is then able to get in and out at any time of night. In the garden at "Martinsfield" there is a large quantity of privet, which attracted *Vanessas* and *Macroglossa stellatarum* by day, and countless moths by night. As, however, moths were even more plentiful on treacle, I did not work this privet beyond a final quick look round before turning in. Still, it might be very useful if treacle were not paying.

Arriving about 3.30 on 31st, I commenced operations during my lunch by boxing three *Amblyptilia acanthodactyla* and one *Acidalia imitaria* off the dining-room ceiling, and immediately after netted a fine *M. stellatarum* over the garden privet. Up to dinner time I did nothing much except prospecting the ground and putting treacle on some hundred odd posts, in two lines of fences running across the sandhill half-a-mile apart. This plan worked well, as the space between the two gave a good opportunity for working for *Lithosia pygmaeola*, &c.

This little "footman" has certainly become very scarce, as hard work on three evenings only produced eight specimens in all. Only one was netted at dusk, two more on treacle, and the others at rest on the marram grass stems. In this situation they are very conspicuous in the lamplight, and I feel sure I did not miss any over the ground I searched. The three nights, however, were all very windy, and probably a still, warm night is wanted for this species, as for *Nudaria senex*, in the Fens. The wind, though very strong, was south-west, and did not in any way interfere with treacle. On the contrary, the best posts were the most exposed ones—two or three on a high sand-hill, and others on a shingle ridge at the top of the beach, being always the most favoured.

There was a truly vast assemblage of moths, the last night being the best. The commonest species was undoubtedly *Xylophasia polyodon*, of which I took one almost black; then came in order *Amphipyra tragopogonis*, *Triphena pronuba*, *Agrotis tritici*, *Hydrécia nictitans*, and *Agrotis puta*, all in the finest possible condition. I took long and variable series of *A. tritici* and *H. nictitans*, and some nice forms of *T. pronuba*, amongst which I picked out one fine *T. jimbria*, but *A. tragopogonis* and *A. puta* were wonderfully constant. *A. velligera* was much scarcer, only about half-a-dozen each night, and there were no *A. cursoria*, a species I rather expected. *A. suffusa* occurred in about the same numbers as *A. velligera*, and was as usual in grand condition, whilst *A. nigricans* was a bit commoner and very variable, but nowhere near *tritici* in numbers. Amongst a number of common Caradrinas, a close search failed to turn up *C. ambigua*, in this almost its earliest British locality. A specially striking feature (more noticeable, perhaps, after several "fen seasons") was the scarcity of "wainscots." Even *Leucania impura*, which was the commonest of them, rarely visited the treacle, being far fonder of the flowering heads of marram grass, where it kept company with *H. nictitans*, *Cerigo cytherea*, and *Miana furuncula*, the few *Lithosia pygmaeola* taken being all on the stems. Six *L. conigera* were the only other *Leucanias*, all but one on treacle, and the other on grass; and, in one little corner where the fence ended at a reedy dyke, *Cenobia despecta* occurred sparingly, both on treacle and round the reeds at dusk. *Calamia phragmitidis* did not come to treacle, although

I kicked one up in the evening on the neighbouring pasture land very worn. The only other species worth mentioning were *M. literosa* (scarce), and two very poor *Apamea fibrosa*. It is curious that the latter should be so worn, as three or four days later, last year, they were only just coming out at Wicken Fen. Most of the above also occurred commonly on the privet, and, in addition, plenty of *Plusia gamma* and *Hadena chenopodii*, the latter being very scarce on treacle. This species I also saw on the privet in the day time, flying with *P. gamma* in the afternoon sun. Whilst working for *L. pygmaeola*, and when putting on the treacle, *Mesotype virgata* occurred sparingly, and, amongst the Crambi, *C. perlellus* and var. *warringtonellus* (common) and *C. contaminellus* (very scarce).

I worked hard during the two and half days I had, although the first day and last morning were very wet, and the second day so exceedingly windy that scarcely anything flew except under shelter. On August 2nd, however, in sheltered spots, butterflies were very abundant, and I then got my first glimpse of *Colias hyale*, netting two fine males on the Kingsdown cliffs. This first indication of a *Colias* year was abundantly realised when during the next fortnight I took large numbers of both *C. edusa* and *C. hyale* at Littlehampton.

I walked along the cliffs in the wind to St. Margaret's Bay, and here found *Argynnis aglaja* common, but small and mostly worn. *Lycæna corydon* literally swarmed, but it was too windy to work for vars. *Lycæna astrarche* was fairly common (but more plentiful on the sand-hills), and a single female *L. argiolus* occurred in Upper Wahnier. *Pyrameis cardui* turned up everywhere, defying the wind with its strong flight, and *Melanargia galatena* was common on the Kingsdown cliffs. This species was also very small compared with some taken at Chatten den a fortnight earlier. *Polyommatus phlaeas* was abundant, and the specimens uniformly dark and dusky, some of them being very extreme in this direction. This darkening in colour was probably due to the effect of the excessive heat of mid-July upon the pupæ. I found *Liparis chrysorrhæa* at once on the first morning, and, although exceedingly local, it was abundant in its special locality, so abundant in fact, and the food so limited, that I should imagine the larvæ would next year be in great danger of starvation.

The hawthorn bushes in this spot are few and stunted, and from one of them, not two feet high, I took eleven females, and counted twenty-one batches of eggs. From a larger bush I took twenty-three females, each one having a batch of ova beside her, and every bush had several specimens, in many cases ten or more. There were also a number on blackthorn and wild rose. I had no hesitation in taking a large number of specimens, all but two having oviposited, and consequently minus their "tails," which of course are used as a covering for the ova, but, curiously enough, could only find three males. Their condition, owing to the rough weather, might have been better, but many were very fair indeed. The batches of eggs, judging from the ten I brought home, are very large. Three of them, in a chip box, hatched unawares, and disported themselves on a lace window-curtain, making such a show that I wished the batches had been smaller. *Leucoma salicis* was also very common on a row of small poplars, both sexes equally, sitting on the under side of the leaves, in the same way as *L. chrysorrhæa* did on the hawthorns; and a long series of *Bryophila perla* was taken off walls in the town, two, with a bright orange-yellow ground colour, coming off a wall covered with a bright yellow lichen.

On the Kingsdown cliffs I spent about an hour each day searching kuap-

weed blossoms for *Eremobia ochroleuca*, and by this means secured six fine specimens and left a seventh bad one. They were all sitting well in the centre of the flowers, but I could find none on scabious, which I believe they are supposed generally to favour. *Aspilates gilvaria* was common on the slopes at St. Margaret's Bay, and *Eubolia bipunctata* literally swarmed on the chalk, rising in confusing numbers at every step, in company with countless *Plusia gamma*. *Melanippe galiata* and *M. rivata* occurred, but were scarce; and amongst the plumes *Amblyptilia acanthodactyla*, *Mimæseoptilus bipunctidactylus*, and *Pterophorus monodactylus* were walked up commonly. *Pyrausta purpuralis* was also in great evidence when the sun shone.—RUSSELL E. JAMES; 18, Onslow Gardens, Highgate, Sept. 17th.

ERRATUM.—Page 281, line 2 from bottom, for July read September.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—October 17th, 1900.—Mr. G. H. Verrall, President, in the chair. Mr. J. Digby Firth, The Grammar School, Chorlton-cum-Hardy, near Manchester, was elected a Fellow of the Society.—Mr. A. H. Jones exhibited a series of *Pararge mæra*—a light form resembling *P. megera*, from the Basses Alpes and the Cévennes; a dark form approaching *P. hiera*, from Cortina; and an intermediate form, from the Italian Lakes; also a variety of *Lycæna corydon*, female, in which the under wing showed a decided blue coloration, taken at Lago di Loppio, near Riva. Dr. Chapman suggested that the union between the three named species of *Pararge* was very near, if the species were not indeed identical.—Mr. A. J. Scolliek exhibited a specimen of *Cethosia cyanea*, a species inhabiting North-west India, which had been taken this year on the wing near Norwich. It was suggested by Mr. Distant that this was a case of accidental importation, probably in the pupal condition.—Mr. H. Rowland-Brown exhibited specimens of *Erebia glacialis*, taken this year on the Stelvio Pass, showing transitional forms to the var. *alecto*. He said that the typical form and the variety were not found flying together, but on opposite sides of the valley. Dr. Chapman observed that the darker specimens approached to the form of *E. melas* found in the neighbourhood of Cortina-di-Ampezzo. Specimens of *E. glacialis* also exhibited from Saas Fée and Evolena showed marked inferiority in size and brilliancy of colour.—Mr. W. L. Distant exhibited a piece of Hawkesbury sandstone from Australia, showing the borings of Termites, and, in connection with the same, communicated a note from the 'Proceedings' of the Linnean Society of New South Wales (pt. iii. 1899, p. 418), as follows:—"Mr. D. G. Stead exhibited specimens of Hawkesbury sandstone—(1) from the sea-shore between tide-marks, showing the tunnelling of marine Isopods (*Spharoma*) with the living animals *in situ*; and (2) from the hill-tops overlooking Port Jackson, offering examples of the borings which so often attract notice, and the production of which has been attributed to Hymenoptera and also to the Termites. Since last meeting Mr. Stead reported that he had investigated the matter, and that, after breaking up a quantity of stone, he had come upon Termites, of a species at present undetermined, actually at work, specimens of which he exhibited."—Mr. M. Burr exhibited a

male and female specimen of *Anisolabis colossea*, Dohrn., from New South Wales—the largest known earwig in the world.

November 7th, 1900. — The President in the chair. — Dr. John Cotton, of 126, Prescott Road, St. Helen's; Mr. George H. Howes, of Spey Street, Invercargill, New Zealand; the Hon. F. M. Mackwood, M.I.C., of Colombo, Ceylon; Mr. William J. Rainbow, of the Australian Museum, Sydney; and Mr. Percy Charles Reid, of Feering Bury, Keldvedon, Essex, were elected Fellows of the Society. — Mr. George S. Saunders exhibited specimens, from Devonshire, of *Pieris rapa* and *Plusia gamma* caught by the proboscis in flowers of *Araujia albens*, Don, a climbing plant of the natural order *Asclepiadaceæ*; and explained the nature of the mechanism by which the insects were entrapped by the flowers. He also showed specimens of the "bedeguar" gall formed apparently on the "hips," or fruit, of *Rosa canina*, the formation of the galls on the hips being considered unusual. They were taken from a small briar about four feet high, having more than thirty of these galls, which was growing on the top of the North Downs near Reigate. Mr. Gahan remarked that the capture of insects by *Araujia albens* had recently been investigated in France by MM. Marchand and Bonjour, whose account appeared in the 'Bulletin de la Soc. des Sciences Nat. de l'Ouest de la France' for 1899. These authors concluded that insects were captured only by immature flowers, the anther-wings, in the cleft between which the proboscis of the insect is caught, being at that time stiff and resistant; but when the flowers are ripe the anther-wings become less rigid and do not offer sufficient resistance to the withdrawal of the proboscis, which carries with it the pollinia ready to be transferred to the stigma of the next flower visited by the insect. — Mr. Tutt exhibited, for the Rev. Mr. Burrows, a large series of *Epunda lutulenta* from Mucking, in Essex, and made remarks upon several interesting variations included in the series. — Mr. W. J. Kaye exhibited *Hydrocampa stagnalis*, var., with examples of the typical form for comparison; the variety differed in having the basal line nearly obsolete, the sub-median double line much strengthened internally and reduced externally, and the cross-band connecting the sub-median and post-median bands almost entirely obliterated. — Mr. F. Merrifield exhibited a variety of *Argynnis dia* taken with a few examples of the ordinary form at Ilanz, in the Vorder Rhein Valley, early in September last, when what was, he believed, a third brood of this species was abundant; the variety was much blackened on the basal half of all the wings.—Canon Fowler exhibited a specimen of *Orochares angustatus*, Erichs., a Staphylinid beetle new to the British list, taken at Leverstock Green, Herts, by Mr. Albert Piffard.—The Rev. F. D. Morice mentioned as a fact of some interest that in a nest of *Formica sanguinea* at Weybridge, in which he found males and workers of that species, he found also males and females as well as workers of the slave-ant *Formica fusca*, an experience somewhat different to that of Huber and Darwin, who stated that workers only of the slave-species were found in the nests of *sanguinea*.—The Secretary read "Some notes on variations of *Zeritis thysbe*, Linn.," communicated by Mr. H. L. L. Feltham, of Cape Town, and, on the latter's behalf, exhibited one female and two male specimens of one of the rare forms referred to in the paper. This form was originally noticed by Mr.

Trimen as an "aberration." Mr. Feltham succeeded in taking several specimens on the summit of the mountains overlooking Minzenberg, and was inclined to consider it a distinct dark variety. He requested that the specimens exhibited should be placed in the British Museum collection.—C. J. GAHAN and H. ROWLAND-BROWN, *Hon. Secs.*

RECENT LITERATURE.

AUG. LAMEERE. *La raison d'être des métamorphoses chez les Insectes ; Discours du Président à l'Assemblée Générale de la Société Entom. de Belgique* (1900, Ann. Soc. Ent. Belg. xliii. (for 1899) pp. 619-36).

AUG. LAMEERE. *Notes pour la Classification des Coléoptères* (1900, l. c., xliv. pp. 355-76, and Classificatory Table).

Whatever may be the ultimate reception afforded to the views propounded in these two papers, no one will be disposed to deny their—in great part—boldness and originality, or the intimate knowledge of entomology upon which they are based.

The author considers that the ancestors of other winged insects cannot be found among the Amphibiotica—and consequently that wings have not been developed from tracheal branchiæ—for they, as well as their near allies the Orthoptera and Embioptera, have a large number of malpighian tubes, while almost all the other winged insects have but few, and a vanished organ (according to the "law of irreversibility of evolution") never reappears, nor does a perfected organ return to a former simple state.

Five orders are embraced by the Holometabola, viz. :—Neuroptera (Planipennia and Plicipennia), Coleoptera, Diptera, Lepidoptera, and Hymenoptera; these are all closely allied, and are probably monophyletic, the last four being specialised Neuroptera. The Rhipiptera are considered to be evidently the last term of evolution of the Rhipiphoridae, therefore coleopterous, while the Fleas (Pulicidæ), which up to the present have been universally regarded as either dipterous or—according to the recent researches of Brauer and Heymons—forming a separate order (Aphaniptera), are positively stated to be coleopterous, belonging without doubt to the group of Staphylinoides of Ganglbauer. It is noted in passing that the antennæ are composed of eleven, and not three, segments, as formerly supposed.

On one point we are not altogether certain of Prof. Lameere's meaning. On page 622 the Cicadidæ are cited as an exception to the rule that the Rhynchota have a direct development; and on page 627 it is stated that this family possesses a true larva, adapted to a subterranean life, and offering especially this peculiarity, viz. that the anterior legs are, during this period—sometimes very long—of the insect's existence, curiously modified into digging apparatus.*

Now we do not think that these statements are borne out by the actual facts. It is true that the terms "larva" and "pupa" are loosely used by many entomologists in speaking of Rhynchota, Ortho-

* Les Cicadides ont une véritable larve adaptée à une vie souterraine, et offrant notamment cette particularité que ses membres antérieurs sont pendant cette période, parfois très longue, de l'existence de l'insecte, curieusement modifiés en appareils fousseurs."

COLEOPTERA.

CARABIFORMIA.

Rhysodidae.
Carabidae.
Paussidae.

Dytiscidae.

Gyrinidae.

STAPHYLINIFORMIA.

Histeridae.
Staphylinidae.
Pselaphidae.
Platypsyllidae.
Pulicidae

Silphidae.

Silphinae.
Clambinae.
Sphaeriinae.
Hydroscaphinae.
Scaphidiinae.
Corylophinae.
Trichopterygiinae.
Scydmaeninae.

Omophroninae.
Haliplinae.
Amphizoinae.
Hygrobiinae.
Hydroporinae.
Dytiscinae.

CANTHARIDIFORMIA.

Lamellicornia.

Lucanidae.

Scarabaeidae.

HETEROMERA.

Melandryidae.

Lagriidae.

PHYTOPHAGA.

Curculionidae.
Tenebrionidae.

Brentidae.
Cerambycidae.
Chrysomelidae.

Bruchidae.

CLAVICORNIA.

Erotylidae.
Phalacridae.
Colydiidae.
Lathridiidae.

Endomychidae

Coccinellidae.

Cucujidae.

Pelle-Brachy-Macrod-icornia.

Mycetophagidae.

Cisidae?

Erotylidae.

Phalacridae.

Colydiidae.

Lathridiidae.

Endomychidae

Coccinellidae.

Cucujidae.

Brentidae.
Cerambycidae.
Chrysomelidae.

Bruchidae.

Curculionidae.
Tenebrionidae.

Pelle-Brachy-Macrod-icornia.

Buprestidae.

Parnidae.

Dermestidae.

Byrrhidae.

Hydrophilidae.

Nitidulidae.

Mycetophagidae.

Cisidae?

Erotylidae.

Phalacridae.

Colydiidae.

Lathridiidae.

Endomychidae

Coccinellidae.

Cucujidae.

STERNOXIA.

Elateridae.

Elateridae.

Buprestidae.

Parnidae.

Dermestidae.

Byrrhidae.

Hydrophilidae.

Nitidulidae.

Mycetophagidae.

Cisidae?

Erotylidae.

Phalacridae.

Colydiidae.

Lathridiidae.

Endomychidae

Coccinellidae.

Cucujidae.

MALACODERMATA.

Melyridae.

Dascillidae.

Dascillidae.

Buprestidae.

Parnidae.

Dermestidae.

Byrrhidae.

Hydrophilidae.

Nitidulidae.

Mycetophagidae.

Cisidae?

Erotylidae.

Phalacridae.

Colydiidae.

Lathridiidae.

Endomychidae

Coccinellidae.

Cucujidae.

TEREDILIA.

Lymexylidae.

Anobiidae.

Bostrychidae.

Cupesidae.

Derodontidae.

Cantharididae.

Melyridae.

Dascillidae.

Buprestidae.

Parnidae.

Dermestidae.

Byrrhidae.

Hydrophilidae.

Nitidulidae.

Mycetophagidae.

Cisidae?

Erotylidae.

Phalacridae.

Colydiidae.

Lathridiidae.

Endomychidae

Coccinellidae.

Cucujidae.

Anobiinae.
Piniinae.
Lyctinae.
Bostrychinae.

Cantharidinae.
Lycinae.
Lampyrinae.
Drilinae.

Malachiinae.
Melyrinae.
Corynetinae.
Clerinae.

Dascillinae.
Chelonariinae.
Eucinetinae?
Cyphoninae?

Cebrioinae.
Perothopinae.
Eucneminae.
Cerophytinae.

Soleniscinae.
Elaterinae.
Throscinae.

Psepheninae.
Parninae.
Elmidinae.

Byrrhinae.
Nosodendrinae?
Helophorinae.
Hydrophilinae.

Hypocephalinae
Sphaeritinae.
Trogositinae.
Nitidulinae.

Byturinae.
Sphiundinae?
Cisinae.
Cryptoplaginae.

Erotylinae.
Mycetaeinae.
Endomychinae

Cucujinae.
Helotinae.

Bruchinae.
Anthribinae.

Melandryinae
Mordellinae.
Rhipiphorinae.
Stylopinae.

Lagriinae.
Pythinae.
Pyrochroinae.

Melomae.
Oedemerinae.
Anthicinae.

Lucaninae.
Troginae.
Scarabaeinae.

Melolonthinae.
Dynastinae.

ptera, &c., when "nymph" ought to be employed for all the stadia between the ovum and the imago; but the learned Belgian has evidently not fallen into this error, for he speaks of "une véritable larve." So far as our knowledge goes, the Cicadidæ are certainly no exception to the general direct development in the Rhynchota, inasmuch as there is no "resting-stage" as in the true Holometabola; "the larval and pupal changes * in the periodical Cicada are normal" (Marlatt, "The Periodical Cicada" [1898. U. S. Dep. Agriculture, Entom. Bull. 14, n. s. p. 81]). As regards the structure of the legs, moreover, the author of the work just cited states that this is "perhaps the best means of distinguishing the adolescent stages of" the periodical Cicada (*Tibicen septendecim* (Linn.)) "from other Cicadas" (*l.c.*, p. 85). On the other hand, we ourselves possess nymphs, in two stages, of an Oriental species of *Dundubia*, in which the anterior legs are developed quite as greatly, proportionately, as in *Tibicen*. It must also be remembered that the anterior femora are of very considerable size in almost all the Cicadidæ in the imaginal stage.

We reproduce the classificatory table of Coleoptera, merely noticing that the Lymexylidæ are supposed to be the nearest to the ancestral Planipennian Neuropteran, and that the presence of an ocellus, or of ocelli, in certain Dermestidæ and Staphylinidæ, points to the high antiquity of these families. The Cantharidæ are perhaps more generally known as Telephoridæ, while the Cicindelidæ of authors are swallowed up in the Carabidæ. After the inclusion of the fleas in the order, the most daring innovation is perhaps the removal of the Brentidæ from association with the Rhynchophora and other Phytophaga and the placing of them in the Clavicornes. (See opposite.)

G. W. K.

L. O. HOWARD. *Notes on the Mosquitoes of the United States* (1900, U. S. Dep. Agriculture, Div. Entom.; Bull. 25, n. s., pp. 1-70; 22 figs.).

This valuable addition to the numerous practical bulletins issued by the U. S. Department of Agriculture consists of introductory remarks upon mosquitos in general, their connection—vigorously discussed and experimented upon in all quarters at the present time—with malaria, their life-history, natural enemies, and remedial measures against their presence and attacks. A synoptic table is furnished of the five genera—*Anopheles*, *Aedes*, *Megarhinus*, *Psorophora*, and *Culex*—and of the twenty-three recognized and eighteen unrecognized species of the North American fauna. Figures of several of these, in various stages, are inserted in the text.

Mosquitos appear to be, occasionally, sad victims of alcoholic intemperance. Dr. Gray, of St. Lucia, quoted by Dr. Howard, relates how he put a few mosquitos "under a bell-jar one day, in order to watch them. I put a single drop of port wine under the jar, as I had heard that mosquitos could be kept alive for a long time on wine. When I went to look at them a few hours later, I found them all apparently dead, so I put them in a dry bottle, intending to pin them later. When I went to pin them, shortly afterwards, they were all staggering about in a most extraordinary manner—they were drunk!"

* By the context it is evident that "nymphal" changes are intended.

Having regard to the heavy charges laid—and proved—against the female mosquito, it is only fair to say that it is only the males, apparently, who indulge in bibulous pleasures.

As to the alleged breeding of mosquitos in mud, the author believes that they must necessarily all perish when the mud dries up completely, but that they may be able to live for some little time in sufficiently wet mud.

Mosquitos exist over almost the entire globe. Dr. Bessels, of the *Polaris Expedition*, was obliged to interrupt his work in lat. 72° N.; while in Texas “hundreds of thousands of millions” of these insects blow in upon the towns when the wind is in certain directions. They are, however, devoured in enormous numbers in their immature stages by the *Hydrophilidæ*, *Dytiscidæ*, various fish, and by the larvæ of dragonflies; while in the winged state they fall an easy prey to dragonflies and various birds, an observer finding six hundred in the crop of a night-hawk.

As preventives and remedies for use in houses, the author favours a thorough screening and mosquito bars about the bed, and the burning of pyrethrum powder; for bites, glycerine or indigo; and for the destruction of larvæ and the abolition of breeding-places, the pouring of kerosene on the breeding-pools, or the introduction of fish into fishless breeding-pools.

G. W. K.

MALCOLM BURR. *Collecting in South Eastern Europe* (1899, Trans. Oxford Univ. Jun. Sci. Club, pp. 112-6).

The author briefly describes the general features of the little-known Herzegovina, Dalmatia, and Montenegro, and enumerates the principal insects encountered. The fauna does not appear to be very rich, although three new species of Orthoptera (*Platyceles* spp.) rewarded the author's endeavours. Two of these, captured at Tisavica, appeared to have an extraordinary distribution, for Mr. Burr “failed to find a single specimen of either species outside the few beds of nettles to which each appeared to be confined.”

Mr. Burr bears a good Scottish forename, though we believe he is an Englishman; but he is certainly qualifying for an Irishman by the following remarkable sentences: “The father of the present Prince fell in love it so happened that he died childless.”

G. W. K.

C. DARWIN. *Origin of Species*. New Impression (John Murray). 1900.

This new impression is a reprint of the sixth (1872) edition, and is well printed, though the paper is rather thin. It has been long anticipated, as the copyright will shortly be out. A fine portrait forms the frontispiece. As the price is exceedingly low there is now no excuse whatever for the absence of this classic from the shelves of any one having the remotest claim to the title of “zoologist.”

G. W. K.

OBITUARY.—The regretted death of JOSEF MIK on the 13th October is announced. The well-known Austrian dipterist was one of the joint editors of the ‘*Wiener Entomologische Zeitung*,’ in which he published a very large number of small papers.—G. W. K.

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