





Riley C. V. RILEY,
Washington,

THE
ENTOMOLOGIST'S
MONTHLY MAGAZINE:

CONDUCTED BY

J. W. DOUGLAS.

E. C. RYE, F.Z.S.

R. McLACHLAN, F.R.S.

H. T. STAINTON, F.R.S.

VOL. XV.

"I suppose you are an entomologist?

"Not quite so ambitious as that, sir. I should like to put my eyes on the individual entitled to that name. No man can be truly called an entomologist, sir; the subject is too vast for any single human intelligence to grasp."—
OLIVER WENDELL HOLMES (*The Poet at the Breakfast Table*). ✓

248871

LONDON :

JOHN VAN VOORST, 1, PATERNOSTER ROW.

1878-9.

LONDON:

NAPIER, PRINTER, SEYMOUR STREET, EUSTON SQUARE.

MDCCCLXXIX.

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Page 76, line 18 from bottom, for "T. melanoptera, white," read "T. melanoptera, White."	
" 129, " 29 " top, for "hepatieus," read "hepaticus."	
" 154, " 10 " bottom, for "parts although," read "parts. Although."	
" 192, lines 2 & 3 from top, for "p. 387 à 393," read "p. 151 à 172."	
" 253, line 2 from bottom, for "last," read "second."	
" " last line, dele "only."	

Pages 231—233, for "Eupelix," read "Enpelex," the original Greek derivation being correctly given by Germar.

THE
Entomologist's Monthly Magazine
VOLUME XV.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY H. GOSS, F.L.S., F.G.S.

No. 1.

[*On the importance of an acquaintance with the subject : its bearing on the question of the evolution of insects, and the evidence it affords of the antiquity of their family types.*]

Although Entomology has attracted a larger number of workers than any other branch of Zoology, the fossil remains of the *Insecta*, and their affinities with existing genera and species of that class of the animal kingdom had, until a comparatively recent date, received scarcely any attention.

This is somewhat remarkable, because since the time of Cuvier, not only have the remains of the *Vertebrata*, the *Mollusca*, and the *Crustacea*, been carefully studied, both on the continent and in this country, but even the lowest forms* of animal life have not been neglected by Palæontologists.

It cannot, however, be denied that of the *Arthropoda* the *Insecta* are at least as interesting as the *Crustacea*; but although fossil insects were first alluded to as long ago as 1700, in Scheuchzler's "Herbarium Diluvianum," and in several later works by Sendelius, Schröter, and others, it was not until 1829, when M. Marcel de Serres† published an important work on the Fossil Invertebrates of the South of France, that they appear to have received serious attention. Ten years later, M. Brullé,‡ in an inaugural address to the Faculté des Sciences de Paris, remarked on the importance of an acquaintance with fossil insects.

More recently, Professor Oswald Heer, of Zurich, most aptly styled by Massalongo "the Cuvier§ of Fossil Entomology," has||

* Such as *Foraminifera*, *Radiolaria*, and other classes belonging to the *Protozoa*.

† *Géognosie des Terrains tertiaires, &c.*, Paris, 1829.

‡ *Sur le gisement des Insectes fossiles, et sur les secours que l'étude de ces animaux peut fournir à la Géologie.* Paris, 1839.

§ *Studii Palæontologici*, p. 11. Verona, 1856.

|| *Die Insekten-fauna der Tertiärgebilde von Öeningen und von Radoboj in Croation.* Leipzig, 1849. *Untersuchungen über das Klima und die Vegetations-Verhältnisse des Tertiärlandes.* Winterthur, 1860.

taught us that the clue which is furnished, by a study of the fossil remains of these animals, to a knowledge of the land and freshwater conditions of the earth, and of its climate and vegetation in past ages, is at least as valuable as, and in some respects more valuable than, that afforded by a study of the remains of other orders of the animal kingdom. Sir Charles Lyell* has also expressed an opinion to the same effect.

Probably the chief reason why fossil insects have received so little attention, as compared with the amount bestowed on the remains of other animals, is that they are, so far as present discoveries enable us to judge, very rare, except in a few localities ;† and when found are frequently in such a fragmentary and imperfect condition as to render the identification of the genera, or in some cases even the orders to which they belong, a matter of the greatest difficulty.

The fact that insect remains, especially from the oldest rocks, are not unfrequently in an imperfect condition is not surprising ; and it is rather a matter of astonishment that any traces of such fragile animals should have been preserved to us at all after the lapse of ages. In some cases, however, the strata in which insects have been found, and the circumstances under which they became embedded therein, appear to have been especially favourable to their preservation, rendering the determination of their species, or at least of the genera to which they belong, a matter of no more difficulty than in the case of living insects.

A further reason, probably, for the comparative neglect of this branch of Palaeontology is, that even a superficial acquaintance with the various orders of insects, and their families and genera, is much less frequently possessed by Geologists and Palaeontologists than a knowledge of the *Vertebrata*, the *Mollusca*, or the *Crustacea* ; and although students of *Brachiopoda* amongst the *Mollusca*, and of *Entomostraca* and other classes of the *Crustacea*, can be counted by the score, there are, I think, scarcely half-a-dozen English Geologists who would be capable of forming an opinion as to the order even, to which a fossil insect, when discovered, should be referred.

On the continent, however, the study of fossil entomology is receiving, and has, during the last thirty years, received, a considerable amount of attention from Dr. Heer, Dr. Giebel, Dr. Hagen, Professor Germar, Dr. Goldenberg, M. Oustalet, and many others.

* Lyell's Elements of Geology, 6th edit., p. 255.

† Such as Eningen, in Switzerland; Radoboj, in Croatia; Siebengebirge on the Rhine; Corent and Menat, in Auvergne; Aix, in Provence; Monte Bolca, near Verona, in Italy; and in several places in North America.

In America, too, in consequence chiefly of the impetus given to the investigation of the subject by the indefatigable Mr. Scudder, discoveries of fossil insects are almost daily being made by members of the United States Geological Survey.

There can be no doubt that when Geologists are more fully awake to the important deductions to be drawn from an examination of fossil insects, and a comparison of their geographical distribution with that of living species, the remains of this class of the animal kingdom will be more generally sought for and attentively studied.

Not only is this branch of Palaeontology of interest and importance to the Geologist, but to the Zoologist also, as throwing some light on the question of the origin and development of insects; the comparative antiquity of the several orders, and their families and genera; the respective dates of their apparition on the geological horizon; and the affinities existing between living and extinct species.

Before proceeding to show how little direct evidence has as yet been furnished, by Palaeontological researches, in support of the theory of the evolution of insects from some primitive types, it will be necessary to refer briefly to the opinions on this point of Professor Hæckel and Dr. Fritz Müller.

In the opinion of Hæckel, the *Insecta*, *Arachnida*, *Myriopoda*, and *Crustacea* must have had a common ancestor. The *Zoëa* or *Zoepoda*, which Hæckel supposes to have been the ancestral form of the *Crustacea*, are believed by him to have flourished early in the Silurian period, and he thinks that it was probably about the Devonian epoch that certain *Zoepods* were naturally selected for a terrestrial life, developed tracheæ, and became *Protracheata*, or progenitors of all the great tracheiferous group of the *Arthropoda*; whilst those which remained in the water were the ancestors of the branchiferous forms, such as crabs, lobsters, and shrimps. Dr. Fritz Müller* also is of opinion that the water-inhabiting and water-breathing *Crustacea* must be regarded as the original stem from which the other terrestrial classes, with their tracheal respiration, have branched off.

It is hardly just to these distinguished Naturalists to refer to their opinions in so cursory a manner; but my excuse for doing so is that it is not within the scope of this paper to discuss the question of the probable origin of insects, but merely to call attention to some of the facts bearing on the subject which have been gathered from Palæon-

* "Facts for Darwin," translated from the German of Fritz Müller, by W. S. Dallas, F.L.S., ch. xi, p. 120.

tological researches ; and to show how little, by itself, the evidence at present obtained by such researches supports the opinions above quoted.

It is a most remarkable fact that up to the present time we have no record of the discovery, even in the oldest fossiliferous rocks, of any forms which are clearly connecting links between existing types and any simpler organisms.

With the exception of about twelve specimens of *Pseudo-Neuropterous* insects, which Dr. Goldenberg* is of opinion should be placed in an extinct order, and which he has named *Palaeodictyoptera*, the oldest known insects belong, most unmistakably, to the *Neuroptera* and *Orthoptera*. Sir John Lubbock,† although arguing in favor of the theory of evolution, admits that "the earliest known *Neuroptera* and " *Orthoptera*, though in some respects less specialized than existing " forms, are as truly and as well characterized insects as any now " existing ; nor are we acquainted with any earlier forms which in " any way tend to bridge over the gap between them and lower groups."

The *Coleoptera* and *Hemiptera* are almost as old as the *Neuroptera* and *Orthoptera* ; and even the comparatively modern orders—the *Diptera*, *Hymenoptera*, and *Lepidoptera*—have existed for ages.

From the fact that the family types of this class of the animal kingdom are of such vast antiquity, and that the remains of insects up to the present time discovered, even in the oldest strata, have all, with the few exceptions before mentioned, been referred to existing orders, it is evident that present Palaeontological investigations do not furnish us with much direct evidence in support of the theory of the evolution of insects from lower forms, and we must look therefore to Embryology for light upon the subject.

It must be remembered, however, as Mr. Darwin‡ observes, that "the noble science of Geology loses glory from the extreme imperfection of the record. The crust of the earth with its embedded " remains must not be looked at as a well filled Museum, but as a " poor collection made at hazard and at rare intervals."

The force of these remarks is especially felt in the particular branch of Palaeontology which is the subject of this paper. Although fossil insects have, in certain strata, and in a few widely scattered localities, been obtained in considerable numbers, they appear to be, as a rule, extremely rare and local.

* Fauna Sarapontana Fossilis, 1877.

† The Origin and Metamorphosis of Insects, c. v, p. 86.

‡ The Origin of Species, ch. xiv, p. 487 (1859).

The great antiquity, not only of the existing *orders* of insects, but even, in many cases, of their families and genera, as compared with the *Vertebrata*, and the very small amount of change which has taken place in them during the geological record is remarkable.

The truth of this assertion will be evident to any one who compares the fossil *Insecta*, even from the older formations, with the remains of animals of almost any other classes which existed during the same period.

Compare, for instance, the fossils of the English Lias with the existing orders of animals : the insect remains of this period have been referred by Professor Westwood* and the Rev. P. B. Brodie, to *Carabidæ*, *Telephoridæ*, *Elateridæ*, *Curculionidæ*, *Chrysomelidæ*, *Blattidæ*, *Gryllidæ*, &c., all represented at the present day ; but with regard to the *Vertebrata*, where are the representatives at the present day of the *Saurians*, the flying lizards, and other gigantic reptiles of the Lias ?

"When we consider," says Mr. A. R. Wallace, in his "Geographical distribution of animals," "that almost the only *Vertebrata* of this period (*i. e.*, the Lias), were huge Saurian reptiles like the *Ichthyosaurus*, *Plesiosaurus*, and *Dinosaurus*, with the flying *Pterodactyles* ; "and that the great mass of our existing genera, and even families, of fish and reptiles had almost certainly not come into existence, we see "at once that types of insect form are proportionately far more "ancient. At this remote epoch, we find the chief family types (the "genera of the time of Linnaeus) perfectly differentiated and recognisable."

In the next paper, I propose to treat of the comparative age of the existing orders of insects, and the sequence in which they respectively appeared on the geological horizon.

Surbiton Hill : 1st May, 1878.

NOTES REGARDING SOME RARE *PAPILIONES*.

BY D. GREIG RUTHERFORD, F.L.S.

1. *PAPILIO ANTIMACHUS*, Drury.

The recent addition to Mr. F. J. Horniman's collection of African *Lepidoptera* of two fine specimens of this handsome butterfly, has induced me to put together such information concerning it as I have been able to acquire, from various sources, during the last few years.

* See "A History of the Fossil Insects in the Secondary Rocks of England," by the Rev. P. B. Brodie, M.A., F.G.S., with introductory observations by Professor Westwood. London, 1845.

There appears good reason to believe, with Donovan, that the first example of *P. Antimachus* ever known to naturalists is that described and figured by Drury in 1782, in the 3rd volume of his "Illustrations of Exotic Entomology." It was taken by Mr. Smeathman at Sierra Leone in 1775, was purchased at the sale of his insects in 1805 by Mr. Macleay, and is now generally believed to be in the Museum at Sydney.

It is regarded as some proof of the extreme rarity of this species, that nearly a century elapsed before another specimen is known to have reached England. This was taken at Old Calabar by Miss Diboll, a missionary lady residing at Creek Town, and is now in the collection of Mr. Christopher Ward, of Halifax. It is in good preservation; and expands, if I remember rightly, a little over eight inches.

A few years later, Mr. W. C. Hewitson had the satisfaction of adding to his rich collection the third known example, an account of the capture of which at Gaboon appeared in this Magazine, March, 1874. It measures $7\frac{1}{2}$ inches. Soon after, Mr. Hewitson received a second specimen from the same region. It is somewhat more highly coloured than the other, varies slightly in the shape of the markings and spots on the wings, and expands $8\frac{2}{3}$ inches.

About the same time, Mr. Thomas Chapman, of Glasgow, came into possession of a specimen in rather a curious way. Learning from a friend that the captain of an African trading ship had brought home with him two large butterflies, he went to inspect them. He found the box containing them lying open in the middle of a circle of admiring children, one of whom had got hold of what he soon discovered to be a fine *Antimachus*, and was using it as a plaything! Mr. Chapman's emotions, until he had the specimen safe in his own hands, are more easily imagined than described. It is the largest example known, expanding $9\frac{9}{10}$ inches. It was taken at some locality far up the Gaboon river.

Not long after, another specimen, also I believe from Gaboon, came to England, and is now in Mr. Henley Grose Smith's collection.

The next specimen of which I have any knowledge was taken by the Rev. T. W. Thomson, one of the missionaries belonging to the Baptist Mission Settlement at Ambas Bay, during a journey he made last September through the country lying immediately to the north-east of Mount Camaroons. It expands $8\frac{3}{4}$ inches, and is almost perfect. A less perfect and rather smaller specimen was captured a few months ago by a native of the hill country lying north of the Sherboro' river. It measures $8\frac{1}{8}$ inches. These two specimens are now in the possession of Mr. F. J. Horniman.

So far as I am aware, the above are the only specimens known to exist in any collection. With the exception of Drury's type and Mr. Henley Grose Smith's specimen, I have examined them all carefully. Those in the collections of Messrs. Ward, Hewitson, Chapman, and Horniman are all males ; and, judging by Donovan's figure, made from Drury's type, and from the description given to me of Mr. Smith's specimen, I have no hesitation in concluding they belong to the same sex. Whether the female, as in so many of the African *Rhopalocera*, differs from the male, either in form or colour, or, like its allied species *P. Zalmoxis*, is in all respects similar to the male, is at present matter for conjecture, and we must wait patiently for some fortunate capture before we can speak with certainty regarding it.

From the measurements I have given, it will be seen that the species varies greatly in size. The differently shaped markings and spots on the wings are also subject to considerable variation.

In their "Species Lepidopterorum hucusque descriptæ," C. & R. Felder place *P. Antimachus* beside *P. Ridleyanus*, with which they consider it has a true affinity. An exhaustive examination of both has failed to convince me that they have any affinity which is based upon structure. They have, it is true, a general resemblance to each other in coloration and markings on the wings and bodies, but the antennæ of the two species are totally different. In *P. Ridleyanus*, and, indeed, in almost every one of the species of the group to which it has hitherto been referred, viz., group 15 of Boisduval, the antennæ are short and suddenly clavate, almost rounded at the points ; whereas those of *P. Antimachus* are long, thicken gradually, and terminate abruptly. If this species has any close ally, I believe it to be *P. Zalmoxis*, which, though so different in colour, varies but slightly in the shape of the wings, and is possessed of exactly the same kind of antennæ. There appears to me to be good reason for concluding at present, and until we have further knowledge upon the subject, that these two species represent a transition group between the *Ornithopteræ* and the true *Papilio*nes.

Of the habits of *P. Antimachus* nothing is known beyond what is recorded by Drury, as communicated to him by Smeathman. From his account we gather that it is seen only at mid-day, and flies very rapidly, frequenting only the upper branches of the trees, from whence it darts and glances from one branch to another, sometimes settling upon the lower branches, but never descending nearer to the ground than the height of eight feet. In curious connection with this account of the habits of *P. Antimachus*, there occurs a passage in a letter

which I have just received from my friend Mr. George Thomson, of Victoria, Ambas Bay, who has recently been exploring the upper regions of Mount Camaroons. "One day (he writes) when sauntering "in front of the house where we lodged (about 5000 feet above the "level of the sea), I observed a large butterfly skimming gracefully "about the tops of the trees. It looked like a large *Acræa*. I watched "it, hoping it might descend within reach; but, after playing about "for some time, it went off in a downward direction, with a steady "sailing flight, but still keeping far from the ground. I could see it "for a long time clear over the trees. I have seen no *Acræa* nearly "so large, nor any other butterfly like it for size and mode of flight. "Could it have been *Antimachus*?" If it was really this fine species (and what else could it have been?) that my correspondent saw, his description would be a striking confirmation of Smeathman's account.

The fact that examples of *P. Antimachus* have been taken at various localities between Sierra Leone and Gaboon would seem to lead us to infer that the species has a wide range of distribution. But such a conclusion, I fear, would be rather premature. Although five localities are mentioned, they yet represent but three regions, which are widely separated from each other, and possess physical features presented by hardly any other portions of Western Africa. Sierra Leone and Sherboro' belong to a region of wooded hills and valleys. Old Calabar is so close to the north-western extension of the Camaroons range of mountains, that it may justly be considered part of the same mountain region. That portion of the Gaboon country from which there is every reason to be believed at least three examples of *P. Antimachus* have come, is also a region of wooded elevations. We thus find that the only specimens of this species of which we have any knowledge, have come, not only from hilly and mountainous regions, but from the only regions which can be called such lying within the great belt of forest which runs from Senegambia as far south as the estuary of the Congo. Are we to infer from this that the food plant of this insect only grows at certain elevations?

It has been suggested that one of the reasons why *P. Antimachus* has not been met with in other localities than those mentioned is, because no one has sought for it elsewhere, or has hit upon the exact locality, or collected during the right season. I can only remark that all this is just possible, but scarcely probable, when we consider that Mr. Skertchly made large collections in the forests of Ashantee,—that Mr. Crossley, one of the most diligent of collectors, explored the most accessible parts of Camaroons,—that the writer collected during seven

months in the same region, eight in the country immediately north and east of Mount Camaroons, and four on the Cross River, north of the Old Calabar country, without ever capturing a single specimen of *P. Antimachus*. When West Africa is better explored than it is at present, we may come to know something more than we do now regarding the habits of this interesting species ; but, until then, what we *do* know leads me to conclude that it is not only one of the most local of African butterflies, but also one of the rarest.

Surrey House, Forest Hill :

May, 1878.

DESCRIPTION OF A NEW SPECIES OF BUTTERFLY FROM THE SANDWICH ISLANDS.

BY N. C. TUELY, F.L.S.

The Rev. T. Blackburn has sent over a new butterfly belonging to the family *Lycænidæ*, specimens of which were placed in Mr. Hewitson's hands to be figured and described. Unhappily, the state of Mr. Hewitson's health makes it very uncertain when he will be able to finish his work, so he thought it better that I should publish a short description of this species at once.

HOLOCHILA BLACKBURNI, *n. sp.*

Expands $\frac{1}{16}$ — $\frac{1}{16}$ ". Shape of *Thecla rubi*, except that the costa of the fore-wing is not abruptly arched near the base, and that the abdominal edge of hind-wing slopes more regularly towards the anal angle, which is rounded, so that the incipient lobe which exists in *rubi* is wanting ; the hind margins of the wings are also quite entire.

♂. Above deep purplish-blue, in certain lights very dark olivaceous-brown (almost black). Under-side exactly like *rubi*, except that the whitish cilia are narrow and unspotted, and that the pale grey space on the inner margin of fore-wing is not tinged with brown.

♀. Above, fore-wing shining purplish-blue, with very broad costal and outer border black ; hind-wing black, with a patch of a similar blue to that of fore-wing occupying nearly the abdominal half of the wing, but not quite reaching either the abdominal margin, or the anal angle. Under-side as in ♂.

Thorax and abdomen (in both sexes) above, black, below, whitish ; slenderly clothed on both sides with fine white hairs. Antennæ slender, black, white-ringed, club tinged with brown.

Type B. M.

This species is altogether a more slender insect than *T. rubi*, not only in the thorax, but also in the texture of the wings. The green scales of the under-side (of a rather different shade to those of *rubi*) are very delicate, and most of the specimens sent showed signs of much

wear and tear. The only two females are somewhat rubbed, and the extent of the blue patch is rather uncertain, it is probably always ill-defined. The males do not vary, except in size; both the largest and smallest specimens were of this sex, the females both being medium sized.

Taken in a mountain pass in the Island of Oahu in March, "flying about in some numbers, frequenting the flowers of the Koa (a forest tree that grows in mountain localities). The insects were very tame, and when settled low enough, could be taken by the fingers, the majority, however, kept high up beyond the reach of any ordinary net."—T. B.

Although, for convenience sake, I have given a comparative description, this species has no real affinity with *Thecla rubi*, but belongs, as Mr. Butler informs me, to the genus *Holochila*, Feld., which is included by Kirby in his genus *Plebeius*. *Holochila* comprises *absimilis* (*Pleb.* No. 291 in Kirby's list) and a few other Australasian species, to none of which does *Blackburni* appear to be closely allied.

Mortimer Lodge, Wimbledon Park :

May 13th, 1878.

NOTES ON AFRICAN HEMIPTERA-HETEROPTERA.

BY W. L. DISTANT.

SCUTATA.

Genus *ASPONGOPUS*, Lap.

ASPONGOPUS NIGRO-VIOLACEUS, P. B., Ins., p. 83, Hem., pl. 7, fig. 4 (1805).

This species seems to have had some vicissitude in nomenclature. In the B. M. Catalogues it is placed in the genus *Cyclopelta*. As figured above, however, the 5-jointed antennæ are plainly visible, as they are also in H. Schäffer's figure of its synonym *Aspongopus unicolor*, Wanz., Ins., iv, fig. 433. Stål again considers it (Hem. Af., i, p. 216, and En. Hem., i, p. 83) as a variety only of *Aspongopus viduatus*, Fab. I am indebted to Mr. Rutherford for the examination, at different times, of a large number of specimens of both species, and, apart from the very different colour above, have always found the following well-defined differences :

Second and third joints of antennæ of equal length.

Abdomen above rufous. Long., ♂, 12 mm., ♀, 15 mm. *nigro-violaceus*.

Second joint of antennæ somewhat longer than the third.

Abdomen above cyaneous. Long., ♂, 14—16 mm., ♀, 17—19 mm.... *viduatus*.

ASPONGOPUS AFFINIS, n. sp.

Dark shining green, thickly and coarsely punctured; pronotum rugulose, scutellum transversely rugose. Frontal and lateral edges of pronotum, a small central spot at base of scutellum, basal half of border of corium above and below, and abdominal border above, luteous. Antennæ narrowly and obscurely fuscous at tip, 3rd and 5th joints equal, 2nd joint minute, 4th joint incrassated towards tip, shorter than the 3rd and 5th. Head strongly emarginate in front, with the lateral lobes broadly reflexed. The luteous border of the pronotum is widest in front, where it contains the two usual slightly raised prominences. The lateral edges are strongly reflexed. Membrane dark fuscous. Under-side coarsely punctate. Coxæ, trochanters, and lateral sides of prosternum, very broadly luteous. Abdomen below dark greenish-testaceous, much more prominently testaceous on disc, and green towards lateral borders. Femora obsoletely spinous, hind tibiæ somewhat dilated except at base and apex, dilated portion distinctly sulcate. Rostrum luteous at base.

♀. Long., 18 mm.

Isubu (W. Africa).

Allied to *A. patruelis*, Stål, from which it can be at once structurally distinguished by the broadly reflexed lateral borders of the pronotum.

ASPONGOPUS DIVERGENS, n. sp.

Above fuscous, shining, strongly rugose and punctate. Head and antennæ brassy-black. Head strongly emarginate in front, lateral lobes slightly sinuate, strongly reflexed. 2nd and 3rd joints of antennæ sub-equal, 4th somewhat compressed, obsoletely sulcated above, rather shorter than apical joint, which is the longest. Pronotum with the lateral angles moderately produced and rounded. Corium rather paler in colour. Membrane concolorous, but largely suffused with brassy-green, which in some specimens appears only at apex, and in others more so throughout the membranal area. Abdomen above castaneous, with the margins brassy-black. Under-side of body and legs brassy-black, thickly and finely (the legs more coarsely) punctate. Femora obtusely spinous, tibiæ strongly sulcated.

♀. Long., 21 mm.; exp. ang. pronot., 12 mm.

Camaroos. Isubu.

The prominence of the lateral angles of the pronotum sufficiently distinguishes this from any other known African species of the genus. Its somewhat elongate form and sulcated tibiæ also give it a characteristic which is slightly divergent from the typical forms of *Aspongopus*. In all essential characters, especially in the size and shape of the head and the broad and rounded scutellum, it agrees perfectly with that genus.

ASPONGOPUS MODESTUS, n. sp.

Ovate, bronzy-black. Head, pronotum and scutellum thickly and coarsely punctured, the last transversely rugulose. Corium thickly and finely punctured. Head slightly emarginate in front, with the lateral lobe obsoletely reflexed. An-

tenuæ with the 2nd joint a little longer than the 3rd, 4th compressed, obsoletely sulcated, a little shorter than apical joint, which is the longest. Pronotum with an obscure transverse impression, about one-third from apex. Membrane fuscous. Under-side of body thickly and finely punctured, excepting on disc of abdomen, which is impunctate, and shining fuscous. Rostrum luteous, pitchy towards the apex. Coxæ luteous, anterior femora prominently spinous beneath.

Long., 11 mm.

Isubu.

Apart from colour, the nearest allied African form to the above would appear to be *A. pullus*, Stål.

Derwent Grove, East Dulwich :

May, 1878.

DIMORPHISM AND ALTERNATION OF GENERATIONS IN THE *CYNIPIDÆ.*

Simultaneously with the announcement from Mr. Fletcher published in our May No. (Vol. xiv, p. 265) that he had confirmed Dr. Adler's statement (see Vol. xiv, p. 44), so far as two of the supposed species are concerned, there appeared in the Pet. Nouvelles Entomologiques for May 1st, 1878, an article by our correspondent M. Lichtenstein under the title "Les Cynipides monoïques," in which he stated that he had obtained galls of *Spathogaster baccarum* from eggs laid by *Neuroterus lenticularis*.

Mr. Fletcher has since informed us that he also obtained two galls of *S. baccarum*, the produce of *N. lenticularis*, but the little oak upon which they were has died. He has now bred *S. vesicatrix* from the galls before alluded to.

We doubt not that all Dr. Adler's statements will be fully confirmed, instead of being "blown to the winds," as it was recently asserted they already had been.—EDS.

ON PARTHENOGENESIS IN THE *TENTHREDINIDÆ*, & ALTERNATION OF GENERATIONS IN THE *CYNIPIDÆ*.

BY P. CAMERON.

In a paper which I published in the "Scottish Naturalist" for October last, I pointed out that the ♂ of *Paeilosoma pulvratum*, Retz. (*obesa*, H.), was quite unknown, and suggested that here we had a case of parthenogenesis. I am glad to be able to confirm this view by direct observation.

At the beginning of the present month (May), I found, in a small bottle containing two or three corks into which the larvæ of *P. pulvratum* had bored to pass the pupal state, two females of that species.

One was dead, but the other had apparently only recently emerged, I at once went out and cut a twig of alder, the food plant of the larva, and placed it and the saw-fly under a bell-glass in the sunshine. The insect, which had been hitherto very sluggish, and had remained motionless in one position, at once on feeling the sunshine became very lively, and flew up and down the enclosure. Soon it discovered the food-plant: examined it nearly all over, and ultimately fixed upon a young, half-grown leaf. At first it rested motionless in the middle of the leaf, then it came close to the border, fixed the outer legs along the edge, then raised the body up so that it was a little more than the height of the tibiæ from the surface of the leaf, which, it may be added, was a little bent on one side. In this position it remained for about a couple of seconds: then the abdomen was bent down, the saw was inserted into the leaf, and apparently was moved up and down but without being withdrawn out of the leaf; at least, I infer this from the motion of the abdomen. The saw was not put in straight, but was bent a little forward; the two leathery sheaths remained at right angles to the saw itself. After being in the leaf for a few seconds, the saw was withdrawn; the insect remained motionless for a second or two, and then the abdomen was bent down again, the saw inserted (but I think not very deeply) into the hole already made, and the egg deposited. During the egg-laying, the antennæ were a little raised above the height of the head, with a slight curve, and almost rigid. The whole operation lasted about eighty or ninety seconds. Several minutes elapsed before the next egg was laid. All were deposited on the thick half-grown leaves, sometimes singly, sometimes as many as three were placed on the same leaf. They were deposited close to, but not touching any of, the nerves, and on the under-side of the leaf.

Immediately after being laid, the eggs were quite invisible; but by twenty-four hours they had swollen up very much, and were easily recognised as greenish oblong elevations. Eight days after being deposited I extracted, with great trouble, an egg from its bed in the epidermis, and on placing it under the microscope, had no difficulty in seeing the future larva curled up inside, which showed conclusively that the eggs were quite fertile. I am not, however, sanguine of rearing many of the larvæ, because of the difficulty of keeping the plant fresh. The leaf, in drying, contracts and presses in the egg, which thus is killed. Experiments of this nature are best performed on growing plants, and are, of course, best carried out by one living in the country.

In the above-mentioned paper, I expressed views unfavourable to the occurrence of alternation of generations in the *Cynipidæ*. I now willingly admit that I then attached too much importance to mere negative observations, and I am very glad to say that I have this spring made some observations on *Neuroterus lenticularis*, which confirm those of Dr. Adler.

Apatura Iris in the New Forest.—I am pleased to find by Mr. Goss's note (vol. xiv, p. 256) my opinion as to the scarcity of *A. Iris* in the New Forest confirmed, but I am inclined to think that his theory of the New Forest being too far westward for *A. Iris* is scarcely borne out by facts. From what I can learn at Lyndhurst, some 25 or 30 years ago *A. Iris* was plentiful in the New Forest, since which time, from some unexplained cause, it has almost disappeared there. Again, in the course of a conversation with Mr. Reeks, of Thauxton, near Weyhill, he informed me that the insect in question was, at the proper time, to be taken in some quantity in Collingbourne and Dole Woods, near Andover.

They have, to my own knowledge, been taken in the woods near Salisbury, although but rarely; therefore, I think we must look to some other cause than that suggested by Mr. Goss to account for its disappearance in the New Forest.—H. NEALE, 45, The Canal, Salisbury: *May 16th, 1878.*

Colias Edusa at Folkestone.—I saw a specimen of *Colias Edusa* on the borders of Lady Wood, at Folkestone, fly swiftly past me, on the 28th ultimo.—H. V. KNAGGS, 189, Camden Road: *9th May, 1878.*

On the habits of Biston hirtaria.—The observation recorded below may, or may not, bear upon the notes on habits of this species published by Mr. Silcock in Vol. xiv of this Magazine, p. 43.

On the morning of Friday, the 3rd inst., I noticed a ♀ on the trunk of a lime tree in this road, about nine feet from the ground: I think she was not there on the previous morning. She remained in precisely the same position up to this evening, when I dislodged her with my umbrella during a heavy rain, fearing the weather might prevent a more minute examination. This ♀ is in perfect condition, and as inert as is usual in the species: *but either she had previously laid all her eggs, or was originally barren;* the latter is perhaps the more probable. To my certain knowledge she had remained about 108 hours without shifting her position in the smallest degree. It is unusually late for the insect.—R. McLACHLAN, Limes Grove, Lewisham: *7th May, 1878.*

Penthina postremana bred; a species new to Britain.—On the 7th October last, when searching for the larva of *Cidaria reticulata* amongst the wild-balsam (*Impatiens noli-me-tangere*), I split open a few stems of that succulent plant and found an active *Tortrix* larva, whitish-green, with black head. Mentioning this discovery to Mr. H. T. Stainton he was able to inform me, on referring to Kaltenbach's most valuable work, that *Penthina fuligana* had been bred by Herr Mühlig from larvæ which wintered in the dry stems of *Impatiens noli-me-tangere*. About the middle of April I split open some stems, and found the larvæ were quite lively. On the 4th inst., I bred two lovely specimens of *postremana*.—J. B. HODGKINSON, 15, Spring Bank, Preston: *May 8th, 1874.*

[The name *fuligana* is employed in Kaltenbach's work as being that used in Staudinger and Wocke's Catalogue, where *ustulana* and *carbonana* are quoted as doubtful synonyms.

Mr. Barrett has recorded in this Magazine (Vol. ix, p. 129) that *Antithesia ustulana* had been bred by Lord Walsingham, from larvæ found feeding in the stems of *Stachys palustris* in the Cambridgeshire fens; and Mr. Barrett informs us (Vol. x, p. 146) that *Ephippiphora nigricostana* has been confounded with *Antithesia fuligana*, from the fact that both feed in the same plant—*Stachys sylvatica*. Von Heinemann places *fuligana* next to *nigricostana*, and says that they come very close together. *Postremana*, which also feeds in the stems of *Impatiens noli-me-tangere*, follows almost as the next species to *fuligana* in Von Heinemann's work.—H. T. S.]

Economy of the larva of Ephippiphora nigricostana.—I first bred this insect from larvæ found at Twickenham in the winter of 1863. I met with it again in numbers in the neighbourhood of Doncaster in 1874 and 1875, and this winter have been successful in finding larvæ round Cambridge, wherever the food-plant *Stachys sylvatica* occurs.

The egg is evidently laid among the flowers, and the larva, on hatching, at once eats its way down the flower-stalk, and so down into the main stem, packing the space behind it very closely with its "frass." In October it may be found nearly full-fed at different heights in the stem; as winter approaches it descends, and in December is generally just above the level of the ground, and here it is to be found again in February; in the interval, however, it seems to eat its way underground, by mining the roots, or rather the horizontal suckers, which stretch from plant to plant; for these may in spring be found as closely packed with "frass" as were previously the higher parts of the stem. By April the larvæ have climbed up into the top of the plant, often through the old "frass" and into dried flower stems, scarcely as wide as themselves, and here the pupæ may be found *just below* a joint in the stem, fastened by a few threads, but otherwise quite unprotected.

The larva is of a pale lemon-yellow colour, with pale brown head; long and thin; attenuated towards the tail, and fond of wriggling backwards. If, by accident, a larva has been ejected from a broken stem and a fresh untenanted one be presented to its tail, it will slip into it as fast as an earth-worm into its hole.

Sometimes in early spring, and in the autumn, before the flower-stalk has lost its greenness, the larva itself bears a greenish tinge, owing to its having lately partaken of the green food of the root or fresh stem.

I think it is certain that the root is only used as winter pabulum, and perhaps not always even then by all larvæ, but only by those, which having found their way into a small or crippled flower-stalk, do not get enough in its substance to feed up upon.

In many cases the mined portion of the creeping root has a hole eaten out at the side, and this usually happens where the flower-stalks, which when dry are very brittle, have been broken off; it has occurred to me that the larva in this plight, finding itself unable to descend to the root in the ordinary way down the stem, drops to the ground from the broken piece and eats its way into the root, thus making these holes.

The pupa state does not appear to last more than two or three weeks, and (as I have said above) the pupa may often be found in parts of the stem scarcely wider than itself.

The perfect insects, both ♂ and ♀, are to be seen sitting at sunset on calm

evenings in May and June on the upper surface of the *Stachys* leaves, and, *with care*, may be pill-boxed; but they are apt to drop or, on the slightest disturbance, to skip from leaf to leaf, and are easily lost either on the ground or among the grass. The males also fly briskly just before sunset along the hedge rows, where the *Stachys* grows.

I cannot help thinking that this insect will be found to be generally distributed all over the island.—W. WARREN, 51, Bridge Street, Cambridge : April 16th, 1878.

Elachista stabilella bred.—In February last I found a number of yellowish *Elachista* larvæ, mining the leaves of a common grass on the chalk soil at Newmarket, which produced in April *El. stabilella*.

This larva very nearly resembles that of *El. Gregsoni*, but is more yellowish: while the head and the 2nd segment are *pale brownish*: in fact, exactly like the description of *El. nigrella* :—the plate on the 2nd segment is of precisely the same shape as that of *Gregsoni*. I found in some cases as many as three or four larvæ together in the brown withered tips of the blades, from which they mine downwards in narrow pale yellow mines to the stem: the larva pupates at the base of the blade under an oval shaped web, just as *Gregsoni*: and the perfect insect seems to emerge over a lengthened period, as my first specimens came out in the middle of April, and many have not yet emerged: while I found *very young* larvæ still feeding on the 1st of May. Probably, the larvæ found in the dried tips of the blades had hibernated: but this point, together with the name of the grass itself, I must leave for further examination.—ID. : May 8th, 1878.

Stinging Lepidopterous larvæ.—With reference to the notes on luminous and stinging larvæ of *Lepidoptera* contained in the last Vol. of this Magazine, it may not be uninteresting to republish the following statement from Proc. Ent. Soc. (1841), p. 23 :—“Mr. Yarrell exhibited a large and hairy caterpillar, evidently one of the “*Lepidoptera*, picked up in South America by Capt. Blakeney, R.N., who felt, upon “touching it, a sensation extending up his arm similar to an electric shock, of such “force that he lost the use of the arm for a time, and his medical attendant con-“sidered that his life was for some time in danger.”—W. F. KIRBY, Dublin : April, 1878.

Description of the larva of Pyrameis Huntera.—Mr. Blackburn has sent eight specimens of *Pyrameis Huntera*, and a full description of the larva, which he found in the island of Maui, or Mowee. This makes only the fourth species of butterfly he has seen. He does not appear to have met with *cardui*, which, in the “*Genera of Diurnal Lepidoptera*,” p. 205, is given as found in the Sandwich Islands. Possibly *Huntera* has been mistaken for it.

Description of the larva :—Head black, with white pubescence. Spiracular line greenish-yellow. Ground colour of each segment greenish-yellow, more or less mottled and transversely striped with black (both dorsally and on under-side). Each segment bears (especially about and below spiracular line) long whitish hairs. The third and fourth segments (counting the head as first segment) have each the following in addition, viz., a broad, velvety, black dorsal band, passing from spiracular line to spiracular line, and bearing four long black spines, each spine being itself covered

with spines. The fifth segment is similar to the fourth, saving that it bears seven spines instead of four. Segments six to twelve are similar to five, except that each bears in addition two large white spots placed on the velvety dorsal band just in front of the spines (which run in a row along centre of band) and a little to left and right of the central spines. Most of the spines (especially those intermediate on each segment between the central one and the spiracular lines) spring from a more or less distinct red wart or protuberance. Legs and claspers all black, or nearly so. The last segment has no white spots, but is confnsedly black and yellowish-green, and bears four spines (placed at the four corners of an imaginary square described on the segment) pointing backwards. Feeds on a species of "everlasting," which grows in sandy places near the sea. Pupa suspended by the tail—of an ashy colour, generally more or less marked with yellow.—N. C. TUELY, Mortimer Lodge, Wimbledon Park: *May 13th, 1878.*

NOTE.—In Smith & Abbott's *Lepidop. Insects of Georgia*, the food-plant of *Pyrameis Huntera* is stated to be *Gnaphalium obtusifolium*.

Natural History of Xylomiges conspicillaris.—It gives me great pleasure to be able to publish some account of the preparatory stages of this rare species, and for the ability to do this I have to thank Dr. Wood (of Tarrington), whose eyes were keen enough to detect a moth resting near the ground on an old gate-post, and for all the world looking like a splinter of the wood on which it was sitting ; my friend had found others previously in similar situations, but this was the first female, and luckily it proved fertile.

The moth was found on June 4th, 1877, and she deposited her eggs in clusters on the sides of a chip box during the night of June 5th ; in the cluster sent to me on the 9th, I found them lying three deep, but cannot say if in nature they would *have been laid so thickly ; possibly they might, for some species I know—such as *Tæniocampa miniosa* and *gracilis*—lay all their eggs in one dense heap.

The larvæ were hatched on June 14th and 15th, and ate about half the cluster of empty egg-shells before settling down on the food supplied—viz., *Lotus corniculatus*. The first moult took place on June 20th and 21st ; the second on the 27th and 28th ; the third about July 5th ; the fourth from 12th to 15th of July ; and the last was accomplished by the most advanced larva on July 26th—followed by others at intervals ; after this some deaths occurred among my stock, and in addition to the food previously given—viz., *L. corniculatus* and occasionally *Polygonum aviculare*, I now gave them *Lotus major* and *Euonymus europæus*, and afterwards I learnt from Dr. Wood that I should have supplied them chiefly with the flowers of *L. corniculatus*, which he found his larvæ preferred to the leaves : the first two full-fed burrowed into the earth on August 5th, and were followed not long afterwards by some others, though two individuals chose to remain at last on the surface and pupate there without making any attempt to cover themselves ; whilst those, which had entered the earth formed therein a thick and tough cocoon of earthy particles, looking as though they had been kneaded up with fluid, the result being of the texture of a worm-cast, the interior very smooth ; the moths appeared on April 17th, 18th, 19th, and 22nd, 1878.

The egg is of a regular round shape, convex above, and depressed on the under-surface, the shell ornamented with numerous fine ribs and reticulations; when first laid the colour is a pale bluish-white, by the fourth day changed to a light pinkish-grey, with a zone round the middle and a blotch on the top of light brown, which deepening day by day makes the pale ground still paler by contrast, until the ninth day when the whole egg becomes uniformly of the hue of the bloom on a cluster of purple grapes, and in a few hours the larva is hatched.

The newly hatched larva has a very pale and transparent pinkish-grey body, and a pale brown head, the dorsal vessel showing blackish-brown through some of the segments, but after food has been taken and growth commenced the skin shows glossy light yellowish-watery-green, with minute black dots. After the first moult the colour changes to a more opaque bluish-green, still with the black dots, and with a paler whitish dorsal and narrower sub-dorsal lines, the head of a yellower-green, sprinkled with black atoms; after the second moult the same tint of green was retained, with the dorsal and sub-dorsal lines as before, but now a still paler spiracular stripe appears, and in this stage—when the length is about $\frac{3}{8}$ inch long—the larva is much like the young larva of *Tæniocampa gothica*, except that it is more slender and the pale lines are not so white nor so sharply defined. After the third moult the colours are much as before, but now the spiracular stripe is decidedly greenish-yellow, or ochreous-yellow, and the tubercular black dots are imperfectly ringed with whitish-yellow. After the fourth moult the general colouring, though deep and of sober richness for a time, gradually grows paler, and three varieties could be noticed, brownish-green, ochreous-green, and one or two light brown, the markings as before; when the larva is about an inch long the last moult occurs, and the size and colouring become that now to be described as belonging to the full-grown larva: the length is from $1\frac{1}{2}$ to $1\frac{5}{8}$ inches, the figure tolerably stout, cylindrical, yet tapering very little at either extremity, the eleventh and twelfth segments being rather the thickest, and all the divisions very slightly defined, the skin soft and smooth; the colour of the glistening head is pale pinkish-drab, with a blackish-brown streak down the front of each lobe, a finer streak at the side, and delicate reticulations on the other parts; the ground colour of the back and sides is ochreous-greenish-brown, very much but finely freckled with brownish-grey; the second segment is thickly freckled with dark grey-brown, and edged on the front margin with very dark grey, through which, rather distinctly, pass the fine thread-like dorsal and sub-dorsal lines, a trifle paler than the ground; but on the rest of the body they are of the ground colour merely relieved with outlines of grey-brown, and can only just be traced in their course, more or less interrupted, along a series of double dorsal diamond-shapes of close darkish grey freckling within a larger diamond outline of freckles on the back of each segment; each of the small tubercular spots, which are ranged in threes on either side of the dorsal region, is of cream-colour or pale drab, bearing a dot of blackish-grey on its upper margin; lower on the side is a single similar tubercular spot, below which the grey freckles form a dark contrasting edge to the paler whitish spiracular stripe of reddish-drab or flesh-colour, most delicately freckled with whitish; the spiracles are pale flesh-colour, finely outlined with black; the side below them with the legs is of similar freckled ground-colour, but rather paler than the back, and the belly is unfreckled.

The pupa is nearly $\frac{5}{8}$ inch in length, and about $\frac{1}{4}$ in diameter, of somewhat dumpy shape, the head and thorax thick and rounded, the three flexible rings of the abdomen well cut at the divisions, their anterior ridges having punctate roughness, convexly tapered towards the rather blunt tip, which is furnished with four diverging shortish spines, the outer pair much the shortest ; the colour is dark purplish-brown, and the surface shining.—WILLIAM BUCKLER, Emsworth : *April 30th, 1878.*

Clivina fossor myrmecophilous.—Whilst out collecting at Whimmoor, near Leeds, early in April this year, I came across several nests of *Formica flava*, De Geer, which I searched for myrmecophilous Coleoptera, and, to my surprise, found in them *Clivina fossor*, L., an addition to Mr. Janson's published lists.

I have found this beetle, singly, in several localities round Leeds this season, but here in a few moments, from two or three nests I took above a dozen specimens, picking them up with the wetted blade of a penknife, and then with difficulty, as the ants invariably seized them and attempted to carry them off ; the loss of several specimens testifying to their success.—H. CROWTHER, The Museum, Leeds : *May 6th, 1878.*

Phryganea obsoleta in Ireland.—I possess a specimen of *Phryganea obsoleta* captured at Killarney, in the summer of 1867, by Mr. John Ray Hardy, of Manchester. It is larger and darker coloured than my Scotch examples. See Ent. Month. Mag., Vol. xiv, p. 117.—BENJAMIN COOKE, Bowdon : *2nd May, 1878.*

Occurrence of Therèva fuscipennis, Meigen, an addition to the British List of Diptera.—In June and July, 1875, I captured, on the banks of the Bollin, one male and five females of a *Therèva*, which Mr. Meade and I have determined to be *T. fuscipennis* (Meig.). Both sexes are described by Schiner.—ID.

Review.

HEMIPTERA GYMNOCERATA EUROPÆ. HÉMIPTÈRES GYMNOCÉRATES D'EUROPE, DU BASSIN DE LA MÉDITERRANÉE ET DE L'ASIE RUSSE, décrites par O. M. Reuter. Tome premier, avec 8 planches. Helsingfors : Imprimerie de la Société Finlandaise de Littérature. 1878. Pp. 1—187. 4to.

Except in Fieber's *Europaischen Hemiptera* (1861), there is no work in which the European *Hemiptera-Heteroptera* have been treated as a whole, the works of other authors having reference to the product of more restricted limits, and although in that a great advantage was gained by concentrating into one view the labours of previous Hemipterists, yet the advance in knowledge of new species and of consequent views of classification since the date of publication of Fieber's work has been so great as to make the present work extremely welcome. The scope of the term "European" is here extended to include the area lying within the following limits : on the north—the Frozen Ocean; on the west—the Atlantic; on the south and east—the Atlas Mountains, the Sahara, the Arabian Gulf, the Syrian Desert, Mesopotamia, Chorassan or the Great Salt Desert of Persia, the Hindukoosh, the Bolortag, the Mus-tag, the Thian-Schan, the Altai and Daûr Mountains, and also the Seas of Ochotsk and Kamtschatka. Thus are included the following countries which are geographically out of Europe :—Algeria, the coasts of Tunis, Tripoli, and Egypt,

Syria, Suez, Asia Minor, Transeaucasia, the north-west corner of Persia, Turkestan, Dsungaria, and Siberia. The reason given for this is that political and geographical limits are by no means identical with those of Natural History ; and with respect to *Hemiptera* specially the author finds that the species of Asia, the North, and the Mediterranean countries are for the most part European, and that the fauna generally exhibits an essentially European type, although, as happens in certain parts of Europe, many species are found in one part which do not occur in another.

It is evident that the more comprehensive the area thus traced out the less exhaustive can any descriptive work be at this time, when so much of the ground has been absolutely unworked with regard to *Hemiptera*, yet there is no doubt already a great amount of species collected and waiting description or revision, and to this end the author seeks the assistance of the directors of museums as well as of amateurs.

With the rules to be observed in the application of specific names we may in main concur, but with respect to genera, however much they may be held to be *de rigueur*, there appear to be many logical reasons for objection. Modern genera, even with the most rigid and fine-drawn definitions, are the most unstable idealisms, not only of authors, with regard to the creations of others, but also to those of themselves at some recently previous time, of which this work exhibits many examples (*e. g. Psallus*) ; but this is not the place for a dissertation on the subject, and we reserve for another opportunity some remarks we are tempted to offer. It would, however, be very desirable if, in a work of this kind, the faulty orthography of many generic names were corrected.

The work begins with the *Capsidæ*, the reason given by the author being that he regards them as the lowest in the system, that he has resolved to work from the lowest to the highest, moreover, that these inferior groups specially require revision, and that he is specially acquainted therewith: 148 species are described, forming the Division *Plagiognatharia*, Reut.

The preface is written in French, and the descriptive matter in Latin; the printing, done at Helsingfors, is clear and distinct; the plates, engraved and coloured in Paris from Fieber's drawings, are excellent, and the entomological world may congratulate itself that it will here reap the benefit of the labours of a very competent authority.

ENTOMOLOGICAL SOCIETY OF LONDON : April 3rd, 1878.—H. W. BATES, Esq.,
F.L.S., &c., President, in the Chair.

Miss Eleanor A. Ormerod, of Spring Grove, Isleworth, was elected a Member.

Mr. Grut exhibited, on behalf of the Rev. T. A. Marshall, a collection of insects captured by the latter in the West Indian Islands of Antigua, Martinique, &c.

Mr. F. Smith exhibited a series of examples of a Harvesting Ant, apparently identical with *Myrmica barbata*, sent to Mr. Darwin from Florida, by Mrs. Mary Treat. These were remarkable for the variation that existed in the teeth of the mandibles, some having acute teeth, others rounded teeth, and in others the teeth were obsolete, but no intermediate conditions were present, and he had no information as to whether the forms inhabited different nests or otherwise.

Mr. Berens exhibited a pair of *Thestor mauritanica*, Staudinger, from the Atlas Mountains.

Mr. McLachlan exhibited a Coleopterous larva, sent by Dr. Kirk from Zanzibar, where it was doing great damage as a coffee-borer. It pertained to either the *Buprestidæ* or Longicorns (probably to the former), and its mode of life was remarkable, inasmuch as it appeared to establish a communication with the air by cutting a series of small, nearly equidistant, holes (each, externally, about the size of the hole of an *Anobium*) along the sides of its gallery, commencing internally rather large, but gradually decreasing in diameter until the bark was reached. Various surmises (such as the presence of parasites, &c.) as to the object of this singular habit were put forward, but Mr. McLachlan inclined to the opinion that the holes were really intended for ventilation.

Mr. W. C. Boyd exhibited an example of *Oxyptilus latus* taken at Deal, in June, 1869, and remarked on apparent differences between it and the form captured in Norfolk.

A paper by the Rev. T. A. Marshall, on the entomology of the Windward Islands, was read by the Secretary.

The Rev. H. S. Gorham communicated the description of a new species of *Cleridæ*, with corrections of synonymy, &c.

Dr. Sharp communicated a paper on some *Nitidulidæ* from the Hawaiian Islands.

The Secretary read a paper by Mr. Mansel Weale (accompanied by illustrations) on South African insects, with especial reference to those infesting *Acacia horrida*, and their protective resemblances, &c. Mr. Wood-Mason exhibited the insects referred to in the paper, and alluded to the resemblance of one of the species of *Mantidæ* noticed in the paper to bird-droppings. The larva of a species of moth of the family *Phycidæ* had the singular habit of forming long cases, like the thorns of the *Acacia*, and the resemblance was strengthened by the larva attaching leaflets at the end, so as to cause the cases to bear a still greater resemblance to young thorns. With regard to resemblance between ants and spiders, Mr. Meldola thought the case should be referred to the category of aggressive mimicry, the spiders feeding upon the ants and flies attracted by the sweet secretions of the *Acacia*.

Mr. Swinton communicated a paper on "display and dances by insects."

Mr. Slater communicated a paper on the "secondary sexual characters of insects," with especial reference to the development of horn-like processes and elongated mandibles in the males of *Coleoptera*, alluding to the theories advanced in explanation of the causes and purpose of the growths.

1st May, 1878.—H. W. BATES, Esq., F.L.S., President, in the Chair.

H. J. Elwes, Esq., F.L.S., of Preston House, Cirencester, was elected a Member, and P. Cameron Esq., of Glasgow, was elected a Subscriber.

Mr. Dunning drew attention to the fact that the Meeting marked the 45th Anniversary of the foundation of the Society.

Mr. Distant read a paper on some *Hemiptera-Homoptera*, with descriptions of new species, in which he remarked on the uncertainty of generic nomenclature as a basis upon which to found theories of geographical distribution. He exhibited a specimen of *Tetrodes bilineata*, Walker, as a remarkable instance of the power some insects appeared to have of resisting damp; that same specimen having been in a damp relaxing box for over four months without injury.

NEW SPECIES OF GEODEPHAGOUS COLEOPTERA FROM NEW
ZEALAND.

BY H. W. BATES, F.L.S.

In the paper on the Geodephagous *Coleoptera* of New Zealand, which I published in 1874, eighty-nine species were catalogued as belonging to the islands. To this number must be added three species described by Captain Broun in the Trans. of the New Zealand Institute, nine species by myself in Entom. Monthly Mag., Jan. and Feb., 1878 (Vol. xiv, pp. 191—196), and eighteen in the following pages, making, in all, one hundred and nineteen species now known as belonging to the New Zealand Fauna in this department.

CICINDELA AUSTROMONTANA, n. sp.

Oblonga, supra saturate olivacea, opaca, subtilissime sculpturata, fere levigata; elytris lunula humerali, fasciaque brevi mediana vix curvata, per marginem cum lunula apicali connexa, albis: labro valde transverso, margine antico fere recto, medio tridentato; capite subtilissime strigoso; thorace lateribus rotundato, postice magis quam antice angustato: elytris apice rotundatis, suturâ spinosa, dorso æqualiter subtilissime granulatis: corpore subtus femoribusque æneis, sparsim albopilosis.

Long. 5 lin., ♂.

Closely allied to *C. Feredayi*, from which it may be distinguished by the form of the anterior edge of the labrum. This, in the ♂ of *C. Feredayi*, is angularly produced in the middle, and ends in a stout tooth; but in the same sex of *C. austromontana*, it is not produced, forming in the middle a sharp tooth with a more obtuse one on each side. Besides this definite structural character, the new species differs in being more parallel-sided, duller in colour, and in the sculpture of the elytra consisting of granules instead of punctures. The usual row of large green punctures is not visible. The white markings are not very different; but the white margin is interrupted at the end of the humeral lunule, and the median belt is not bent and prolonged posteriorly. The forehead and thorax have a few long white hairs.

Castle Hill, Eastern slope of New Zealand Alps, Canterbury (C. M. Wakefield); two examples.

PHYSOLESTHUS INSULARIS.

Oblongus, subdepressus, piceo-niger, elytris thoraceque marginibus rufescentibus, capite thoraceque subopacis, illo antice late concavo; thorace transversim quadrato postice modice angustato, angulis obtusis, ibique margine elevato, margine postico late rotundato; elytris politis, striatis, interstitiis convexis.

Long. 2½ lin.

Considerably smaller than either of the Australian species already described of this genus; but agreeing in almost every other respect

with *Ph. australis* (Chaudoir). It bears a strong resemblance to the European *Badister peltatus*, from which its swollen labial palpi at once distinguish it. It is smaller, and has a shorter thorax, the hind angles having a broad smooth fovea, from which springs a strong bristle. The pale margin of the elytra is confined to the reflexed rim.

Canterbury Province (C. M. Wakefield).

LECANOMERUS OBESULUS.

Oblongo-ovatus, convexus, subæneo-niger, nitidus, antennis basi, palpis, tibiis (apice piceo excepto) tarsisque apice rufotestaceis; marginibus inflectis thoracis et elytrorum plus minusve rufescentibus; thorace transversim quadrato, lateribus rotundatis, angulis posticis fere nullis, foreis basalibus sparsim grosse punctatis; elytris striatis, interstitiis paulo concrexis, apice leviter sinuatis.

♂. *Tarsis quatuor anticis, articulis 2—3 latissime dilatatis, 2^{do} fere semi-circulari, 3^{io} brevi.* Long. 2½—2¾, ♂ ♀.

Distinguished from the other species of the genus by its greater convexity and the sharper and deeper striation of the elytra. The colour of the upper surface is shining black, with a faint brassy metallic sheen on the elytra. The extreme lateral margins of the thorax and the elytra are rufescent; the two basal joints of the antennæ, the palpi and the basal half of the tibiæ are also of the same colour. The basal foveæ of the thorax are coarsely but sparsely punctured.

West Coast, S. Island, numerous examples (C. M. Wakefield).

HYPHARPAX ABSTRUSUS.

II. *antarctico proxime affinis, dimidio major.* *Oblongus, æneo-niger, antennarum articulo 1^{mo}, tibiisque (apicibus exceptis) rufotestaceis: thorace transversim quadrato, postice paulo magis quam antice angustato, lateribus antice late rotundatis, angulis posticis paulo obtusis apice rotundatis, foveis basalibus sparsim grosse punctatis: elytris apice oblique fortiter sinuatis, apud suturam productis, supra undulatis, sericeo-nitentibus (præcipiue ♀), striatis, interstitio tertio apicem versus puncto majori conspicuo.* Long. 3 lin., ♂ ♀.

Agrees with *H. antarcticus* in almost everything except size; Castelnau giving 2½ lines as the length of that species, which agrees with a very large number of specimens that I have examined. "The feeble punctiform impression behind" of Castelnau's phrase also indicates a difference between *antarcticus* and the present species, in which the interstitial puncture is very large and conspicuous. When the two species are compared, several other points of difference are observable, which it is impossible to render clear by description.

Described from a single pair ($\delta \ \varphi$) from Auckland.

A specimen in Mr. Wakefield's collection, ticketed "Tairua, Capt. Broun," and others which I have examined from "Wellington," and from parts of New Zealand not specified, differ from the type described in the sutural apex of the elytra not being notably prolonged, and in the thorax being much less rounded on the sides anteriorly and more gradually narrowed to the base. Some of the specimens have a slight greenish tinge, and others have two basal joints of the antennæ clearish red. It is impossible, without much further material, to decide whether we have here to deal with several closely allied species, or only with a single variable one.

BEMBIDIUM ORBIFERUM.

Oblongo-ovatum, convexum, nigro-aeneum, palpis, antennarum articulis basalibus pedibusque fulvo-testaceis: capite ovato, oculis modice convexis, sulcis frontalibus latis: thorace fere globoso, late rotundato, juxta basin constricto, ibique lateribus parallelis, angulis rectis: elytris apice angustatis, striato-punctatis, interstitiis vix convexis, tertio punctis duobus parvis; striis exterioribus apice vix impressis.

Long. 2 $\frac{1}{2}$ —3 lin. $\delta \varphi$.

δ . Tarsi antici, articulis duobus dilatatis apice intus productis, primo oblongo, secundo parvo.

Allied to *B. rotundicolle*, *callipeplum*, &c. Thorax much more strongly rounded, more constricted at the base, with hind angles more distinctly rectangular. It is also larger than the allied species, more convex and broader, the thorax being also larger in proportion to the whole insect. The colour of the upper surface is dark brassy, more or less cyaneous. The thoracic foveæ, as in the rest of this small group, are feebly marked; long, narrow, and situated close to the hind margin near the angle. The elytra taper strongly just before the apex, and are there more or less testaceous. The striæ are but feebly impressed, but the punctures are strong. The third interstice has only two small punctures. The first dilated joint of the male tarsi is much longer than in the allied species.

West Coast of Southern Island (C. M. Wakefield). I have also a specimen from Mr. H. Edwards, ticketed "Auckland."

BEMBIDIUM CHALCEIPES.

B. anchorodero affine, at paullo latius, modice convexum, cuprascenti-aeneum: thorace fortiter rotundato, juxta basin fortiter angustato; elytris punctato-striatis, striis paullulum impressis, interstitiis planis; antennis articulo primo piceo; pedibus aeneis.

Long. 2 $\frac{1}{4}$ lin.

Closely allied to *B. anchoroderum* (Bates), having the same general proportions, *i. e.*, the thorax is not so short relatively to the elytra

as in *B. parviceps* and *Tairuense*, and not so broadly-rounded, and relatively large, as in *B. eustictum* and *orbiferum*. The insect is also broader and flatter. In nearly all the specimens, the colour is dullish coppery-brown, with the head more greenish-brassy, and the antennæ and legs metallic, except the basal joint of the antennæ, and sometimes the tibiæ, which are more or less reddish-pitchy. The thorax is slightly shagreened, and, as usual in this group, rather abruptly narrowed just before the base, where the sides, for a short distance, are straight and parallel. The striae of the elytra are very slightly impressed, but the punctures are very distinct, and are not wholly obliterated near the apex.

Typical examples of *B. anchoroderum* are only $1\frac{3}{4}$ lin. long.

West Coast, Southern Island (C. M. Wakefield).

BEMBIDIUM HOKITIKENSE.

B. anchorodero proxime affine; differt colore nigro, thorace paulo latiori, striisque 3—7 apice evanescientibus. Supra paulo convexum, nigrum, leviter æneotinctum; palpis, antennis, pedibusque nigris: thorace latiori, valde rotundato, juxta basin constricto ibique lateribus rectis, supra vix ruguloso; elytris punctato-striatis, striis 3—7 ante apicem desinentibus, interstitiis paulo convexis. Long. $1\frac{1}{2}$ lin.

Another of the numerous ill-defined species closely allied to *B. anchoroderum*. The colour of the two specimens taken by Mr. Wakefield is dull brassy-black, quite different from the brighter brassy tinge of *anchoroderum*. But the chief distinction lies in the broader form of the thorax, which is a conspicuous differentiating character, when the two species are compared side by side; another good character is offered by the smooth apical area of the elytra.

West Coast, South Island (C. M. Wakefield).

PTEROSTICHUS (TRICHOSTERNUS) AUCKLANDICUS.

Elongato-oblongus, thorace quam elytris distinete angustiori; capite magno, antice (cum mandibulis) elongato: viridi-æneus, nitidus, elytris fusco-æneis; palpis antennisque rufo-piceis, pedibus piceis: thoracis margine antico arcuato-emarginato, mox pone angulos anticos leviter rotundato-dilatato, deinde gradatim, ante angulos posticos citius, sinuatim angustato, angulis rectis; forea utrinque curvata valde profunda: elytris elongato-ovatis, postice latioribus, suprà profunde aequaliter striatis, striis fundo punctulatis, interstitiis passim convexis, tertio 3 vel 4-, septimo pluri-punctatis. Long. 9—11 lin., ♂ ♀.

Variat colore saturate cupreo, ut in Tr. Australasiæ, Guér.

Distinguishable from *Tr. Sylrius* and allies at once by its quite different form, due to relative narrowness of the thorax, which is also longer, less rounded anteriorly, and more gradually narrowed to the base, its basal foveæ are also deeper and more curved or branched.

The head is much larger, especially much longer in front of the eyes ; the mandibles and palpi being also longer. The elytra offer fewer points of difference ; the interstices, however, maintain their convexity to the apex. The antennæ and palpi are reddish, and the legs dark pitchy-red in all the examples I have seen.

One example, from Auckland, differs from the above description, in being of a dull purplish-copper hue, inclining to æneous on the head and thorax.

PTEROSTICHUS (TRICHOSTERNUS) TEMUKENSIS.

Niger, supra fusco-cupreus, lateribus interdum viridibus; palpis apice rufis: thorace transversim quadrato, postice vix sinuatim angustato, angulis posticis paulo prominentibus; elytris elongato-oblongis, punctato-striatis, interstitiis convexis, 3^{io}, 5^{to}, et 7^{mo} paulo latioribus.

Long. 9½ lin.

Very closely allied to *Tr. Sylvius*, and probably only a local form of the same. Comparing half-a-dozen specimens of each species, *Tr. temukensis*, besides its more uniform and dusky-cupreous colour, appears rather more elongate and parallel-sided, and shows, in some examples, a conspicuous inequality in the width of the elytral interstices. But the most important and constant structural feature is in the curvature of the sides of the thorax ; this, instead of forming a rather deep sinuation posteriorly between the middle and the tip of the hind angles, continues nearly to the base, as in *Tr. antarcticus*, the angle being somewhat abruptly, and, to a less degree than in *Tr. Sylvius*, turned outwards. The head and front margin of the thorax are formed the same in both species.

Temuka (C. M. Wakefield).

PTEROSTICHUS (TRICHOSTERNUS) SYLVIUS.

Suprà viridi-æneus vel cupreo-æneus, marginibus viridibus, nitidus, palpis apice rufis: thorace transversim quadrato, postice sinuatim angustato, angulis posticis prominentibus, acutis: elytris oblongis, punctato-striatis, interstitiis convexis, æquibus, tertio 3 vel 4-, septimo pluri-punctato.

Long. 9 lin.

Agrees with the description of *Feronia* (*Tr.*) *rectangula* (Chaud.) in every important respect, except in the hind angles of the thorax, which, instead of being "exakte rectis," are decidedly projecting. This character is constant in the six examples before me, and is corroborated by the shining metallic colour of the whole upper surface, head included ; Chaudoir giving as a speciality of *Tr. rectangula*, "color paginæ superioris minus nitidus, elytrorum dorso fere nigricante." Specimens agreeing with this description were taken by Mr. Wakefield, at Rangiroa, whereas all his examples of *Tr. Sylvius* came from Peel Forest.

Tr. Sylvius has the head of moderate size, in both sexes, with prominent eyes, and very small, rapidly narrowed, posterior orbits. The thorax is arcuate-emarginate on the fore margin, with rounded anterior angles, quite as broad at the base as at the apex, and moderately dilate-rotundate at a short distance behind the anterior angles. The elytra are dentate at the humeral angles, the punctures in the striæ are small and distinct, and the interstices become flatter towards the apex.

Peel Forest, S. Island (C. M. Wakefield).

PTEROSTICHUS (HOLCASPI) INTEGRATUS.

Elongatus, niger, suprà cuprescens; thorace quadrato, mox ante basin fortiter angustato, angulis acutis: elytris oblongo-ovatis, elongatis, striis vix punctulatis, omnino integris, septima apicem versus fortius impressa. Long. 9 lin., ♂ ♀.

Very closely allied to *Pt. vagepunctatus* (White); differing chiefly in the striæ not being interrupted, and in the 7th stria being deepened into a flexuous sulcus, extending from two-thirds its length to the apex. The elytra are rather more narrowed to the base, and consequently more oval than in *Pt. vagepunctatus*, and the hind femora of the ♂ are not dilated on their under surface.

Hokitika and Lake Paroa (C. M. Wakefield).

PTEROSTICHUS (RHYTISTERNUS) PUELLA, Chaud., Bull. Mosc., 1865,
No. 3, p. 44.

Captain Broun has recently sent examples of this Australian species from Tairua, both to Mr. Wakefield and Dr. Sharp, which bear the closest resemblance to specimens, with which I have compared them, from Queensland.

ANCHOMENUS (PLATYNUS) OTAGOENSIS.

Elongatus, deplanatus, nigro-piceus, opacus; antennis, palpis, pedibusque omnino melleo-fulvis: labro late emarginato; collo haud sulcato: thorace elongato-quadrato, postice longe, sinuatim sed modice angustato, angulis posticis subacutis; suprà impunctato, utrinque linea curvata paulo impressa a basi fere ad marginem anticum ducta: elytris planis, elongato-ovatis, prope apicem fortiter sinuatis, apice suturali obtuso, subtruncatis; suprà subtiliter striatis, interstitiis planis. Long. 5 lin., ♂ ♀.

Allied to *A. deplanatus* (White), from which it is at once distinguished by the tawny-yellow colour of antennæ, palpi, and legs. From other allied species it is distinguishable by the form of the thorax, which is not at all strongly narrowed behind, but gradually and slightly, the anterior part of the sides being also gently rounded:

the shallow lateral groove begins as a broad depression, with the basal fovea, and extends towards the front, gradually becoming narrower and fainter. The elytra are nearly plane, smooth, and opaque, regularly elongate-oval, with sharp lateral edges: the interstices are quite flat, and the three punctures of the 3rd very well marked. The labrum is broadly and distinctly emarginated. The mesosternal epimera are short and broad as in the sub-genus *Platynus*.

Otago.

(*To be continued*).

NOTES REGARDING SOME RARE PAPILIONES.

BY D. GREIG RUTHERFORD, F.L.S.

2. PAPILIO HOMERUS, Fabr.

Originally described by Fabricius (*Ent. Syst.*, iii, 1, 1793) from a drawing made by Jones, taken, according to Donovan (*Nat. Rep.*, i) from a specimen in the possession of Drury; and in 1801 more fully described, and, for the first time, figured, by Esper in his "Aussändische Schmetterlinge," this splendid *Papilio* has, until within the last few years, been rarely met with in European collections. In England it has, I believe, been confined to those of the British Museum, the Hope Museum at Oxford, and that of the late Mr. W. C. Hewitson. This is the more remarkable, since its habitat (Jamaica) has long been well known—has been frequently visited by naturalists, and in all directions traversed by English travellers who, we may readily conclude, would spare no pains to secure such a gorgeous and conspicuous insect, if it came in their way.

P. Homerus has already been so well and so fully described by Godart in the "Encyclopédie Méthodique," and by Boisduval in the first volume of his "Species Générales," that it is unnecessary for me to do more than supplement their work. This I am fortunately enabled to do from a comparison of a number of fine specimens recently received by my friend Mr. F. J. Horniman from Jamaica, the only region in which, so far as I can learn, this species has hitherto been found. My comparison results in the following addition to the descriptions referred to:

Upper surface of both pairs of wings varying from dark brown to deep black: transverse bands varying from a bright lemon colour to rich yellow. Apical spots usually five, sometimes all but the upper two suppressed. Lunules on hind wings generally five, various shades of yellow, orange, or bright red, often very faint, and in some ex-

amples altogether absent ; usually distinct and well marked in female. Inner margin of hind-wings of female at extremity of transverse band finely dusted with orange. *Expanse*, 5— $6\frac{1}{2}$ inches.

As illustrative of the habits and nature of the habitat of this species, I extract from a letter recently received from our correspondent in Jamaica, the following interesting account of the capture of the specimens now in the Surrey House Collection :

"I lost no time in trying to obtain news of the classical object of which I was in quest ; but, though there was a doctor who had been resident in the neighbourhood for fifteen years, and a clergyman who had also been stationed there for some time, neither had seen it, or could give me any information as to its haunts. One Negro boy of whom I enquired, informed me that it was found near a certain river. For this I accordingly started early one morning ; but though I searched in all directions and the likeliest places, I could find no trace of *Homerus*. At last, and just as I was beginning to despair of finding it, I caught sight of a fluttering mass of unusual proportions about twenty yards ahead of me, and presently recognised the object of my search. The difficulty now was to catch it, for it was hovering round a mango tree on the bank of the river. I advanced cautiously, and, on my approach, it sheered off a little, but soon returned to a position within reach of my net, when, with one fortunate stroke, I secured my prize. I leave you to imagine my feelings when I found the glorious creature fluttering inside my net. For three successive days I wandered for miles up the same stream, seeing a specimen occasionally, but getting no chance of making a capture, and I reluctantly decided to try another part of the island. Before doing so, however, I made one more visit to the stream, along which I walked to a place where a waterfall came down the face of a very high rock, with a narrow gorge between. Here I rested, thinking what a paradise it *ought* to be for butterflies. Gigantic trees quite overshadowed the river, and the undergrowth was rank and luxuriant. Presently, to my great delight, I saw, just above my head, a mass of blue and gold sailing gracefully along : then another ; and, after going a little way, one wheeled round and came up the bank low down, just hovering over the leaves for a second, but before he could fly further I had him safe in my net ; and ere I left that place, I had succeeded in capturing several fine specimens.

"Regarding the habits of this species, I observed that few specimens were on the wing before *noon*. They then all come *down* the river (chiefly on the same side), hover over leaves of trees, principally

the mango, rarely or never settle, and about 3 p.m. begin to come up the stream, when they gradually disappear. Every one I secured was captured on the wing. I never saw them alight on flowers; but, on two occasions, I saw one settle on the top of a mango tree. Its mode of flight is very deceptive, appearing to be slow, but, in reality, is very rapid. It is fearless, if one remains perfectly quiet, but the slightest movement will cause it to swerve in its flight. I tried very hard to discover the caterpillar, and offered rewards to the natives for it, but my efforts were fruitless."

The extraordinary fact of such a large and strongly winged butterfly capable, one would think, of long and sustained flight from one region to another, being confined to such a small area as that comprised by Jamaica, is highly significant, in view of some of the problems raised by the subject of the geographical distribution of species. The large majority of *Lepidoptera*, we know, are dependant for their range of distribution upon that of the plants upon which their caterpillars feed; and while, in the case of a widely distributed species, we argue either a corresponding extension of its food plant, or a capability of adapting itself to more than one kind of plant, we naturally infer, when we find another species confined to a small area, that it is so restricted because its food plant does not extend beyond the same region. It is a well known fact, that many of the older forms of plant life, unable to adapt themselves to recent climatic changes, have gradually narrowed their range of distribution, and already show signs of becoming extinct. If we suppose the case of a plant at one time distributed over a large area, and furnishing food for a given species of butterfly, gradually yielding to adverse influences until it becomes confined to one locality in which alone it found the conditions favourable to its existence, the butterfly, unless it had been able to find food elsewhere, would suffer a corresponding restriction and diminution in numbers until it at last quite died out. This would be pre-eminently the case with such species as originated during a period when the physical conditions of a given region were different from what they are at present. I am inclined to regard *P. Homerus* as an illustration of this general law, and feel convinced that when its food plant is known, it will prove to be not only one of the rarest but also one of the oldest forms of the flora of the West Indies. In the extract given above, the mango is mentioned as one of the plants to which *P. Homerus* shows a preference, and it may occur to some that this may be the food plant of the species. This, however, is hardly probable, as the mango has been introduced into Jamaica only within very recent

times. Like many other species of *Lepidoptera*, *P. Homerus* is, doubtless, attracted to the mango by the sweet juices exuded from its fruit soon after its becoming ripe.

Nearly allied to but one species, viz., *P. Andræmon*, found as yet only in Hayti, Cuba, and some parts of Mexico, *P. Homerus*, although exhibiting most of the characteristics peculiar to similar forms common to Central America and the West Indies, is yet so distinct from them all, that it seems to occupy a position quite unique in the group to which it is referred. Reasoning from the analogies presented by other insular species and varieties of *Lepidoptera*, I am strongly of opinion that *P. Homerus* is a survival of some group of *Papiliones* once largely distributed throughout Central America at a time when the region now occupied by the Gulf of Mexico and the Caribbean Sea formed part of the Mainland.

Surrey House, Forest Hill : June, 1878.

LIST OF THE HEMIPTERA OF NEW ZEALAND.

BY F. BUCHANAN WHITE, M.D., F.L.S.

(Continued from Vol. xiv, p. 277).

Tribe LYGÆODEA.

Of this tribe or section Captain Hutton mentions five and Mr. Butler four New Zealand species. Of these five, I have seen New Zealand specimens of two only, but I am able to add nine other species, one of them, however, being possibly identical with one of Walker's species.

Family BERYTIDÆ.

14. *Neides Wakefieldi*, n. sp.

Pale testaceous, coarsely punctate above and below; the sides of the head and of the prostethium with a longitudinal brown line; the last joint of the antennæ and the apex of the tibiæ and of the tarsi ferruginous-brown. The apical lamina of the head cylindrical, straight, gradually narrowed to an obtuse point, and reaching far beyond the apex of the head; the antecular part of the head sub-equal to the postocular; the antennæ two-thirds the length of the body; pronotum rather flat, with sub-parallel sides and a longitudinal keel, the length less than double the breadth behind; elytra much abbreviated, and only one-fifth the length of the abdomen, immaculate; legs and antennæ (especially the front femora and basal joint of antennæ) with small black tubercles in rows.

Length, 7—8 mm.; breadth, scarcely 1 mm.

Wellington (Wakefield); several specimens.

It is very probable that this is an apterous form of a dimorphic species—dimorphism being not unfrequent in this family, though the species are rarely so brachypterous as in this instance.

Family LYGÆIDÆ.

15. *Lygaeus (Spilostethus) pacificus*, Boisd. This I have not seen. It occurs also in Tasmania and Australia.

16. *Arocatus ruficollis* (= *Lygaeus ruficollis*, Walker).

Though the description of *Lygaeus ruficollis*, Wlk. (which Mr. Butler *l. c.* says is "not a *Lygaeus*"), does not altogether tally with my specimens, I have little doubt but that they belong to that species. The type specimen is evidently (from the description) a dark example, for usually the red markings are much more extensive, the clavus and interior and apical margins of the corium, as well as the apex of the scutellum and base of the pronotum, being generally of that colour. It is allied to *A. rusticus*, Stål, an Australian species.

Common. Messrs. Broun, Hutton, and Wakefield.

17. *Nysius zealandicus*, Dallas.

The teeth on the hind margin of the pronotum are often nearly or quite obsolete.

Common. Messrs. Broun, Hutton, and Wakefield.

18. *N. Huttoni*, *n. sp.*

Obovate, greyish-testaceous, with grey pubescence and coarse fuscous punctures; head rather finely punctate, black, the vertex and the antennæ reddish-brown, the outside of the 1st joint of the antennæ, the 2nd and 3rd towards the apex, and the 4th darker; pronotum with a transverse band near the front margin, a central longitudinal band abbreviated before and behind, the sides, and some spots within the hind angles, irregularly black, as is almost all the scutellum except the extreme apex. Elytra streaked more or less with black, the extreme front margin and three spots more or less confluent on the apical margin, always fuscous-black; membrane whitish, spotted with fuscous at the base; legs yellow-testaceous, spotted (especially the femora) and punctured with black; the 1st and 2nd joints of the tarsi at the base, and the whole of the 3rd, fuscous-black; body below black marked with yellow. Head sub-equal in length to the pronotum, and with the eyes somewhat broader than the apex of the latter; the bucculæ not reaching the base of the head, scarcely decreasing in height backwards and suddenly ending, about equal to the 1st joint of the rostrum; rostrum reaching the hind coxae; 1st joint of the antennæ much, and the 2nd a little, longer than the 3rd. Scutellum with a triradiate elevation in the middle. Elytra sub-parallel at the base, then dilated and reflexed along the front margin. ♂ ♀. Length, $3\frac{1}{2}$ —4 mm.; breadth, $1\frac{3}{4}$ mm.

In the structure of the bucculæ, *N. Huttoni* is allied to *N. marginalis*, Dall. It is also allied to *N. thymi*, Wolff, and *N. cœnosulus*, Stål; but it is broader than the first, and differs from the second by the shape of the bucculæ, pronotum, &c. It varies somewhat in the intensity of the dark markings.

Messrs. Hutton and Wakefield.

19. *N. anceps*, n. sp.

Oblong, brownish-testaceous variegated with black, with grey pubescence and coarse punctures. A yellowish band runs through the basal half of the head to the apex of the scutellum; the centre of the clypeus and a larger spot on each side reddish-brown; the upper margin of the orbit yellowish. Antennæ pitchy-brown, the inside of the 1st joint (except at the apex), a broad band in the middle of the 2nd, and the apex of the 3rd, pale reddish-brown. Veins of the elytra pitchy-brown. Legs yellow-testaceous, a broad band on the upper side of the femora, rows of spots on the femora and tibiæ, the base of the 1st and 2nd joints of the tarsi, and the whole of the 3rd joint, pitchy-black. Upper surface of the abdomen with a broad central band, and on the three basal segments a narrower and interrupted band on each side black; under side of the body blackish-fuscous, with paler bands and spots. Head and pronotum sub-equal in length, the head with the eyes a little broader than the apex of the pronotum; 2nd joint of the antennæ longer than the 3rd, which is sub-equal to the 4th. Buceculæ as long as the gula, gradually disappearing behind and not reaching the base of the head; 1st joint of the rostrum a little shorter than the buceculæ, the apex of the last joint reaching the middle coxæ. Sides of the pronotum sub-parallel, diverging a little behind, the front angles with a small sharp tooth. Elytra abbreviated, scarcely covering the base of the abdomen, the front margin somewhat rounded, the membrane rudimentary.

Length, 5— $5\frac{1}{2}$ mm., breadth, 2 mm.

N. anceps is perhaps the type of a new genus, but, in the meantime, I have kept it in *Nysius*. Possibly it may have a macropterous form.

Two specimens taken by Mr. Wakefield.

Family PACHYMERIDÆ.

20. *Plociomerus Douglasi*, Buch. White.

Captain Broun.

21. *Pamera nigriceps*, Dallas. "New Zealand," Mayr (Novara Hemiptera).

This species so very much resembles the last, that I have, with some hesitation, suggested (Ann. N. H., May, 1878) that possibly the two may have been confounded, a not very improbable occurrence, if Dr. Mayr had only the original description of *P. nigriceps* (made when it alone of the two was known) to guide him. I have seen no New Zealand specimens of this species, which is common at Honolulu and elsewhere.

Rhyparochromus inornatus, Walker (B. M. Cat., v. 112. 196), seems, from the description, to be either this species or No. 20. It is referred to "the group *Scolopostethus*," but it is certainly not the species described hereafter (No. 26).

METAGERRA, n. g.

Body oblong. Head triangular, equilateral, immersed to the eyes, and with them rather broader than the apex of the pronotum. Rostrum reaching the middle coxae, and the 1st joint attaining the base of the head. Antennæ about half as long as the body, the 1st joint reaching beyond the apex of the head. Pronotum rather broader than long, slightly convex, and with a slight transverse depression before the hind margin; front margin one-third shorter than the hind margin, both concave; side margins keeled and sub-reflexed, nearly straight, but rounded in front. Scutellum longer than broad. Elytra with abbreviated membrane (always?). Legs medioere; femora (especially the front pair) thickened; front femora with one small spine and some obscure tubercles near the apex below; tibiae straight; basal joint of the hind tarsi as long as the last two joints together. Hind margin of 3rd ventral segment curved forward at each side, and not reaching the margin of the body.

Allied to *Rhyparochromus* and *Stygnocoris*.

22. *M. obscura*, n. sp.

Dull chestnut-brown, the two basal joints of the antennæ, rostrum and legs (especially the tibiae and tarsi), paler; pronotum with a spot in the middle of the front margin, the reflexed side margins, the hind angles, and some spots on the hind lobe, the scutellum with a spot on each side behind the disc, whitish-brown; rostrum at the tip, pronotum with an obscure fascia within front margin, an obscure central line, and a spot on each side of the centre of the hind lobe, scutellum with a central band from the middle to the apex, corium with a streak in the middle of the apical margin, as well as the tarsi-claws, blackish; clavus and corium obscurely variegated with paler and darker, and with dark punctures; membrane fuscous, with pale streaks. Antennæ with the 1st joint thickened upwards, the 2nd more slender but also thickened upwards, the 3rd and 4th stoutish and fusiform; pronotum with the hind lobe very short and remotely punctured, hind angles truncate, hind margin concave in front of the scutellum; scutellum punctured; elytra with rows of punctures, the clavus with three rows; membrane very short, leaving nearly one-quarter of the abdomen uncovered.

♂ ♀. Length, 3½ mm.; breadth, 1½ mm.

Two specimens taken by Mr. Wakefield. Doubtless a macropterous form occurs.

(To be continued.)

Orthotylis with green cell-nerves.—Being about to describe the *Cyllecoraria* of Europe, I beg the British Entomologists to collect during this summer especially specimens of the many *Orthotylis* which occur in their country. These species are not yet sufficiently elucidated, and it is necessary to compare many individuals of both sexes before we can surely characterize them. I shall be very much obliged to the Hemipterists who will have the kindness to communicate to me specimens of the above named species, with information relative to the trees on which they live.—O. M. REUTER, Helsingfors: June 7th, 1878.

DESCRIPTION OF A NEW SPECIES OF *CORDULEGASTER* FROM COSTA RICA.

BY R. McLACHLAN, F.R.S., &c.

The fine new Dragon-Fly described below was taken by Mr. H. Rogers on the volcano known as Mt. Irazu (at an elevation of between 6000 and 7000 feet), and was sent home by him to Messrs. Salvin and Godman. I examined three ♂ and one ♀.

CORDULEGASTER GODMANI, n. sp.

Occiput brown, with a crest of blackish hairs : back of the head (behind the eyes) yellow. Front brown (black about the ocelli), above ciliated with black ; the excavated superior portion darker, almost blackish. Nasus yellow, slightly brownish in the middle. Rhinarium dark brown or fuscous. Labrum yellow, slightly brownish on the sides. Labium and palpi yellow.

Body black. Thorax clothed with yellowish-grey hairs ; above with two cu-neiform yellow stripes, broadest posteriorly ; sides with two narrow oblique yellow bands, the lower the broader, the intermediate band indicated by two widely separated yellow spots (most conspicuous in the ♀). Legs black ; femora piceous externally (excepting at the tips). Abdomen brownish at the base ; second segment with a complete yellow ring, very narrow on the middle above, joining and including the oreillettes in the ♂, becoming gradually broader and very oblique on the sides in the ♀, the posterior margin of this segment above with two yellow transverse spots widely separated, and the margins of the genital suture are broadly yellow ; 3rd to 7th segments with a narrow median yellow ring, interrupted on the middle above, on the 3rd to 5th there are also two widely separated posterior yellow spots ; 8th with a broad complete yellow median ring, expanding on the sides posteriorly ; 10th with a narrower complete basal yellow ring.

Appendages of the ♂ black : the superior scarcely so long as the 10th segment, somewhat dolabriform, the apical edge very oblique ; beneath they are furnished with two teeth, one basal, triangular and rather large, the other ante-median, smaller, and slightly hook-shaped : inferior appendages nearly quadrate, slightly narrower in front, the apex excised. In the ♀ the vulvar horns are piceous, and extended somewhat beyond the apex of the abdomen.

Wings hyaline, strongly tinged with brownish in the very adult ♂, and then slightly yellowish at the extreme base (more conspicuously so in the ♀) ; costal edge finely yellowish outwardly ; pterostigma narrow (4 mm. long), black ; membranule pale cinereous, 19—21 ante-cubital, and 14—16 post-cubital nervules in the anterior-wings.

Length of abdomen, ♂, 55 mm. ; ♀, 58 mm. Length of posterior-wing, ♂, 45 mm. ; ♀, 50 mm.

In the very adult ♂ (and also in the ♀) the yellow markings of the abdomen are apparently sometimes nearly obliterated.

Among American species this should come nearest to *C. maculatus* and *C. diadema*, but is abundantly distinct from either in the character of the markings.

Lewisham : June, 1878.

Change of generic names.—In vol. xiii, p. 23, of this Magazine, I described a new Coleopterous insect from New Zealand and called it *Camirus convexus*. I find the word *Camira* has already been used for a genus of *Coleoptera*, and I therefore propose to alter the word *Camirus* into *Camiarus*, so as to differentiate it sufficiently from the pre-existing *Camira*.

Epistrophus (mihi, Ann. Nat. Hist., xviii, p. 22) must also be changed, on account of *Epistrophus*, Kirsch. (Berl. Ent. Zeit., 1868), and I propose to call the Colydiid insect *Epistranus Lawsoni*.—D. SHARP, Thornhill, Dumfries : June 14th, 1878.

Strange locality for Anobium paniceum.—Lord Arthur Russell has brought to my notice a curious instance of that adaptability in this insect, which accounts so easily for its abundance and wide distribution. Ten years ago, he bought a parcel of powdered Orris root at the well known Convent of Sta. Maria Novella at Florence, where the nuns sell various articles for toilet purposes. This parcel was accidentally unopened until now, and was found to have afforded a pasture and breeding-ground for many generations of the beetle, which swarmed in it. My first introduction to it in any quantity was in a Medical Lecture Room in the Strand, where it had established a colony in a human skeleton, which had been dried with the ligaments left on.—E. C. RYE, 70, Charlewood Road, Putney, S.W. : June 15th, 1878.

Observations respecting Phalæna Stratonice of Cramer.—In the 21st part of the “Tijdschrift voor Entomologie,” recently published, there is a paper by P. C. T. Snellen upon *P. Stratonice* of Cramer. The author states that in February of last year he obtained a pair of Japanese moths from Mr. Heine, which reminded him greatly of *Vithora indrasana*, of Moore, as represented in the figure (P. Z. S., 1865, pl. 42, f. 5), and also (excepting in the structure of the body) of Cramer’s *Phalæna Stratonice*.

Knowing how frequently broken specimens of insects are mended up with the bodies, antennæ, &c., of other species, he was “inclined to suspect a similar deception “in this instance, but before concluding this to be the case, he induced Mr. C. “Ritsema, the ever-obliging Curator of the insect-room in the National Museum at “Leiden, to see if specimens of *P. Stratonice* existed in the Museum, and to let him “know what kind of antennæ they had.” The following was Mr. Ritsema’s reply : “The Museum possesses two examples of *Ph. Stratonice*, Cramer, both possessing only “the left antenna, whilst in one also the abdomen is wanting. The other example “seems to me, or, rather, I am certain of it, to be a female.* The antennæ of both “at first sight seem to be like one another : slender at the base, slowly growing “thicker towards the end, and, as it seems to me, provided near the end of the “joints with some fine little hairs.† Cramer seems, to judge by the strongly combed “antennæ, to have figured a male.” Mr. Snellen then examined his moths, and finding that one of his specimens was a male, he concluded that the antennæ of Cramer’s original were false.

After recording the above possible fact, Mr. Snellen goes on to criticize the view held by recent Lepidopterists of the affinities of *Vithora* (which he now considers congeneric with *Ph. Stratonice*), and states his opinion that it is nearly allied to

* Evidently from the width of the abdomen.

† Just the same as in *Vithora indrasana*, Moore

Abraxas, *Pantherodes*, and *Rhyparia*, concluding with a few remarks upon the modern views of protective resemblances, in which he mentions the fact that I named the common Japanese moth *Vithora agrionides*, in the "Annals and Magazine" for 1875, and he says: "moreover, he informs us that it 'mimics *Phalæna* 'Stratonice, Cramer!' without clearly informing us whether he grounds this conclusion on objects like what Cramer represents, or only upon the figure."

In my description of *Vithora agrionides*, I do not anywhere say that it mimics *P. Stratonice*, but that it "resembles *Cystidia Stratonice*, Cramer, excepting in the 'body';" and I add, in a foot-note, "*Cystidia* is probably a mimic of *Vithora*;" this I still believe to be the case; for, although I have examined many examples of *Vithora agrionides*, and have not hitherto seen Cramer's insect, it is well-known that in most instances of mimicry, the *pattern* is by far more numerous in individuals than the *copy*, so that there is every probability that the species will yet come.

If there were no other differences but those which Cramer figures and describes in the body of his species, I should still hold that *Vithora* belonged to a distinct family; but the pattern of the wings, though very similar, differs as much as in any of the numerous parallel species of the genera *Heliconius* and *Melinæa* amongst the butterflies.

I cannot for a moment agree with Mr. Snellen as to the affinities of *Vithora*, the antennæ alone would at once decide their position to be in the family *Agaristidae*; nor is there any reason (excepting that in colour, it nearly agrees with one or two species of *Abraxas*,* which are mimickers of it) for referring it to the *Zerenidae*: the whole structure of the body is essentially that of *Agarista*, and the veining of the wings is quite normal.—A. G. BUTLER, British Museum: *May*, 1878.

Description of the larva of Eubolia bipunctaria.—On August 6th, 1875, I received eggs of this species from Mr. A. E. Hudd, of Clifton, Bristol. They were globular, very glossy, with a semi-translucent appearance; pale straw-colour. Before hatching, which event took place on the 20th of the same month, they changed to lead-colour, but still retained their glossy character. The newly emerged larvæ were slate-colour, the head brown. They fed on the common white Dutch clover until autumn, when they hibernated, feeding again in the following spring. By June the 8th, they were nearly full-grown, when I took the following description:—Length, about an inch, and stout in proportion; head rather narrower than the second segment, rounded at the sides, but the face somewhat flat; there is a slight notch on the crown. Body roughly cylindrical, and of nearly uniform width throughout, tapering only a very little towards the anal extremity; segmental divisions well marked, and each segment is also divided by transverse ribs into numerous sections; trapezoidal tubercles raised, each emitting a short hair.

Ground colour of the dorsal area pale yellowish-grey with slight green tinge; head very pale yellowish-brown, dotted and freckled with darker brown. Dorsal stripe conspicuous, dark green, on each side of it is another much narrower, and consequently less distinct line, of the same colour; there is also a rather indistinct double line above the spiracles: spiracles rust-colour, each followed anteriorly by an intensely black dot; tubercles also black. The ground of the ventral surface is much

* Can Mr. Snellen have got the *Abraxas* instead of the *Vithora*? Compare Felder's figure (*Reise der Nov. Lep.*, pl. cxxix, fig. 29); this species occurs also in Japan, and is not uncommon.—A. G. B.

darker than the dorsal area, being a pinkish-brown shade; extending throughout its entire length is a broad stripe of still darker brown, and within this stripe is a double central yellow line. On segments 6, 7, 8, 9, 10 and 12 is a double series of large black marks placed within the broad central stripe, but outside, and on each side the double yellow inner line: pro-legs brown on the outside, this colour being very noticeable on the anal claspers.

The pupa is about five-eighths of an inch long, smooth, the thorax and abdominal segments polished, the wing-cases duller. It is uniform and cylindrical, but sharply attenuated towards the anal point. Colour almost uniformly bright brown, the anal point, segmental divisions, and eye-cases darker. The first imago emerged July 26th.
—GEO. T. PORRITT, Highroyd House, Huddersfield: *June 4th, 1878.*

Description of the larva of Crambus contaminellus.—Towards the end of May, 1877, while turning over a stone on muddy earth near a sea-bank, I chanced to find a small larva, which I brought home together with part of a little rigid tuft of grass that was growing close to the stone. The larva was evidently a *Crambus* of a species I had not before seen, and seemed near moulting; a few days later, having accomplished its moult within a slight web it had spun around itself and attached to the grass, it began to feed well on the grass, and to fashion its dwelling with more silk into a complete tubular form, and to cover it with frass.

After watching its progress a little, it was not very difficult to find a few more, the only real difficulty seemed to consist in finding stones in similar places not already tenanted by ants or other predaceous creatures. However, on the 11th of June following, I fell in with an occasional stone or two that rested on or close to small tufts of *Poa maritima* and *Borreri*, which were, so to say, tenanted by one of these larvæ, and in one instance by two of them. When these stones were turned over the tubular gallery, though of no great length, was readily seen attached to the lower whitish sheaths of the grass towards the roots, being conspicuous, however small, by its covering of fine greenish frass, or frass and fine grains of earth together, or else partly spun against the stone itself, the sudden removal of which tore open the gallery and the surprised larva dropped out.

These larvæ thrived very well in confinement on growing tufts of the same species of grass planted in a pot, with some of the muddy soil, and surrounded with a few small stones, amongst which they constructed their galleries, and when full-fed converted them into very tough cocoons smoothly lined with brownish-grey silk, and externally coated with fine earth and frass.

The moths, and a couple of ichneumons, were bred from July 17th to August 7th.

This season I have again found a few of the larvæ, and have been able to verify and extend last year's observations, so that I can now say in early spring the larva is not more than three-sixteenths of an inch long, the body of an earthly reddish-brown with darker brown head, the spots and plates of the same colour as the body but contrasting by their gloss alone. After each moult the colour becomes greyer as they advance in growth, and when full grown the larva measures a little more than three-fourths of an inch in length, and is moderately slender, yet the segments have a certain characteristic plumpness in detail from their being well defined, and each sub-divided with a deep transverse wrinkle between the trapezoidal spots of the back; the rather rounded head is a trifle less than the second segment, which is long in

proportion, and the body tapers a little just towards the hinder part: in colour the head is greyish-brown marked with blackish-brown, the plate behind it is similar, and both shining; the body lightish dull earthy-grey with a rather darker dorsal line, the spots lightish brown and glossy, the larger trapezoidal pairs transversely roundish-ovate, the smaller pairs rather linear and each encompassed with a faintly paler outline; a row of somewhat tri-lobed spots along the side, and under them the small round black spiracles, and beneath them again other rows of paler and longitudinally ovate spots; every spot having within it, nearer the outer margin than the middle, a small black dot bearing a fine hair: on the front part of the thirteenth segment the two spots are united into one larger than usual, a few minute dark dots are on the shining anal plate; the ventral and anal legs tipped with brown hooks.

Varieties occur with dark brown heads, and plates on the second segment; but principally towards the last (when about to pupate) these parts and the anal plate grow darker, and the rest of the body lighter of a dirty yellowish tint.

The cocoon, constructed as before described, is of a somewhat oval figure, its longer diameter about five-eighths of an inch, and shorter diameter one-fourth. The pupa is a little over three-eighths of an inch in length, and one-eighth in diameter at the thickest part, its form is quite ordinary though the wing-covers are rather long in proportion, and from them the abdomen tapers to a bluntness rounded-off tip; it is of a warm brown colour, and glossy, with the abdominal tip blackish-brown.—

WILLIAM BUCKLER, Embsworth: June 5th, 1878.

Capture of Argyrolepis (or Eupaecilia) Mussehliana near Pembroke.—On the 27th ultimo, when I was examining a patch of *Genista tinctoria*, for larvæ feeding in the shoots, a small *Eupaecilia* started up and was secured. It belonged evidently to the group which includes *Geyeriana* and *udana*, but I could not then identify it. The ground was almost covered with *Inula dysenterica*, so *notulana* might reasonably be expected, but this insect was too yellow and too glossy. By long and hard work in the afternoon I secured three more, and on examining them at home was astonished and delighted to find that I had re-discovered the long-lost *Mussehliana* (see *ante*, vol. xi, p. 133).

I know of no record of its occurrence in this country since Weaver took his few specimens in Devonshire many years ago. Some of these were placed in Mr. Doubleday's collection, and I expect Mr. Allis had, and partially distributed, the rest.

It does not now intend, I fear, to become a common species, for I have seized every available opportunity of looking for it since, with but very limited success.—

CHAS. G. BARRETT, Pembroke: June 10th, 1878.

On the distinctive characters of Penthina postremana, Z.—In the June No. (p. 14) Mr. Hodgkinson very briefly recorded his discovery of the larva of *Penthina postremana*, Zell., in the stems of wild balsam and the rearing of the perfect insects; but I think a few further particulars may be of interest, especially as the species, from its secluded locality in Cumberland, cannot well be of recent introduction, but is most likely an ancient inhabitant, perhaps far more widely distributed in this country in the (good) old times of undrained marshes and fens and extensive morasses than it now is. It is one of the most beautiful species in the genus, and a short description may be useful.

Al. exp. $7\frac{1}{2}$ lines. Head pale yellow; antennæ and eyes black; thorax black, marbled with yellow; abdomen grey; fore-wings long, rather pointed at the apex, and of pretty uniform width, ground colour pale yellow almost obliterated by grey and bluish scales; basal blotch angulated, shining blue-black; central fascia black, strongly angulated outwards and faintly interrupted, beyond this fascia an elongated black triangular spot on the dorsal margin of the wing extends beyond the middle, and at its apex joins an oblique black blotch which reaches the hind margin: at the apex of the wing is a round black spot edged with blue lines. The spaces between these markings are filled in with a marbling of glossy blue, grey, and orange, except before the apex, where the usual black and silvery streaks are visible in the pale ground colour, and at the anal angle, where is a conspicuous somewhat square yellowish-white spot, including that part of the cilia. The remainder of the cilia blue-black with two yellow spots or dashes in the middle. Hind-wings dark grey, darkest at the margin, cilia pale grey.

The larva, with its habit of feeding and hibernating in the stems of *Impatiens noli-me-tangere*, is described by Von Heyden (Stett. Ent. Zeit., 1865, p. 378), and it appears that Mühlig has recorded the rearing of the allied *Penthina fuligana* from the same plant, but it does not seem impossible that Herr Mühlig may have made some mistake as to the species reared by him, both because *fuligana* is well known to feed in the roots of various species of *Stachys*, and because from this circumstance it appears to have been confounded with *nigricostana*, Haw., which has similar habits.

When I wrote some notes on these species (*vide* vol. ix, p. 129) I did not feel satisfied about some German specimens sent by Professor Zeller under the name of *Remyana*. He afterwards sent me a type of *fuligana*, Hüb., by which I was able to satisfy myself that it (and two of the supposed *Remyana*) were really identical with specimens taken in Surrey, although the dark markings were much less intense in colour. These Surrey specimens were *carbonana*, Dbd., = *ustulana*, Haw., and their coincidence confirmed Wocke's correction of the name to *fuligana*, Hüb. This species is the smallest of our *Penthinæ*, but is sufficiently like *postremana* to make it desirable that the points of distinction should be pointed out. The male is but 6 lines in expanse, but large females sometimes reach 8 lines. In the males the fore-wings are rounded, but in the females, although the apex is rounded, it and the anal angle are slightly dilated, so that the hinder part of the wing is broad and peculiar in shape. The markings are very obscure, consisting of a black strongly angulated basal blotch, a narrow irregular central fascia, from which is a curved projection outwards below the middle, a triangle at the anal angle and several streaks across the apex, all black. Ground colour apparently whitish, almost totally suffused with bluish-grey, or steely, scales. Cilia entirely dark grey. This description applies well to both Continental and South English specimens, but some specimens reared by Lord Walsingham from roots of *Stachys palustris*, from Wicken Fen, present singular variations. These variations are in the greater or less partial absence of the suffusion of bluish-grey scales, some specimens showing the white ground colour pretty plainly, while one shows the close alliance of the species with the normal *Penthinæ* by having the apical third of the wing almost entirely white. But in all these the markings, when visible, agree closely with typical *fuligana*, and in all the cilia are entirely dark grey.

The two species may therefore be easily separated:—*postremana* having the apex of the fore-wings pointed and the dark cilia with one blotch and two spots pale

yellow; while *fuligana* has rounded fore-wings and dark grey cilia. But the most conspicuous character is the square pale yellow blotch at the anal angle in *postremana*.—ID.: June 10th, 1878.

Acherontia Atropos in the County Cork.—I have to record the appearance and capture of a specimen of *A. Atropos* at the same place (viz., Schull) as before chronicled (*vide* vol. xiv, p. 158, *ante*). This specimen was captured at 9.30 on the evening of June 8th last, and is now in my possession.—WILLIAM W. FLEMING, The Vicarage, Glengariff, Co Cork: June 17th, 1878.

The Scandinavian Psyllidæ.—In the 8th fasciculus of his “Opuscula Entomologica” (1877), Professor C. G. Thomson gives, *more suo*, a Synopsis of the Scandinavian *Psyllidæ* under the title of “Översigt af Skandinaviens Chermesarter,” reverting to the name *Chermes*, under which Linné, in 1742, characterized this Section of the Homoptera, and to which Geoffroy, in 1762, applied the name *Psylla*, rejecting Linne’s name as erroneously used, because *Chermes*, in ancient time, designated the insect which afforded the famous Tyrian dye (*Coccus ilicis*, Lin.) ; and there is no doubt that, on the ground of priority, Thomson is right in his restoration, though, on the other hand, most authors have followed Geoffroy. Thomson’s object in this article is, he says, partly to recapitulate Zetterstedt’s species, and partly to divide the Section into small natural groups by means of characters never before utilized for this purpose, namely, the form of the head, pronotum, elytra, and posterior coxae. As to genera, he adopts—*Trioza* (with *Trichopsylla* as a new sub-genus for *T. Walkeri*) ; *Chermes* vice *Psylla* (with, as sub-genus, *Atænia* vice *Arytaæna* for *C. genistæ*, and *Psylla* for the other species) ; *Aphalara*, *Rhinocola* and *Livia*. To Zetterstedt is given the credit of having first pointed out the essential character of the neuration of the elytra as of the greatest importance both in distinguishing species and in grouping them.

In *Trioza* 11 species are enumerated:—*Walkeri*, Foerst.; *galii*, Foerst.; *obliqua*, n. sp. (near *albiventris*) ; *dryobia*, Flor.; *acutipennis*, Zett., = *femoralis*, Flor.; *striola*, Flor.; *nigricornis*, Foerst.; *urticæ*, Lin.; *viridula*, Zett.; *proxima*, Flor.; and *hypoleuca*, n. sp. (near *obliqua*).

In *Chermes* are 24 species:—*genistæ*, Latr., = *spartii*, Hartig; *fraxini*, Lin.; *fraxinicola*, Foerst.; *sorbi*, Lin.; *fuscula*, Zett., = *alpina*, Foerst., = *perspicillata*, Flor.; *buxi*, Lin.; *alni*, Lin., = *Heydeni*, Foerst., = *fuscinervis*, Foerst.; *Foersteri*, Flor., = *viridis*, Hartig, = *alni*, Foerst.; *betulæ*, Lin.; *Zetterstedti*, n. sp. (very like *salicicola* in colour, rather smaller than *betulæ*); *lutea*, Thoms., = *saliceti*, Flor. (*nec* Foerst.) ; *quercus*, Lin., = *costato-punctata*, Foerst., = *annulicornis*, Boh.; *puncticosta*, n. sp. (very like *quercus*, but much larger and more obscure in colour); *pyri*, De Geer (hitherto attributed to Linné); *mali*, Foerst. (Löw cites Schmidberger as the older authority for this name); *annellata*, n. sp. (like *mali*, but differing in the neuration and the genitalia); *nigrita*, Zett., = *pulchra*, Zett.; *elegantula*, Zett.; *obliqua*, n. sp. (like the preceding, but differing in the neuration and the genitalia); *Hartigi*, Flor., = *sylvicola*, Reut. (Reuter cites Lethierry); *microptera*, n. sp. (like *obliqua* in form, and *salicicola* in the genitalia); *pruni*, Scop.; *saliceti*, Foerst.; and *salicicola*, Foerst.

In *Aphalara* 6 species:—*exilis*, Ljungh (otherwise attributed to Weber and Mahr); *affinis*, Zett.; *calthæ*, Lin., = *picta*, Zett.; *nervosa*, Foerst.; *artemisiæ*, Foerst.; *graminis*, Lin., = *nebulosa*, Zett., = *radiata*, Scott.

In *Rhinocola* 2 species:—*aceris*, Lin.; *ericæ*, Curt., = *callunaæ*, Boh.

In *Livia* 1 species:—*juncorum*, Zett. (more properly Latr.).

Chermes sorbi, *quercus*, *calthæ*, and *graminis*, of Linné, have puzzled every one for more than a century, and yet they are here referred to as a matter of course. When a species can be undoubtedly referred to the description of an old author his name ought certainly to be adopted, but it is not stated on what evidence the conclusions have been arrived at with regard to these species so long hidden from recognition.

Chermes sorbi, Lin.: Thomson's description fairly agrees with Linné's.

" *quercus*, Lin., has "4 brown spots on the anterior margin and one on the interior margin of the elytra":—Thomson's is "orange spotted with white; elytra hyaline with pale nerves,"—and not a word about brown spots.

" *calthæ*, Lin.: Thomson says, = *picta*, Zett., but Reuter gives *polygoni*, Foerst., as the only synonym, and enumerates *picta*, Zett., as a distinct species.

" *graminis*, Lin., has "pedes non saltatorii," which would at least make it doubtful if it were one of the *Psyllidæ* at all, but this is not noticed by Thomson, who gives it as = *nebulosa*, Zett., = *radiata*, Scott.; which last species, at any rate, does not accord with Thomson's words "clytris fere ut in *A. exili* nebulosis."

One cannot but admire the wonderful succinctness of Thomson's diagnoses, but it is doubtful if they are sufficient to differentiate new species, especially if the particular species, with which comparison is made, is not before the student; and no dimensions are given. Neither are the plants on which the insects are found, nor the times of their appearance mentioned, both being possibly due to the fact, stated by the author, that he has rarely collected any of the species himself; but they are serious deficiencies for all who would desire to capture them. The authors who have described species of *Psyllidæ* since the times of Foerster and Flor are only twice, and then incidentally, referred to; it is, therefore, not at all improbable that some of the species deemed to be new have been already described by them.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: April 30th, 1878.

Notes on Cynipidæ and Aphides.—I found, on the 5th of April last, a very common Cynipid, the *Neuroterus lenticularis*, laying its eggs in the bud of a young oak in my garden. I could adjust a glass tube over the insect without disturbing it in its operation, and saw how it repeated five times the act of inserting its terebra in the bud. The following day it was dead, and I had it put in my collection. I destroyed all buds of the branch except the attacked one, and surrounded the branch with a bag of muslin; the leaves soon displayed themselves, and three of them showed after about a fortnight the well known galls of another Cynipid, the *Spathogaster baccarum*, viz., three on one leaf and one on each of the others. On the 5th of May, the winged "*Spathogaster*" made its appearance. This fact is a new confirmation of Dr. Adler's discovery on the dimorphism of *Cynipidæ*.*

* *Vide p. 12, ante.*—EDS.

I had also good fortune in my breedings of *Aphidæ*, the solitary egg I had obtained from the apterous female of *Pemphigus spirothecæ* in January last, at Nice, gave me on the 20th of April, the young louse forming the first phase of the new colony. I have followed the formation of the gall.

The eggs, which I had found under the bark of the elm and which I suspected to be those of *Tetraneura ulmi*, gave me also their produce as a little louse, which proved to be the very insect I expected. I saw it form its galls, and I could follow the first and second phases, as they are now taking wing. . . . But now here is the difficulty, where do they go in summer?

I find now at the roots of grass (*Bromus*) a little louse which I suppose is Kirby's *Aphis radicum* or Koch's *Amycla fuscicornis*, but the winged form (unknown to the authors) is very curious, as it carries its wings, like *Phylloxera*, horizontally and crossed on the back. The neuration of the wings is that of *Aplooneura*, Passerini, of which one species only (*A. lentisci*) is mentioned by the author. The new one ought to receive the name of *A. radicum*, and the forms known to me are the third and fourth phases, this last as winged Pseudogynæ, carrying the sexuated pupæ, and the sexuated ♂ and ♀ without rostrum. It is a curious fact that in the other *Haploneura* only the gall-maker (the fundator) and the second phase (the emigrant) are known and described (this last winged), but producing young ones *with rostrum and not sexuated*.—J. LICHTENSTEIN, La Lironde, near Montpellier: June, 1878.

Stridulation in Insects and the Microphone—a suggestion.—As the microscope reveals to the eye of man all the most insignificant of Nature's works, why may not the microphone disclose to our hearing the most inaudible sound? Through Professor Hughes' discovery we may hope to have great light thrown upon the somewhat obscure subject of "Stridulation in Insects." As soon as the microphone is practically developed, what can possibly hinder us from adding it to our long and able list of entomological apparatus. We shall then be able to hear our *Thecla rubi* at work in the wood-borders, and possibly a female *Saturnia carpini* may be distinctly (nay loudly) heard to call her loving mate from a distant spot, and this in a language of her own.—S. D. BAIRSTOW, Woodland Mount, Huddersfield: May 29th, 1878.

Luminous Insects, especially Diptera.—This subject having been alluded to in the notice on "Luminous Lepidopterous larvæ" (*vide* vol. xiv, p. 260, *ante*), I may be allowed to complete the references there given.

In the "Entomol. Monatsblätter," by Dr. Kraatz (1876, p. 41), there is a very interesting observation on luminous *Chironomi*, by Brischke. They were observed on a warm summer evening in 1860: the light seemed to proceed from the thorax and abdomen. Dr. Loew determined the species as *Chir. tendens*. In the same article, the previous observations on the same phenomenon, by Pallas (his *Culex* was a *Chironomus*), and by Alenitzin, Member of the Aralo-Caspian Expedition, are referred to; an account of the latter, given in the "Deutsche Entom. Zeitschr. (1875, p. 432), is quoted.

Another case of phosphorescence among *Diptera* deserves to be investigated.

The head of the rare and remarkable fly *Thyreophora cynophila* is said to be

luminous. This fly is metallic blue, its head comparatively large, swollen, and of a bright orange-red. Macquart ("Suites à Buffon," ii, p. 497) says about it: "Quant aux habitudes, elles sont fort lugubres. Il ne recherche que les ténèbres et les cadavres desséchés. A la sombre lumière de sa tête phosphorique, il se jette sur les ossements décharnés et se repaît des derniers restes de l'animalité. C'est sur les chiens morts qu'il se trouve." Macquart's authority is probably Robineau Desvoidy, who says ("Essai sur les Myodaires," 1830): "On l'a trouvée deux ou trois fois dans les environs de Paris, sur diverses sortes de cadavres. M. le Comte de Saint Fargeau en possède un individu pris dans une écurie de cavalerie, et que la tête, phosphorescente durant la nuit, rendait facile à reconnaître." Beyond this single statement, the fact has never been recorded, as far as I know, and I thought it worth while to draw upon it the attention of entomologists who may be in a position to verify it.

Concerning luminous Coleopterous larvæ, see my articles in "Proc. Entom. Soc. Philad." (1862, p. 123, tab. i, f. 8, and *l. e.* vol. iv, 1865, p. 8); also a brief notice in the "Canadian Entomologist" (December, 1868). In these articles I described a beautiful luminous larva, three inches long, which occurs in North America, and which I refer to *Melanactes* (*Elateridæ*).

Finally, I will notice on the same subject of luminosity of insects, that the "American Entomologist (and Botanist)" (vol. ii, p. 371, St. Louis, 1870), contains an article, "Luminous (?) leaf-hopper," the author of which pretends to have noticed that the Homopteron *Tettigonia quadriguttata*, Say, emits flashes of scintillations in the dark. The Editors of the Review, in publishing this article, very properly express their doubts about the reality of this observation. This communication was undoubtedly a hoax.—C. R. OSTEN-SACKEN, Heidelberg: June, 1878.

Obituary.

William Chapman Hewitson, F.L.S., was born at or near Newcastle-on-Tyne on January 9th, 1806, and died at his residence, Oatlands, Weybridge, on May 28th, 1878.

After completing his education he was articled to a Surveyor, and subsequently practised his profession at York and at Bristol; but at a later period the bequests of relatives placed him in an affluent position and free to cultivate his tastes for Natural History on an extensive scale.

Whilst yet a comparatively poor man, he commenced a work on British Oology, of which the first part was published at Newcastle and London in April, 1831. His earliest published entomological observations appear to have been the localities of *Lepidoptera* occurring near Newcastle, York, &c., in Stephens' "Illustrations," commencing (in 1828) at *Polyommatus Agestis* and *Artaxerxes* and extending to near the end of the *Pyralidæ*. In vol. v of the "Entomological Magazine," in 1837, is a note by him "on the Economy of *Hedychrum*," one of the *Chrysididæ*. In 1844 he visited Switzerland, and an account of his doings amongst the Alpine Butterflies will be found in the "Zoologist" for 1845; henceforth his attention appears to have been more especially devoted to exotic Butterflies. It is needless here to refer to the numerous papers published by him in Journals and in the Transactions of various Societies (the latest having appeared in this Magazine in March of the present year). His best known works are the illustrations for the "Genera of Diurnal *Lepidoptera*," published (with descriptive matter by E. Doubleday and Westwood) from 1846 to

1852, the "Exotic Butterflies," commenced in 1851 and concluded (at the termination of the third volume) in the present year, and his separate work on the *Lycaenidae*, left unfinished at the time of his death, and which will (we believe) be edited and concluded by his faithful friend and co-worker, Professor Westwood. These works are remarkable for the surpassing accuracy and fidelity exhibited in the forms and colours of the wings, drawn by himself on the stone and coloured from his own patterns. In these points he was (and probably will long remain) without an equal. On the other hand, the absence of appreciation of structural characters other than those furnished by the wings is painfully apparent, the bodies and legs being delineated in a mechanical manner (or the latter altogether omitted); nor do we anywhere find notes of biological interest in his writings on Butterflies.

These omissions, and the want of power of grasping (or intelligently combating) the modern philosophical theories of Natural Science, will prevent his name acquiring the high position amongst those of scientific Entomologists in which we should have liked to have seen it. This is greatly to be deplored. After fortune had favoured him, he spared neither time nor money in amassing materials: there never has been an Entomologist to whom science is so directly indebted in this way; there probably never has been one who could have advanced its higher branches more directly had he aimed at something further than the mere possession and description of specimens of the perfect insects.

Some thirty years ago the Oatlands Park Estate (once the residence of the Duke and Duchess of York) was cut up into a variety of lots for building purposes. Mr. Hewitson purchased the first of these (about ten acres) and built himself a house, laying out the grounds with exquisite taste and planting a variety of choice conifers and flowering shrubs, so that to the natural beauties of the suddenly-broken ground, with ornamental water at the foot of the slope, and two large and aged cedar trees near the mansion, as the trees and shrubs grew up, ever more and more charms were added. Hence a visit to Oatlands was remembered by the many who enjoyed the privilege as one of the experiences of a life-time. It is possible that few more genuinely single-minded and charitable men have (or ever will be) connected with Entomology. Truly we could better have spared a better man, from an entomological point of view.

Mr. Hewitson had long been a valetudinarian, but up to the last his most intimate friends refused to believe his end was so near. So far as we can learn, the disposition of his collections and property is strikingly in keeping with his character. The Butterflies are bequeathed to the British Museum on the condition that they remain separate for twenty-one years, accompanied by a wish that at the expiration of that time the same condition be extended for a further similar term; the birds' eggs are left to his friend and publisher, Mr. Van Voorst, who long ago assisted him (when assistance was valuable) in continuing his "British Oology." He was a widower for many years before his decease, leaving no issue, and no relatives; his property—after the payment of large sums to several charities, liberal bequests to his executors, and a multitude of smaller amounts to his servants, and to those who had directly, or indirectly, assisted him in his entomological pursuits—is left to an old friend and schoolfellow; with the exception of his library, bequeathed to his native town (Newcastle), and certain pictures which will enrich the national collection.

ENTOMOLOGICAL SOCIETY OF LONDON : 5th June, 1878.—H. W. BATES, Esq., F.L.S., &c., President, in the Chair.

Mr. J. A. Finzi exhibited an example of *Anthocharis cardamines* from Darenth Wood, remarkable inasmuch as although it appeared to be undoubtedly a ♀, one fore-wing had a large patch of orange on the underside only.

Mr. D. G. Rutherford exhibited a series of large, brown, irregular masses of strong web from 4 to 7 inches in diameter, being the common envelopes of aggregations of cocoons of a species of *Bombycidæ* allied to *Anaphe Panda*, Bdv., sent from Mount Camaroons (5000' alt.) by Mr. G. Thomson. Each of these masses contained from 130 to 150 special cocoons, and to some of them were attached cases containing large larvae (still living) of a parasite, either Dipterous or Hymenopterous, probably the latter.

He also exhibited an example of *Papilio Boisdurianus*, which on one of its anterior-wings showed some of the markings usual in *P. Cynorta*, and which he thought confirmed, to some extent, the suspicions that these supposed two species are only sexes of one.

Mr. Meldola exhibited a series of objects forwarded by Mr. Darwin, viz.:—photographs of two species of *Orthoptera* allied to *Pterochroza illustrata* and *P. ocellata*, received from Dr. Zacharias, and remarkable for their perfect imitation of dead leaves, which was carried out in the neurulation of the wings even to microscopic details as compared with the ribs and veining of leaves; small beetles of the genus *Spermophagus* bred from seeds of *Cassia neglecta* sent from Brazil by Dr. Fritz Müller, and received alive in this country; and the proboscis of a *Sphinx* caught by the tubular nectary of a pale yellow *Hedychium*, also from Dr. F. Müller. He mentioned that Dr. Müller (Blumenau, Santa Catharina, Brazil) was anxious to enter into correspondence with entomologists respecting the scent-producing organs of *Lepidoptera* not occurring in Brazil.

Sir S. S. Saunders, on behalf of M. Lichtenstein, communicated a series of notes by the latter on the Natural History of *Aphides*, especially *Phylloxera*, in reply to Professor Westwood's criticisms on his theories in his last Presidential Address.

Mr. Park Harrison brought under the notice of the Society certain marks on chalk found during his examinations of the old shafts at Cissbury. Some of these he attributed to direct human agency two thousand years ago, but of others he was not so sure, and thought they might have been caused by insects. These exhibitions occasioned considerable amusement and discussion, the result of which was that Mr. Park Harrison was informed that he might be perfectly certain the markings were not due to insects. There appeared also to be a pretty general idea that all the markings were of *very* recent origin.

Dr. Fritz Müller communicated "Notes on Brazilian Entomology," especially concerning the odours emitted by butterflies and moths, and their bearing on the theory of evolution. Considerable discussion ensued, in which the President, Mr. Meldola, Mr. Wood-Mason, Mr. Distant, Mr. McLachlan, and others, took part.

Dr. Sharp communicated a paper on some Longicorn *Coleoptera* from the Hawaiian Islands.

Mr. P. Cameron communicated a paper on the larvae of *Tenthredinidæ* with special reference to protective resemblance.

The President read a paper on *Macropschium Cotterilli*, and other new species of *Coleoptera*, from Lake Nyassa.

NEW COLEOPTERA FROM NEW ZEALAND.

BY D. SHARP, M.B.

Among some *Coleoptera* that I have recently received from New Zealand, there are a few interesting species which I think may be named and characterized with advantage: as they are either species closely allied to known ones so as to be readily identified, or else forms so entirely new that they cannot be mistaken for anything else.

They are:—*Demetrida maesta* (*Carabidae*); *Brachypeplus brevicornis*, *Epuraea zealandica*, and *Soronia optata* (*Nitidulidae*); *Brounia thoracica*, an isolated form, that cannot, I consider, be placed with advantage in any of the families of *Coleoptera*; *Pericoptus stupidus* (*Dynastidae*); *Cilibe Huttoni* and *Chærodes concolor* (*Tenebrionidae*); *Rhipistena lugubris* (*Evaniocerides*, but connecting them with *Mordellistena*); *Somatidia longipes* (*Cerambycidae*), and *Cryptodacne synthetica* (*Erotylidae*); *Brounia*, *Rhipistena* and *Cryptodacne* are new generic names.

We are indebted to Professor Hutton, of Dunedin, and Captain Thos. Broun, of Whangarei, for the discovery of most of these insects.

DEMETRIDA MAESTA, n. sp.

Depressiuscula, sat nitida, nigra, pedibus fere concoloribus, antennis rufescens, articulis 1^o et 3^o infuscatis; prothorace sat lato, obsoletius transversim strigoso; elytris subtiliter (fere obsolete) striatis, apice oblique, vix sinuatim, truncatis. Long. 6½ mm., lat. 2⅔ mm.

This seems very distinct from the other described species; it is rather broad, and in its form resembles *D. picea*, but the thorax is even more quadrate than in that species; the elytra have no impressions, and their apex is not so straight as in *D. picea*, the species being in this respect intermediate between *D. picea* and *D. nasuta*.

A single individual has been sent from Otago, by Professor Hutton.

BRACHYPEPLUS BREVICORNIS, n. sp.

Depressus, sub-oblongus, parallelus, niger, antennis pedibus elytrorumque parte basali rufis, his apice late fuscis, subtus griseo-pubescentes, supra nigro-pubescentes, sed pubescentia ad basin elytrorum et abdominis grisea.

Long. 3½—3¾ mm., lat. 1½ mm.

The antennæ are short and rather stout, red in colour, the joints are short, the 2nd and 3rd being each only a little longer than broad, while the following are not so long as broad. The head and thorax are densely and finely punctured; the latter is strongly transverse, nearly straight at the sides, but distinctly narrowed in front, the hind angles rectangular and very definite; the colour at the sides is more dilute. The elytra have the basal part rufescent, the apical blackish, the limit between the two colours is indefinite; their sculpture is fine and indistinct, and con-

sist of series of fine punctures, and punctate interstices. The dense pubescence of the upper surface is blackish, but there is a patch of pale pubescence at the base of the elytra, and two very large patches on the first exposed dorsal segment, there are also a few pale hairs on the margin of the following segment, at the hind angle.

The male has a supplementary dorsal segment.

The species may be located in Murray's sub-gen. *Tasmus*, near the Australian *B. binotatus* and *B. blandus*; though it greatly resembles these species, it is very readily distinguished by the much shorter antennæ.

Sent from Tairua by Captain Broun, as No. 303.

EPURÆA ZEALANDICA, *n. sp.*

Latiuscula, testaceo-ferruginea, supra prothoracis disco elytrisque plus minusve infuscatis; crebrius evidenter punctata; prothoracis elytrorumque lateribus sat explanatis, his apice in utroque sexu rotundato.

Long. 3 mm., lat. $1\frac{5}{8}$ mm.

This species is intermediate in form between *E. deleta* and *E. limbata*, Er., and is about the size of the latter. The club of the antennæ is elongate. The labrum is elongate, but is deeply divided nearly to its base. The thorax is shaped much as in *E. deleta*, but the sides are more explanate, and the base on each side is more sinuate, the surface is uneven on account of some obsolete impressions.

Sent from Tairua by Captain Broun, as No. 239.

OBS.—This species is evidently variable in colour, it has not only the appearance of our European species of *Epuræa*, but I can detect no structural character whatever to distinguish it. The male is distinguished from the female by the broad front tarsi, and the additional minute apical segment. White's *Nitidula antarctica* is, I have no doubt, another species of *Epuræa*; I have specimens agreeing with his insufficient description; the species has the peculiarity that in the female the apices of the elytra are prolonged and acuminate.

SORONIA OPTATA, *n. sp.*

Oblonga, nigro-fusca, antennis, pedibus, prothoracis elytrorumque limbo rufescentibus, supra tomento obscuro, setisque dorsum curvatis vestita; elytris pone medium fascia undulata colore dilutiore. Long. vix 4 mm., lat. $1\frac{7}{8}$ mm.

This insect is rather long and narrow in form. The eyes are rather small, but very prominent; the thorax is much emarginate in front, nearly straight, and not undulate at the sides, the hind angles obliquely truncate; its surface is a little uneven, and its sculpture is quite concealed by the obscure tomentum and setæ which it bears. The elytra are clothed in a similar manner, so that their sculpture is also obscure.

The species cannot be confounded with *Soronia hystrix*, on account of its very different outline ; it has also the setæ of the upper surface very different, for, instead of being upright and very conspicuous as in that species, they are arched or bent down, so as to escape notice when only a superficial observation is made.

I have seen but one individual ; it was from Mr. Bakewell's collection, where it was merely labelled New Zealand.

BROUNIA THORACICA, *n. sp.*

Oblongo-ovalis, nigra, elytris purpureo-nigris, sat dense pubescens, minus nitida, tarsis fusco-testaceis ; thorace lateribus et parte anteriore deflexis et dense punctatis, disco inaequali minus punctato, margine basali crenato ; elytris crebre sat fortiter punctatis, versus suturam obsolete sulcatis.

Long. $5\frac{1}{2}$ mm., lat. 2 mm.

Antennæ rather long, the 1st and 2nd joints short and bead-like, 3rd larger and triangular, 4th shorter than 3rd, somewhat produced inwardly, 6th to 11th each produced inwardly into a long slender lobe, 5th joint intermediate in form between the 4th and 6th. Thorax with all the anterior and lateral parts depressed, so that their outer margins are not visible from above, these parts densely and coarsely punctured, the part which remains in the natural plane of the pronotum shining and but little punctured. Scutellum conspicuous, somewhat circular, impunctate ; elytra rather long, black, but with a distinct violet or purple tinge, shining, but pubescent, with some ill-defined longitudinal grooves towards the suture, and rather closely, but not coarsely, punctured. Under-surface densely punctured, and very densely and finely pubescent, except on the middle of the metasternum.

Captain Broun has sent me an individual of this species labelled *Drilus ? atrocaeruleus*; and informs me he has only been able to find two specimens. It is one of the most remarkable beetles yet discovered in New Zealand, and I give below its structural characters, so far as I can make them out from the very brittle and mutilated example before me. I have, with very great pleasure, named the insect in honour of its discoverer, whose energy and skill are doing so much to enable us to get a satisfactory knowledge of the important insect-fauna of New Zealand.

Anterior parts of the head atrophied, so that the antennæ appear inserted near one another on its front edge, eyes large and conspicuous ; antennæ 11-jointed, the basal joints small, those towards the extremity emitting an elongate lobe : beneath, the parts of the mouth seem small but exposed, and the apical joints of the labial and maxillary palpi rather large and subsecundiform. The prothorax is so formed that its anterior open part is placed on the under surface, and the head can be completely doubled in and concealed, all the parts of the head except the prominent trophi when doubled in fit the front opening, and to accommodate the trophi, there is a deep depression in the middle of the prosternum, which extends as far as the coxae.

The flanks or side-pieces of the thorax are rather largely developed, and their limits and sutures quite distinct; the prosternum is divided as above described, by a very deep fossa or depression in the middle, the piece on each side of this depressed middle part is rather large: the front coxae are moderately distant from one another, being separated by a depressed prosternal process, the form of the coxae themselves I cannot see, but their inner terminations are distinctly exserted. The mesosternum is exposed between the middle coxae, and is emarginate in front, so as to receive the prosternal process and (probably) render the prothorax almost immovable. The middle coxal cavities are moderately large, irregularly oval, with the slender part outwards, and the embedded coxae have a small trochantin visible. The metathorax is moderately long, its episterna are large, and almost parallel-sided; the epimera are minute and triangular, and can be seen at the extremities of the coxa and episternum. The hind coxae are nearly contiguous in the middle, and have a very short but broad upper lamina, which is, however, distinctly broader at its inner portion over the trochanteral articulation; there is a perpendicular lamina to which the femur and tibia can be closely applied when flexed, so as to be concealed. There are five rather large ventral segments, the basal one of which sends off a narrow process between the coxal laminae. The tarsi are all five-jointed, the 1st and 2nd joints are rather small, the 3rd is very small, but bears a large membranous lobe, extending forwards on the under-face of the foot, the 4th joint is very small, and might, without a careful examination, be supposed to be absent; the 5th joint is, without the claws, as long as the other four together, the claws are large and simple.

This extraordinary insect is one of the most interesting of the *Coleoptera*; it is undoubtedly allied to *Chelonarium*, though at first sight it has more the aspect of an Euenemid; it departs very widely from *Chelonarium* by the structure of the antennæ, which are similar to those of *Cerophytum elateroides*, except that the basal joint is much smaller. I see no other relationship except to *Chelonarium* and *Cerophytum*, and, in my opinion, it goes far to settle the position of the latter most remarkable insect, for *Cerophytum* is just intermediate between *Brounia* and the *Elateridæ* and *Euenemidæ*. To force any of these interesting insects into the ordinary families of *Coleoptera*, is to refuse to recognise them for what they really are—isolated anomalies, whose relationships, even *inter se*, are highly problematical.

PERICOPTUS STUPIDUS, n. sp.

Supra nigro-piceus, nitidus, subtus cum pedibus piceo-rufus, et (abdomine excepto) fulvo-hirsutus; prothorace transverso, elytris angustiore, impunctato; elytris obsolete punctatis, et vix perspicue sulcatis; pygidio utrinque parce punctato.

Long. 18–22 mm., lat. 11–12½ mm., alt. 8½–9½ mm.

Mas, prothorace in medio pone marginem anteriorem obsolete tuberculato, et in medio indeterminate depresso.

Fem., prothoracis tuberculo et depressione ægre distinguendibus.

Head rough over all the upper surface, on the middle indefinitely transversely

elevated, the clypeus much narrowed to the front, and the front edge, in the middle, a little reflexed, and obscurely emarginate : the form of this part does not differ in the sexes.

Several very mutilated individuals of this species were sent from Otago by Prof. Hutton ; I should fancy they were picked up dead.

OBS.—There are two very distinct forms placed in collections as *Pericoptus*, and though at first sight they appear very similar, I think they will probably ultimately form distinct genera. In the larger insect, which is generally called in collections *P. truncatus*, the anterior part of the head is flattened, and placed on a different plane to the hinder part, so that the front part forms a sort of disc, which is evidently the same in kind (though less in development) as that of *Temnorhynchus*. In the species I have here described as *P. stupidus*, the head departs but little from the *Pentodon* form. So far as I can judge from White's description of *Cheiroplatys punctatus*, I consider it will prove allied to *P. stupidus*.

CILIBE HUTTONI, n. sp.

Picea, antennis pedibusque rufis vel piceo-rufis; prothorace nitido, crebrius minus fortiter (disco parcus et subtiliter) punctato, lateribus rotundatis, basin versus angustatis, ad angulos posteriores acutos haud explanatis; elytris subopacis, crebrius irregulariter punctatis, longitudinaliter subsulcatis.

Long. 10—12 mm., lat. 5—6 mm.

The antennæ are short, and are reddish in colour, with the 3rd and one or two following joints generally more obscure, the 9th and 10th joints are decidedly shorter than broad ; the thorax is strongly transverse, with the sides rounded and the base a little sinuate on each side, so that the hind angles are decidedly acute.

The male at first sight seems to exactly resemble the female, but a careful examination shews some constant, though inconspicuous, characters to distinguish it ; the front tibiæ along their inner and hinder edge bear a dense very short pubescence ; the intermediate tibiæ are clothed in a similar but more conspicuous manner, and are not at all incurved at their extremity.

The species can only be confounded with the variable *C. elongata*, but it is undoubtedly distinct. Mr. F. Bates, to whom we are indebted for the most of our knowledge of the species of this difficult genus, agrees with me on this point, and as he has been kind enough to point out the characters by which it differs *primo visu*, I quote here his remarks in a letter to me. He says : "on first looking at the *Cilibe*, I judged it to be *elongata* (the form *phosphugoides*, White) ; on com-

" parison, however, with a numerous series of that species, I find it to " be distinct. Your species has the prothorax relatively broader, dis- " tinely more rounded at the sides, and contracted at the base, the " punctuation at the sides more open, the elytra not opaque, and with " but very few of the small, shining, black granules which stud the " surface in *elongata*; the two costiform elevations down the middle of " each elytron are in your species obsolete."

This species is probably to be found in numbers in the province of Otago; a series of good specimens sent by Prof. Hutton from there shew but little variation.

I may here remark that I am in hopes that the very difficult species of this genus may be elucidated by examination of the characters distinctive of the sexes; I feel pretty sure that more than one true species is at present called "*elongata*," although the examples before me do not enable me to settle the point.

(To be concluded in our next).

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY H. GOSS, F.L.S., F.G.S.

No. 2.

[*The comparative age of the existing Orders of Insects, and the sequence in which they appeared on the Geological Horizon.*]

Primary or Palaeozoic Period.

Up to the present time no traces of insects have been met with in the most ancient fossiliferous rocks. The oldest organic remains,* belonging to one of the lowest† classes of the animal kingdom, were discovered by Sir Wm. Logan, in 1859, in the Laurentian rocks of Canada.

The Cambrian rocks contain remains of *Hydrozoa*, *Echinodermata*, *Mollusca*, and *Crustacea* of the lower grades. From the Silurian rocks, in addition to remains of animals of the classes before-named, the oldest known Vertebrates have been obtained, consisting of ganoid and placoid fishes.

The earliest traces of insects at present known, were discovered in the upper portion of the next series—the Devonian or old red sandstone. They consisted of a few broken wings of *Neuroptera*, or

* The oldest known fossil has been named by Dr. Dawson *Eozoon canadense*. Sir Charles Lyell observes of it:—"It appears to have grown one layer over another, and to have formed 'reefs of limestone, as do the living coral-building polyp animals.'

† *Foraminifera*.

Pseudo-Neuroptera, allied to the *Ephemeræ*, and were obtained by Mr. C. F. Hartt, in certain plant-bearing shales (of Devonian age) near St. John's, New Brunswick.

Although these insects are the most ancient yet discovered, and "show * a remarkable union of characters now found in distinct 'Orders of insects,'" thus differing from any existing types, it is improbable that they represent the earliest forms of the class to which they belong. In all other classes of the animal kingdom with whose fossil remains we are acquainted, as well as in the vegetable kingdom, the simpler forms precede the more highly organized. There seems no reason for supposing that the *Insecta* formed any exception to this rule, and we may fairly assume that the earliest types of this class were likely to have been smaller in size, simpler in form, and even less specialized than these remarkable Neuropteroid insects of the upper Devonian period; and that they had probably existed for ages before that epoch, as had representatives of the *Crustacea*, the *Mollusca*, and even the *Vertebrata*.†

Reasoning from the analogy which one may assume to exist between the *Insecta* and other classes of the animal kingdom in progressive development, it seems not unlikely that further researches in earlier Devonian strata, and possibly in rocks of even greater age, may bring to light still more ancient forms of insect life, as different from those of the present day, as are the fishes of Devonian‡ age from existing Orders.

I will now pass on to the insects of the carboniferous period, the next in the ascending order of Geological succession to the Devonian.

No insects have been found in the carboniferous or mountain limestone, but from the coal measures of Gt. Britain, Belgium, Germany, and America, a considerable number have been obtained, including nearly ninety species.

With the exception of two species of *Coleoptera* and three species of *Hemiptera*, these insects have all been referred to the *Neuroptera*§ and *Orthoptera*.

The *Neuroptera* comprise *Termes*, *Dietyoneura*, *Miamia*, *Hemeristia*, *Ephemerites*, &c., and the *Orthoptera* include *Locustidæ*, *Mantidæ*, *Phasmidæ*, and a great number of *Blattidæ*, which family appears to

* Dr. Dawson, in the Geological Magazine for September, 1867.

† The oldest known type of fishes (and of Vertebrates) is described by J. W. Salter, F.G.S., in the Annals and Mag. of Nat. Hist., vol. iv, 1859.

‡ Hugh Miller alludes to these Devonian fishes as:—"creatures whose very type is lost—fantastic and uncouth—and which puzzle the Naturalist to assign them even their class."—The Old Red Sandstone, 2nd edit., 1842.

§ About five of these have, with the Devonian insects, been placed by Dr. Goldenberg in his extinct Order *Palaeodictyoptera*.

have been more numerously represented, and more generally distributed than any other at this period ; the three *Hemiptera* have been referred to the *Fulgoridæ*.

As has been stated, a considerable number of insects have been discovered in the coal measures ; but, until quite recently, only *one* insect had been obtained from the comparatively more modern Permian strata. This insect, according to Dr. Dohrn*, possessed characters intermediate between those of the *Hemiptera* and *Neuroptera*, and was apparently related genetically to the two Orders : it was placed by Dr. Dohrn in an extinct Order, *Dictyoptera*, and has since been included by Dr. Goldenberg in his Order *Palaeodictyoptera*.

Since this remarkable insect was described by Dr. Dohrn, a few *Blattidæ* have been obtained from Permian strata in Saxony, and have been described by Dr. Geinitz and Dr. Goldenberg.

With the Permian rocks we reach the close of the Primary or Palaeozoic Period, and pass into the Secondary Period.

Secondary Period.

In the oldest formation of this epoch—the Trias—remains of insects are extremely rare, and up to the present time only five specimens have been recorded from it, viz.: two *Neuroptera*† and three *Coleoptera*.‡ ‡

In the Lias, remains of insects have been obtained in great quantities. The Orders represented being the *Neuroptera*, *Orthoptera*, *Coleoptera*, and *Hemiptera*.

One wing of an apparently Hymenopterous insect has been recorded by Dr. Heer, from the Lias of Sehambelen in the Swiss Alps, but as no remains of insects of this Order have been obtained elsewhere from strata of this period—even in those localities in which insect remains have been found in abundance,—it is probable that the supposed Hymenopterous wing was that of an insect of another Order.

In the Liassic rocks the *Coleoptera* are far better represented than any other Order : no less than 116§ species having been determined from the Swiss Lias, and 29 from British strata of this age ; and from this remote period down to the present time the *Coleoptera* appear to have been a dominant Order. It must be remembered, however, that

* “ *Palaeontographica*, ” 1866, Bd. xiii, p. 333, and *op. cit.*, 1869, Bd. xvi, p. 129.

† “ *Die Urwelt der Schweiz*, ” by Prof. Oswald Heer, 1865 ; and an English translation of the same by W. S. Dallas, edited by J. Heywood ; London, 1876.

‡ *Vierteljahrsschrift der naturforschenden Gesellschaft in Zürich*. *Viertes Heft*, p. 297.

§ See “ *Die Urwelt der Schweiz*, ” &c., *ante cit.*

from the indestructible nature of their elytra, insects belonging to this Order are likely to have been preserved in far greater numbers, and under much less favourable circumstances, than insects of other co-existing Orders, and may thus appear to have been comparatively more abundant than they really were.

Next to the Lias, in ascending order, follows the Oolite, in the lower division of which is included the Stonesfield slate of England. In this formation (Stonesfield slate) a few insects have been obtained, chiefly *Coleoptera*, and two or three large species of *Neuroptera*, as well as two *supposed* specimens of *Lepidoptera*, one of which has been described and figured by Mr. A. G. Butler* as *Palaeontina oolitica*.

Mr. Scudder, after an examination of this fossil (*P. oolitica*), was of opinion that it belonged to the *Homoptera* and not to the *Lepidoptera*. Space does not here permit me to enter into any discussion on the subject; but as we have no evidence of the existence of true flowers at this period, and as the *Lepidoptera* could not have existed without them, there appears to be a considerable amount of probability in favour of the correctness of Mr. Scudder's opinion as to the insect not being Lepidopterous, but its location among the *Homoptera* by no means finds favour in the eyes of Entomologists.

From the Solenhofen slate of Bavaria and the Purbecks of this country, both belonging to the Upper Oolite—in addition to *Neuroptera*, *Orthoptera*, *Coleoptera*, and *Hemiptera*,—we have the earliest traces of *Diptera*, five of which are recorded from the first-named formation and seventeen from the latter. One specimen of *Hymenoptera* is also recorded from the Solenhofen slate, and two from the Dorset Purbecks.

In the Cretaceous rocks so few traces of insects have been met with, that it is unnecessary here to allude to them.

Tertiary Period.

We now pass into the Tertiary Period in which the *Hymenoptera* first became abundant and generally distributed, and during which the *Lepidoptera*, in all probability, first appeared; at any rate, it is only in strata of this age that remains of *undoubted* specimens of the last named Order have been obtained.

The occurrence of the *Lepidoptera*, and of the Bees amongst the *Hymenoptera*, at this period, is quite consistent with the then state of

* "Lepidoptera Exotica," pp. 126–128; and the "Geological Magazine" for October, 1874.

development of the vegetable kingdom, and as true flowers then began to be abundant, it is likely that flower-feeding insects should have simultaneously appeared.

In the oldest strata (Lower Eocene) of this period, but few insects have been detected ; but, in the Middle and Upper Eocene, and the Lower, Middle and Upper Miocene, their remains have, in certain localities, been found in great numbers, and represent all the existing Orders.

As a rule, and possibly to some extent for the reasons before given, the *Coleoptera* are better represented than any other Order ; this is especially noticeable at Oeningen, in the Valley of the Rhine, where, out of 844 species of fossil insects distributed among all the existing Orders, 518 have been referred by Heer to this Order. In some localities, however, the *Hymenoptera** are more numerous than any other insects ; and in others the *Diptera*† are in a large majority.

In every case the *Lepidoptera* is by far the rarest Order, and of the butterflies only ten well authenticated species have been obtained from all the localities in which fossil insects have been discovered.

From the evidence at present obtained by Palaeontological researches, it appears that the *Neuroptera* is the oldest of the existing Orders ; that it was followed by the *Orthoptera*, and that these two Orders included almost all the insects of the Primary or Palaeozoic period, towards the close of which the *Coleoptera* and *Hemiptera* first appeared.

Early in the Secondary or Mesozoic period the two last named Orders began to be abundant and widely distributed, and somewhat later were followed by the *Diptera* and certain families of the *Hymenoptera*.

Towards the close of this period other families of the *Hymenoptera*, including the bees, appeared, and, about the same time, or early in the Tertiary epoch, succeeded the *Lepidoptera*.‡

In the next paper I shall call attention to the correlation of fossil insects with the fossilized remains of other animals, and with those of the vegetable kingdom.

Surrey Hill : 1st June, 1878.

* From Radoboj in Croatia, 85 species are enumerated by Heer.

† From Corent and Menat in Auvergne, 30 species are enumerated by M. Oustalet.

‡An insect discovered in 1875 in the Belgian coal fields, was for some time believed by Dr. Breyer and M. Preudhomme de Borre to belong to this Order ; but Mr. McLachlan, after an examination of the fossil, decided that it was that of a Neuropterous insect belonging to the *Ephemeroptera*.

NEW SPECIES OF GEODEPHAGOUS COLEOPTERA FROM NEW
ZEALAND.

BY H. W. BATES, F.L.S.

(Concluded from p. 28).

SCOPODES VERSICOLOR.

E majoribus. Suprà lâte sericeo-nitens, cupreus, interdum nigrescens; corpore subtus, antennis, palpis pedibusque chalybeo-nigris, antennis basi æneis: capite suprà minus regulariter et subtilius striguloso: thorace cordato, lateribus antice obtusissime angulatis, deinde leviter incurvatis, angulis posticis rotundatis, suprà subtiliter, irregulariter, transversim striguloso: elytris suprà vix undulatis, striis haud profundis cum foveis tribus parvis cyaneo-tinctis.

Long. 3 lin.

The eyes, though large, are much less prominent than in the typical species, and the neck, in consequence, appears less constricted. The labrum is richly metallic and punctured; the neck is vaguely rugulose-punctured, the rest of the surface of the head is covered with fine longitudinal strigæ, less sharp and less continuous than in many other species. The thorax appears, at first sight, rounded, but the reflexed margin at the dilated anterior part really forms an obtuse angle; from this the sides are sinuated, and the margin is gradually rounded off to the place where it ceases, a little before the true base. The elytra are long and ample in proportion to the anterior part of the body; the striæ are much less interrupted than usual, and shallow: they show but slight traces of punctuation, and, like the three small discoidal foveæ, are tinged with bluish-green. The species has a striking general resemblance to *Bembidia* of the section *Tachypus*.

Under stones. Otira Pass, S. Island, New Zealand (C. M. Wakefield). The *nigrino* variety appears to be rather common.

One example, from the West Coast, in Mr. Wakefield's collection, has a nearly smooth thoracic surface.

SCOPODES PRASINUS.

Suprà deplanatus, viridis, sub-opacus, antennis basi et tibiis rufo-testaceis: epistomate et labro alutaceis, collo et vertice subtiliter strigosis: thorace postice valde angustato, lateribus utrinque bidentatis, margine inter dentes biflexuoso, dorso alutaceo, transversim minus distincte striguloso: elytris suprà paulo inæqualibus, striis et foveis vix impressis, illis elongato-punctatis.

Long. 2 $\frac{3}{4}$ lin.

Differs from the allied species in the nearly uniform green colour of its upper surface, including labrum, outer side of the mandibles and femora; the colour on head and thorax is metallic, on elytra more olivaceous and duller. The usual strigæ of the thorax are finer, and more irregular and indistinct than usual, and the two lateral dentiform projections very prominent, the margin between them being biflexuous.

The elytra are ample, somewhat depressed and moderately unlevel; the striæ are shallow, and formed of elongate punctures, the usual foveæ are broad and shallow.

Powell. One example, in Mr. Wakefield's collection.

SCOPODES MULTIPUNCTATUS.

Suprà cupreus, minus nitidus, interdum infuscatus: antennis palpis pedibusque testaceis: capite grosse longitudinaliter striato; thorace angusto, lateribus utrinque bidentatis, suprà grosse striatis: elytris quadratis, planis, seriatim subgrosse punctatis, foveis tribus valde distinctis.

Long. 2 lin.

Readily distinguished from allied species by the distinctly bidentate sides of the thorax, and the rows of elytral punctures. The thoracic dentiform projections are placed, the anterior at the apex of the usual angular dilatation, the posterior just before the hind angles, the sides between the two being straight. The sculpture and appearance of the elytra are similar to those of the Queensland *S. aeneus* (McLeay); the striæ being not impressed, but marked by rows of large, mostly oblong punctures; there is scarcely any silky gloss, and the usual foveæ are small and sharply defined. The pale legs, antennæ, and palpi are slightly varied with fuscous, particularly at the extremities.

Auckland (Capt. Broun).

SCOPODES LEVIGATUS.

Angustior, niger, aeneo-tinctus, glaber; capite inter oculos angustiori, stria frontali utrinque unica: thorace breviter cordato, marginibus reflexis, haud angulatis, dorso fere lœvi; elytris ovatis, striispunctatis modice impressis vel obsoletis, foveis indistinctis; apice recte obtuse truncatis.

Long. 1 $\frac{3}{4}$ lin.

This interesting aberrant species of *Scopodes* is of narrower form than its allies; the head is also narrower, and the eyes, though very large, less projecting. The thorax is of rounded cordate outline, free from angularity, and the lateral rims, together with the dorsal and transverse lines, are very strongly marked. The elytra are less squared at the shoulders, and the apical truncature presents no trace of sinuation: the striæ of the surface differ in strength of impression, but the three foveæ are, in all the examples I have examined, inconspicuous. The legs, antennæ, and palpi are black.

West Coast, Southern Island (C. M. Wakefield).

Scopodes aterrimus, Bates, Ann. Mag. Nat. Hist., 1874, on account of the prior use of the name for an Australian species by Chaudoir, Bull. Mosc., 1872, may be renamed *S. Edwardsii*.

ON THE PUPATION OF THE NYMPHALIDÆ.

BY J. A. OSBORNE, M.D.

Last year I communicated to "Nature" (vol. xvi, pp. 502-3) a discovery of mine in regard to this matter; and as my explanation of the process is altogether at variance with the account given in Kirby and Spence, and other works of the kind, I expected that it would have called forth some reply. As I have no access to any books here but my own, I should not have been surprised to hear that my discovery had been anticipated, or was even a fact well known to entomologists, as it is by no means far to seek or difficult to verify.

In watching the transformations of *Vanessa urticæ*, I found that the chrysalis was attached to the old skin of the caterpillar by a membrane sufficiently strong and permanent to support the insect during the critical last moments of pupation, and fully explaining why it does not fall down when the tail of the chrysalis is withdrawn from the old skin and thrust up to be attached to the silk. I found the same membrane, only less perfect, in the common white butterfly, and I believe I have evidence of it also in some beetles. It is now the time when the matter can be easily investigated in *Vanessa* and its congeners of the *Suspensi*; and I would, therefore, request you to call attention to it in your magazine, or if the thing is already known, that you would kindly inform me of the fact. I have still some of the specimens prepared last year to show the membrane *in situ*, and will be happy to forward them for inspection, if required. I may say that I bought some books treating of the metamorphoses of insects, with the hope of clearing up this matter, but have hitherto failed to obtain any information on the subject.

Milford, Letterkenny :
24th June, 1878.

[We reprint below the letter to "Nature," referred to by our correspondent, and will be very glad to know if the very reasonable explanation advanced in support of his theory has been elsewhere referred to, and also to have the results of direct experiment by others. So far as we can discover, most of the published accounts are simply copied, or extracted, from Réaumur. That most original of British entomologists—George Newport—in the article "Insecta," in Todd's Cyclopaedia of Anatomy and Physiology, vol. ii, pp. 876, 877, gives a much detailed account of the method of pupation of *Vanessa urticæ*, but misses all mention of the critical moment when the tail of the chrysalis is withdrawn from the cast-off larval skin; and our valued

friend Mr. Buckler has apparently likewise not accounted for this critical moment in his description of the transformations of *Limenitis Sibylla*, published in this magazine, vol. iv, pp. 33-35.—EDS.]

[Last year (*Nature*, vol. xv, p. 7) I communicated the result of some experiments on the caterpillars of *Pieris brassicæ* from which it appeared that, when these are artificially converted from *Succincti* into *Suspensi* by cutting the loop before the exclusion of the chrysalis, a certain number (a third or fourth of the whole) succeed in attaching themselves to the silk by the hooks in the tail of the chrysalis in the manner of the true *Suspensi*. I have repeated the experiment this year with a like result, and I have also had the satisfaction of witnessing the process of successful exclusion, and comparing it with that of the chrysalis of *Vanessa urticae*. The method is essentially the same, except that the rapid and assured precision with which the *Vanessa* chrysalis thrusts up its tail and lays hold upon the silk, is replaced in *Pieris* by long and laborious efforts, as if the tail were just a little too short to reach the silk.

I have likewise made similar experiments with another of the *Succincti*—*Anthocharis cardamines*—with the following results:—In seven instances I cut the loop (and sometimes a second one) which the caterpillar had spun; and in all the chrysalis was excluded without falling down; but in no case was the tail of the chrysalis withdrawn from the pocket of the old caterpillar-skin, so that its suspension is directly from the latter. In eleven cases in which I did not interfere, only two chrysalids were excluded in the normal way, *i. e.*, vertically, with the head up, a girdle round the insect and the chrysalis-tail withdrawn from the old skin and attached immediately to the silk on the stem of the plant. In three other cases in which a loop was spun by the caterpillar, the chrysalis seems to have turned upside-down during exclusion, the tail being now uppermost, the *loop twisted*, and the hooks fastened in loose silk upon the plant-stem. Six caterpillars either spun no loop at all or one so insufficient that they became *Suspensi* of themselves before exclusion began, and where all but one (which fell down) successfully excluded in this position—the tail of the chrysalis, however, being still retained within the pocket of the old skin.

The most interesting and curious point in the transformation of a caterpillar of the *Suspensi* is the manner in which the newly-excluded chrysalis is kept from falling, while its hook-furnished tail is being withdrawn from the old skin of the caterpillar and made fast in the cone of silk to which the latter was attached. I am ignorant whether any other explanation of this process has been given than that, I believe, originally communicated by Réaumur and detailed in Kirby and Spence, vol. iii, pp. 208, 209, and repeated in such recent works as Figuier's "Insect World," from the English edition of which work by Prof. P. Martin Dunean (1872), p. 148, I quote the following account of the pupation of *Vanessa urticae*:—"But here comes the culminating point, the most difficult part of the operation. The chrysalis, which is shorter than the caterpillar, is at some distance from the silky network to which it must fix itself; it is only supported by that extremity of the caterpillar's skin which had not been split open. It has neither legs nor arms, and yet it must free itself from this remaining part of the skin, and reach the threads to which it is to suspend itself. The supple and contractile segments of the chrysalis serve for the limbs

which are wanting to it. Between two of these segments, as with a pair of pincers, the insect seizes a portion of the folded skin, and with such a firm hold that it is able to support the whole of its body on it. It now curves the hinder parts slightly, and draws its tail entirely out of the sheath in which it was enclosed," &c. (The italics are mine.) How this can be conceived possible, considering the utterly soft condition of the newly-excluded pupa, and that the caterpillar skin is now "reduced to a packet so small that it covers only the end of the tail of the chrysalis" (*loc. cit.*), in which, moreover, there are no longer any free segments, I cannot understand. On the other hand, it is very easy to show that the last and sufficient bond of connection between the chrysalis and the old larva-skin is *a membrane extending from the lining of the latter to the anterior horns of the two lateral ridges bounding the anal area of the chrysalis*. I have prepared several specimens showing this membrane still intact, and should be happy to forward one or two, if required, for inspection. I find it in all three species of butterfly mentioned above, and I believe it is to the persistence of it unbroken that is owing the continued suspension of my chrysalides of *Anthocharis*. I have tested its strength to sustain the weight of the chrysalis, and the time during which it resists desiccation and the writhings of the insect, the obvious object of which is, not to get rid of the old caterpillar-skin, but to rupture this membrane after the chrysalis has made good its tail-attachment to the silk.

J. A. OSBORNE.

Milford, Letterkenny.]

DESCRIPTION OF THE LARVA OF *CIDARIA RETICULATA*.

BY WILLIAM BUCKLER.

For some years Mr. J. B. Hodgkinson of Preston has endeavoured to find the larva of this rare and local species, until at length, in August, 1876, success attended his efforts, and, in 1877, he again found the larva, and was lucky enough, during the summer, to prove the identity of those found the year before, by breeding a specimen of the moth, as recorded by him in this Magazine, vol. xiv, p. 67. In both years Mr. Hodgkinson sent me a couple of larvæ and occasional supplies of the food plant, though, from an unlucky accident during winter, I was unable to produce an imago from the first larvæ, but have now been able to breed a specimen on the 9th of this present July. Mr. Hodgkinson's experience is somewhat different, as he tells me he has bred only ten out of quite a hundred larvæ.

With this species there are more than usual difficulties to contend with in rearing the larvæ at any great distance from the growing food plant, *Impatiens noli-me-tangere*, a native of woods bordering Windermere; for this plant, when gathered, is quite unsuitable for transporting

far, because if the least exposed to air it rapidly shrivels up, or when confined in a tin just as rapidly turns mouldy ; although the larva will, when pressed by hunger, feed on flowers and tender leaves of the common garden balsam, yet it will not thrive unless it has occasionally some of its natural food plant, the seed vessels of which it eats out apparently in preference, though it also will eat the leaves if they are in good condition.

The habit of the larva, like that of many other Geometers, is to be perfectly quiescent on the stem of the plant all day, looking rather shorter and stouter than when it wakes up at sunset, and feeds, and continues to do so at intervals throughout the night, for then it stretches itself to the full extent as a very active looper, lively enough.

When half-an-inch long, the young larva is very slender, and often rests on a stem with its head and next two segments bent backwards, and anterior legs extended free ; its colour at this stage is a tender yellowish-green, more or less tinged with faint brownish-pink, and with whitish sub-dorsal lines : after moulting, and during further growth, its semi-transparent skin indicates very well, day by day, on what it has nourished itself from one night to another, whether on the flowers or on the leaves of the substituted food of balsam, for at one time the body beyond the thoracic segments would be light bluish-green, at another time pinkish-green or much suffused with deep pink, and whenever it could return to its natural food would become of a more subdued tint of uniform yellowish-greenish.

When full fed and about to change, it contracts in length a little, and appears stouter while it loses its lively colouring, grows torpid, holds on to any object occasionally with the anterior legs only, and elevates the hinder legs a little, quite free : this curious posture I observed with the first two larvæ of 1876, when the leaves of balsam were removed, and only a mixture of peat earth and leafy mould remained in their cage, and by the next morning (Sept. 24th) both had buried themselves. But in the case of the two larvæ I received on the 12th October, 1877 (one much smaller than the other), I saw in the evening of the 15th the largest had crept between two leaves of the balsam, and a few reticulated silk threads could just be detected around it, and by the 19th it had evidently made up, as the leaves then withering had become closely twisted together in somewhat of a cylindrical form : at this time the smaller larva, which previously had fed fairly well, appeared to be dead or dying, but on placing it in the sun for a few minutes, it revived and seemed lively, but the next

morning I saw it had not fed and was again torpid, and, greatly to my surprise, already showed signs of contraction for pupation as it lay under a small bit of moss, although its previous length had not exceeded five-eighths of an inch, and there on the surface of the earth it became a naked pupa on the 29th, and, by the end of November, had died and shrivelled up.

The full grown larva measures seven-eighths of an inch in length, and is of a slender proportion, stoutest at the 9th and 10th segments, from whence it tapers gradually forward, though most from the 3rd segment to the head, which is very small and narrow, with the mouth extended in front; it tapers also just a little towards the anal extremity: the 2nd segment rather short, the others moderately well defined and tolerably plump, with the usual transverse wrinkles of the genus just visible: the colour of the head is very pale watery-greenish, with a fleshy tinge, the thoracic segments (generally paler than the rest of the body) are of a light warm pinkish yellow-green, and sometimes the three or four hinder segments are similar, while those of the middle of the body are deeper coloured, of rather stronger green inclining a little to slaty or pinkish, or else much the same pinkish yellow-green throughout, the sides often deeply tinged with pink: conspicuous on either side of the back is a whitish or faint yellowish-white opaque sub-dorsal stripe, the dorsal vessel of brownish-red continuous on the thoracic segments shows obscurely through the skin of the back as though deep below it, in some parts pulsating between whitish threads, but at the segmental divisions is strongly and clearly marked on the skin as a spear point, or thick elongate spot of dark red, often prolonged on one or two of the hinder segments: the anterior margin of the anal legs is pale primrose-yellow, very fine brown trapezoidal dots are sometimes noticeable on the back; on the belly a central yellowish stripe; the small flesh-coloured spiracles are situated on the fine tracheal whitish thread which shows distinctly through the clear skin, this assimilates well with the internal pale fibres which show through the stem of its food plant.

The pupa is about seven-sixteenths of an inch in length, of a plump figure, the wing covers rather prominently developed, their rays distinct, the abdomen convexly tapering to a pointed tip, which is furnished with two small converging spines, the surface has a fine punctate roughness, and the colour is light ochreous-brown, rather shining.

DESCRIPTIONS OF TWO NEW SPECIES OF *TRICHOPTERYX*, AND
RECORD OF THE CAPTURE OF *T. VOLANS* IN BRITAIN.

BY THE REV. A. MATTHEWS, M.A.

A short time ago, I received from Mr. Champion a series of *Trichopterygia* for examination, of which the greater part had been taken by himself in Scotland. This series, although by no means extensive, contained more rare species than I ever saw before in such close contact. Besides examples of *T. longula*, *T. picicornis*, and other good species, I found three specimens of *T. volans*. This insect had previously been found by Col. Motschulsky alone, and though I have for a long time expected to meet with it in this country, I have hitherto searched for it in vain. But *T. volans* was not the most important or interesting member of the group, for it contained seven examples of a distinct and pretty species hitherto undescribed; this I now propose to name after its discoverer, whose perseverance and success in the pursuit of the *Trichopterygia* well deserve to be recorded in their nomenclature. The position of this species in the British list will be between *T. attenuata* and *T. fascicularis*; *T. volans* must be placed immediately after *T. sericans*.

While comparing Mr. Champion's specimens of *T. volans* with others of the same genus reserved in my own cabinet for future examination, I resolved to describe one species, which I am fully persuaded is truly distinct. It has always been my habit to put by specimens which would not coincide with known species for future examination, labelled "n.s.?" Thus I have many whose specific value has not been determined by the subsequent capture of other similar specimens; they may possibly be only varieties, at any rate, I do not choose to publish them as distinct species without further corroborative evidence. But in the case of this species, no such uncertainty exists, since three examples have occurred precisely similar to each other: they may be readily distinguished from their congeners by the outline of the thorax, of which the posterior angles are enlarged in the peculiar curve of the bill of the Puffin, *Fratercula arctica*. This species must be placed next in succession to *T. grandicollis*.

TRICHOPTERYX CHAMPIONIS, *n. sp.*

Angusta, elongata, convexa, obscure-castanea, nitida, pilis fulvis paree vestita; capite parvo fronte rotundato, oculis parvis haud prominentibus; pronoto modico ad basin latissimo, lateribus leviter rotundatis, tuberculis minutis ordinibus sinuatibus indistinctis dispositis, interstitiisque nitidis, leviter reticulatis, ornato, angulis posterioribus elongatis; elytris brevibus valde attenuatis, pronoto parum angustioribus,

ordinibus transversis sinuatis leviter asperatis; abdomine longe exerto obtuso; pedibus atque antennis longis luteis flavis. L. c. $\frac{7}{16}$ lin., = .87 mm.

Head rather small, indistinctly tuberculated; eyes small, not prominent; antennæ large, bright yellow. Thorax moderate, very convex, longer and broader than the head, widest at the base, with the sides rounded and strongly margined, covered with very small tubercles in indistinct wavy rows, with the interstices very shining and faintly reticulated, posterior margin areuated, with the angles much produced, the margin and angles yellow. Scutellum very large, rather deeply asperate. Elytra very convex, narrow, and much attenuated posteriorly, about as long but narrower than the head and thorax, faintly asperate in transverse wavy rows, with the apex slightly rounded and pale. Abdomen obtuse, very much exserted, with five segments uncovered, the terminal segment minutely tridentate. Legs moderate, bright yellow. Under-parts dark castaneous, with the edges of the segments paler.

Seven examples of this distinct and pretty species, which may be known by its narrow form and castaneous tint, were in the collection of Mr. Champion. They were found some years ago in Wicken Fen, near Cambridge.

TRICHOPTERYX FRATERCULA, n. sp.

Sat brevis, lata, nigra, nitida, pilis brevibus fulvis vestita, capite sat magno et lato; pronoto modico, postice valde dilatato, ante basim latissimo, angulis posterioribus latis, apicibus parum contractis, tuberculis minutis, distantibus, ordinibus sinuatis, remotis dispositis, intersticiis profunde et confertissime reticulatis, sive alutaceis, ornato; elytris sat brevibus, capite atque pronoto angustioribus, fere pariter longis, ordinibus sinuatis, remotis, sat leviter asperatis, apicibus latis dilutioribus; pedibus luteis flavis; antennis totis nigris. L. e. $\frac{6-7}{16}$ lin., = .75—.87 mm.

Head large, broad in front, covered with minute remote tubercles in nearly straight rows, with the interstices shining and reticulate; eyes large and rather prominent; antennæ rather short, pitchy-black; palpi black. Thorax large, longer and much wider than the head, very convex, widest before the base, with the sides rounded and broadly margined; the upper surface closely reticulated, or alutaceous, with minute remote tubercles arranged in distant wavy rows, the posterior margin faintly sinuated, with the angles broad, much produced, and dilated on their exterior edge, somewhat in the shape of the bill of the Puffin, *Fratercula arctica*. Scutellum large, triangular, deeply asperate in transverse rows. Elytra short, slightly attenuated posteriorly, about as long as but narrower than the head and thorax, moderately asperate in rather distant transverse rows, with the apices broad and rounded, yellow, with the extreme edge white. Abdomen considerably exserted, broad, with the apex obtuse, faintly tridentate. Legs rather short, robust, yellow, with the femora dusky. Under-parts entirely black.

This species may be distinguished from others by the enlarged and peculiarly curved posterior angles of the thorax, and also by the superficial sculpture of the same part. In the British list it must be placed after *T. grandicollis*, although several exotic species would intervene. Three specimens were found by myself near Gumley.

REMARKS ON SOME BRITISH HEMIPTERA-HETEROPTERA.

BY DR. O. M. REUTER.

(Continued from Vol. xiv, page 245).

GLOBICEPS FULVIPES (Saund., Synops., ii, p. 279, 2). Concerning *G. fulvipes*, Scop., Mr. Saunders says, *l. c.*, "A very doubtful species," and he describes it only by the following lines: "Extremely like the preceding (*flavomaculatus*), but smaller, and with the basal spot of the elytra truncate posteriorly, and not produced along the lateral margin." I, however, think that *G. fulvipes* is a very good species, and perfectly different from *G. flavomaculatus*. The latter lives not uncommonly among grass, and especially on nettles, &c.; but *fulvipes* is a scarcer species, exclusively occurring on small *Salices*, especially on *S. repens* and *rosmarinifolia*, and also on *Betula nana*. Moreover, the larva and nymph of the two species have a different colour, and are more dissimilar than the imagines (*vide* Revisio crit. Capsin., pp. 118, 119). The following characters are sufficient to separate *fulvipes* from *flavomaculatus*:

MALE.

G. FULVIPES.

Vertex not convex, its margin in the whole width carinate, the carina straight; on each eye a distinct foveola. Pronotum wider, with the calli less distinct and scarcely convex. Corium with a small basal spot.

FEMALE.

G. FULVIPES.

Head from the side with the vertex scarcely raised above the eyes. Pronotum with low calli. Corium with the spot below the base truncate posteriorly.

G. FLAVOMACULATUS.

Vertex convex, its margin only in the middle with a transverse, short, curved carina. Pronotum narrower, with the calli distinct and convex. Corium with a larger spot below the base.

G. FLAVOMACULATUS.

Head very globose; from the side with the vertex very convex and highly raised above the eyes. Pronotum with convex calli. Corium with the basal spot produced along the lateral margin.

MACROCOLEUS SORDIDUS (Cat., 38, 4), and *ONCOTYLUS PUNCTIPES* (Cat., 38, 2). Mr. Douglas has kindly communicated a specimen of his *M. sordidus* (Ent. Mo. Mag., iv, 49), and also of his *Oncotylus tanaceti*, in Brit. Hem., i, 394, 2, which latter in the Catalogue is further erroneously named *O. punctipes*. Examining these specimens I have found that both are only the ♀ of *Tinicephalus hortulanus*, Mey., a species not cited in the Catalogue of Messrs. Douglas and Scott, but described by Mr. Saunders as *Macrocoleus hortulanus* (Synops., p. 296). I can therefore confirm the synonymy given by

this last author (*l. c.*). The true *Capsus sordidus*, Kirschb., is == *Macrocoleus tanaceti*, Fall., Reut., Saund., nec Fieb., nec Doug. and Scott. *Oncotylus punctipes*, Reut. (= *O. tanaceti*, H.-Sch., Fieb., nec Fall., nec Doug. and Sc.) is very different from the species with the same name in the Catalogue of Douglas and Scott; the former is a true *Oncotylus*, and not found in Britain.

PSALLUS. To my mind, and also according to Mr. Saunders, *P. alni* and *P. sanguineus* (Cat., 41, 2 and 3) are only varieties of one species (*vide* Rev. crit. Capsin., p. 176). *P. distinctus* (Cat., 41, 9) is likewise a variety of *P. varians* (Cat., 41, 8). I have seen perfectly different coloured varieties of *P. diminutus*, representing a different species, as well as *P. distinctus*.

NEOCORIS SCOTTI (Cat., 42, 2) is only a variety of *N. nigrifulus*, Zett., as cited by Mr. Saunders (Synops., 301, 6). I have found it in Finland *in copula* with the typically coloured form.

CAPSUS CAPILLARIS (Cat., 43, 1). This is the sole Scandinavian species which can be regarded as *Cimex laniarius* of the *Systema Naturae*, 726, 75 (described from Sweden). The diagnosis of Linné accords very well with the var. *danicus*, Fabr.

CAMPTOBROCHIS PUNCTULATUS (Cat., 44, 1). The British species of *Camptobrochis* is not *punctulatus* of Fallén, but *lutescens*, Schill. (= *punctulatus*, Fieb., nec Fall.), a species not yet found in Sweden. I have examined several specimens communicated by Mr. Saunders. The *C. punctulatus*, Fall., H.-Sch., Reut., Saund., is == *C. Falleni*, Fieb., erroneously cited by Messrs. Douglas and Scott as synonymous with their species.

(*To be continued*).

***Psylla rhamnicola* bred : description of the nymph.**—Towards the end of last month I paid a visit to Purley Downs for the purpose, if possible, of learning something about the earlier stages of the above-named species. The large tree of *Rhamnus catharticus* which grows in the valley, well known, I daresay, to many entomologists, and where I took the original specimens of *P. rhamnicola*, was the first to which I directed my steps, and after examining the leaves for some little time, I observed first one and then another small creature running about upon them. I at once took out my pocket-lens, and discovered they were the nymphs of some species of *Psylla*. I then set to work to beat the branches into my sweeping net, and in a short time had the satisfaction of collecting into a tin box a goodly number of these individuals. On reaching home I turned them out into a wide-mouthed stoppered bottle, into

which I had put several of the leaves of the tree, and within two days thereafter I was delighted to find that some of them had already attained the perfect state. On their first entrance into this state both males and females are entirely green, but within a few hours afterwards the head and thorax begin to assume a reddish tinge, and the short dark streak on the dorsal margin of the elytra, adjoining the apex of the clavus, becomes more conspicuous. Several times afterwards I observed a male and female sitting with their heads towards each other, and at such a distance that the apices of the antennae just touched ; these they moved slowly up and down, but whether this motion meant anything I had not an opportunity of determining. On what part of the leaf the eggs are deposited, and what peculiarity the leaf assumes, I am still ignorant ; these are matters for future investigation. Now for a brief description of the nymph.

The entire creature pale lively green, except the cases containing the elytra, which are pale buff coloured. *Head* angulate in front, and with a stout central longitudinal keel. *Eyes* dark reddish-brown. *Antennæ* pale, the joints indistinctly dark at the apex, except the two terminal ones which are black. *Thorax* pale lively green. *Elytra-cases* pale buff, with the rudiments of the neuration visible upon them. *Legs* pale green. *Abdomen* pale lively green, somewhat oval, flattish-convex, round the apex some eight or nine short, stout, dark brown hairs. Length, nearly one-eighth of an inch.—JOHN SCOTT, 1, St. Mildred's Terrace, Lee : 8th July, 1878.

The Natural History of Psylla succineta.—In the “Sitzungsberichte der k. Akademie der Wissenschaften : Mathematisch-Naturwissenschaftliche Classe,” xviii Band, 1855, Dr. Ernst Heeger described, as new, *Psylla succineta*, and as (except in Dr. Puton’s “Catalogue des Hémiptères,” where it is enumerated among the species marked “?”) I am not aware that it has since been noticed, I have thought it desirable again to mention it, and to this end transcribe its natural history. The food-plant has long been naturalized in Britain, and it is not improbable that the insect, which seems capable of withstanding considerable hardship, may have been introduced with the rue and be also naturalized with us. At any rate, the account is interesting.

“I found this pretty diminutive creature several times on *Ruta graveolens*, and, without imagining that it was undescribed and only little known, I endeavoured, during the past year, to observe it both in the garden and in the house, and for this purpose I brought several pairs into my room, where they multiplied so much that at the end of the autumn the plant which I had given them to feed on was reduced to a ruinous condition. I left plant and insects in the window of the unheated room for observation after winter was over, and in April following I placed a fresh plant close by, which in a few days was stocked with both larvæ and perfect insects of the *Psylla*.

“The newly developed insects couple in the day-time, and in warm weather remain together for several hours ; they always live for several days afterwards, but the males die before the females. The fecundated female, in 4 or 5 days, lays her eggs in the day-time, singly, and by preference on the edges of the leaves, and when these are all occupied, then on the leaf-stalk and green twigs.

“After from 8 to 14 days the wingless larvæ appear ; and, sucking a leaf-stalk or young twig, remain stationary up to the time of their first moult, which occurs in from 9 to 12 days, after which they leave their place, having already obtained rudi-

ments of wings ; then, after similar periods, follow the second and third moults, and generally after the last they do not move. They have already attained proportionately large wing-cases, and in the same skin the transformation to the nymph and the development of the perfect insect in a like space of time takes place ; so that about the middle of June the second generation begins.

"A female in 5 or 6 days lays 30 or 40 eggs, and by the irregular development of larvae therefrom it happens that in August an extraordinary number of insects, in all stages of existence, are present on a plant, and ruin it. After the second moult the larvae exude the downy bluish mass, with which an overloaded plant is often entirely covered."

Then follow the description of the egg, larva, and imago in long detail, illustrated by figures. The size of the perfect insect is not given, but it has the body of vermillion colour, the wings cloudy, with pale brown markings, the antennæ yellow with the joints anteriorly black-brown. The head, which posteriorly is but little narrower than the pronotum, has on the face and posterior part two light yellow dots; the eyes are dark violet, and the legs are almost sulphur-yellow. If any one should find such a creature on the rue it may presumably be *Psylla succincta*, and in such a case I should be happy to determine if it be the species.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham : 18th June, 1878.

Phylloxera in Scotland.—Dr. Masters recently sent me a small vine-leaf (from a hot-house in Scotland), which, although scarcely 1½ inch across, has on it about 35 well-marked *Phylloxera*-galls. I have the best of reasons for believing that this pest is proving as destructive in some hot-houses in Britain as it is to the vines of the south of France, &c., grown in the open.—R. McLACHLAN, Lewisham : 16th July, 1878.

Singular habit of Chrysocorys festaliella.—I was much startled yesterday with the information that this insect uses its hind-legs much in the same way that *Stathmopoda pedella* and *S. Guerini* use theirs'. Sir Thomas Moncreiffe had had a specimen in a glass-topped box and had watched its movements with great interest for a considerable time. It would rest with its hind-legs stuck out, and then suddenly jerking down its right leg would make a demi-pirouette to the left ; then down would come the left leg and the right being lifted up again, there ensued a demi-pirouette to the right, or it would put down both legs simultaneously and be propelled straight forward. The motions of a *Stathmopoda* are very leisurely, but a *Chrysocorys* is a far more sprightly insect, and the motions are accordingly far more energetic.

The wonder seems to be that such a habit should never have been observed before. Perhaps, but for the existence of glass-topped boxes now-a-days, the habit would still have escaped observation.—H. T. STANTON, Lewisham : July, 1878.

Food-plant of Elachista stabilella.—The grass this species feeds on is *Aira caespitosa* ; it was so stunted and small when I first found it, on the chalk in the spring, that I did not recognise it. The mined tips of the leaves become yellow, exactly resembling the ordinary decay of the leaf.

The insect seems to me one of the commonest *Elachistæ* round here, and to be out all the season. I find that I have two specimens caught on the limestone near Doncaster.—W. WARREN, 51, Bridge Street, Cambridge : July 9th, 1878.

Micro-Lepidoptera in Australia.—Our collecting season is now almost closed (although insects are really to be found all the year round in this climate), and it may, therefore, interest some if I record the progress Micro-Lepidopterology has already made in Australia.

I landed in December, the heat of summer, and have, therefore, only had half a year's collecting; and as I have been prostrated during the last two months by an attack of low fever, I had only three months of actual collecting; but I venture to assert that in the matter of *Micro-Lepidoptera* Australia stands pre-eminent among the nations of the earth. Other groups of *Lepidoptera* are, I think, scarcer than in England; but in favourable localities Micros swarm to a degree which I have never seen equalled, except once on a July evening in the Engadine Valley. During these three months, from December to March, I collected 450 species (not including *Pyrales*), and have received about 200 others from correspondents, 650 in all. In the collections of residents, consisting (as regards Micros) solely of the larger species, I have seen some 500 or 600 more; and it is a significant fact that in these collections hardly one-tenth of the species, although all taken round Sydney, were identical with mine. I should observe that, the soil being very sterile, the aboriginal bush immediately surrounds the city, and the extent of ground to be explored is therefore considerable.

Mr. G. H. Raynor, formerly of Cambridge, is established at Parramatta, some 16 miles inland, and has proved a most valuable coadjutor, having also furnished me with types of all the species taken during his residence last year at Melbourne; and having converted to the science Mr. Burkitt and divers of the pupils at the King's School, Parramatta. The zeal of Mr. Burkitt furnished us with a pole-lamp, mounting six paraffin burners, with which immense execution was done (on one good night I got nearly thirty new species); and I suppose such a sight as our procession to the scene of action was never before seen in Australia: to wit, two boys carrying the lamp on a pole; two more carrying the tripod of poles on which it was to be hoisted; a fifth boy with a net; and our three selves also with nets, formed a spectacle which produced a visible impression on the spectators. Not but what the inhabitants of Parramatta were tolerably familiar with our eccentricities, and would remark without surprise, "Oh, there's Mr. Burkitt up a lamp-post; any *Chilos* this evening?" It being generally known that two species of that genus were among the special objects of our search.

My collection comprises a fine *Schœnobius* (both sexes abundantly by wading in the Parramatta river among reed-beds), and the two species of *Chilo* above mentioned; *Crambus*, 11; *Eromene*, 2; *Phycidae*, 21, nearly all of European genera and not remarkable. The *Tortrices* number about 50, mostly dull and uninteresting in comparison with English species; a large proportion belong, or are allied, to the typical genus *Tortrix*. One of the most interesting is a little species remotely allied to *Grapholitha*, the larva of which mines irregular blotches in the leaves of *Smilax glycyphyllea* (the plant from which sarsaparilla is procured), thus differing in habit from every known species of the group. The *Tineina* form the bulk of the collection; the principal European genera as yet recognised (a considerable number of species being still unexamined) include, *Choreutis*, 1; *Simaethis*, 1; *Atychia*, 1, nearest to *pumila*; *Blabophanes*, 3; *Tineæ*, 4, not including *tapetzella*, *pellionella*, and *biselliella*, which all abound; *Incurvaria*, 1; *Nemotois*, 2; *Plutella cruciferarum*, of course in

its element ; *Depressaria*, 1, doubtful ; *Cryptolechia*, above 60, I used to get a new *Cryptolechia* almost every time I went out, so that the genus bids fair to rival the original *Gelechia*, unless it also will bear sub-division ; *Gelechia*, the various species of this group I have not yet attempted to grapple with, but they number about 20; for the rest of the *Gelechidæ*, there are undoubtedly many new genera, belonging to the groups of *Hypsolophus* and *Pleurota*, but no species that accord with European genera ; *Harpella*, 2, very similar to *forficella* and *bracteella*, but half their size ; *Dasydera*, 1 ; *Œcophora*, about 30, showing great range of form and colouring ; *Glyphipteryx*, 5, most of them exceedingly handsome, especially one with yellow hind-wings ; *Laverna*, 3 ; *Stagmatophora*, 2 brilliant species ; *Stathmopoda*, 2, and also two extraordinary allied genera with the same habit of erecting the posterior-legs in the air, one a beautiful coppery-red insect with plumose antennæ, allied to *Atkinsonia* ; *Cosmopteryx*, one so exactly resembling *Scribæiella* in every minute detail that I see no distinction but the black ground-colour ; it frequents dry places, and the larva probably feeds on a grass ; *Batrachedra*, 2 ; *Heliozela*, 1 ; *Elachista*, 3, one very near *nigrella* ; *Coleophora*, 1, and also two forms of cases ; *Gracilaria*, 6 ; *Coriscium*, 1, bred from leaf-mines on a *Phyllanthus* (a small tree belonging to the *Euphorbiaceæ*) ; *Ornix*, 2 ; I may mention here that one typical *Gracilaria*, the *Coriscium* very often, and a new genus between *Coriscium* and *Ornix*, stand on their heads like *Argyresthia* ; *Lithocletis*, none yet, perhaps owing to the season ; *Lyonetia*, 2 ; *Opostega*, 1 ; *Bucculatrix*, 2, one bred from *Eucalyptus*, the larva and ribbed cocoon resembling those of European species ; *Nepticula*, 2, one bred from the *Phyllanthus*, and also mines of other species.

I will close this already too long account (omitting any notice of the many new and curious genera) by mentioning three characteristic peculiarities of the Australian *Tineina*. These are (1) the very great comparative frequency of yellow hind-wings, which occur in at least five per cent. of the entire group, and are scattered indiscriminately through the families, appearing even in the narrow winged *Elachistidæ*; compare with this the fact that in England the proportion is 2 in about 700 : (2) the unusually large proportion of rough woolly or tufted heads, occurring in all families, but especially the *Gelechidæ*, and making their boundaries unpleasantly vague : (3) the much increased number of larvae which form for themselves an efficient shelter by spinning a dense web in common, or tough silken galleries coated with excrement, or even (as in *Cryptophasa*, and certainly also some smaller species) boring into wood and closing the hole with a barricade of silk and refuse. The reason of this I believe to be the superabundance of ants, which swarm in great variety on every tree and plant, and which I have seen destroying unprotected larvæ. The above generalisations, which are certainly founded on fact, seem to me worthy of attention.—EDWARD MEYRICK, 243, Macquarie Street, Sydney : May, 1878.

Captures of Lepidoptera at Bishop's Wood, near Selby.—Amongst the captures a few days' visit to Bishop's Wood, at Whitsuntide, produced, were the following species, including larvæ and imagos : *Eurytene dolobraria*, *Tephrosia biundularia*, *Asthenia luteata*, *Eupisteria heparata*, *Melanthis albicillata*, *Cidaria silacea*, *Cymatophora duplaris*, *Tethea subtusa*, *Tæniocampa populeti*, *Himera pennaria*, and *Nyssia hispidaria*.

We also took *Empithecia lariciata* at Brough, not uncommonly. There were

three imagos of *Anticlea badiata* captured in very fair condition, and the day after I swept several half-fed larvae of the same insect out of the hedge-row. I think this is such an unusual occurrence of *badiata* that it merits a record.—S. D. BAIRSTOW, Woodland Mount, Huddersfield : June 19th, 1878.

Incurvaria canariella bred.—On the 4th June, I bred several specimens of *Incurvaria canariella* from *Rosa spinosissima*, collected at Arnside, in North Lancashire. The late Mr. Thomas Hague, of Staleybridge, first met with this insect in the Isle of Man, where it was afterwards captured by the Rev. R. P. Murray. The first specimen I saw alive strongly reminded me of *Nemophora Schwarziella*, only that it had a yellow face and shorter antennæ; but for many years I had not seen a specimen: now, I am happy to say, I have secured a nice series of this local species.—J. B. HODGKINSON, 15, Spring Bank, Preston : July 1st, 1878.

Deilephila livornica at Knutsford.—I wish to record the capture of *D. livornica* at Knutsford on the 11th of June, by my friend, Mr. E. C. Buxton. He saw two specimens at the flowers of a rhododendron in his garden, but only captured one; last year he saw a large Sphinx at the same shrub, which he believes to have been the same species. My friend made me the offer of the specimen he captured, which is a very fine and perfect one, and I was glad to accept it, as it is a species very rarely taken in this part of the country.—JOSEPH SIDEBOOTHAM, Bowdon, Cheshire : July 17th, 1878.

Review.

THE NATURAL HISTORY OF HASTINGS AND ST. LEONARDS, AND THE VICINITY.
Published by the Hastings and St. Leonards Philosophical and Historical Society.
12mo, pp. 1—68, 1878.

This is a well got up local list of plants and animals occurring in the Hastings district, comprised in an area of about 18 miles from east to west, and 10 from north to south (so far as terrestrial or fresh-water productions are concerned), and the shore. 1868 species of insects are enumerated, of which 499 are *Coleoptera*, 923 *Lepidoptera*, the other Orders evidently very imperfectly represented by the few species collected.

Everything must have a beginning, and the Society has made a very creditable one. We hope a new edition will be soon required, in consequence of large additions to the number of species. In this it might be advisable to give more special localities, in order to show how the distribution of species is correlated with the varying geological features, &c.

Obituary.

Professor Carl Stål. By a letter from his widow and father we have the sad news that Professor Carl Stål died at Frösundavik, near Stockholm, on the 13th June last, aged 45 years. We hope to be able to give subsequently some further information of one who worked well for the science of entomology, and whose premature death gives so much cause for lovers and students of nature to lament.

Two errors occurred in our notice of the late Mr. W. C. Hewitson in the July No. With respect to the "Exotic Butterflies," it should be mentioned that the work was concluded at the end of the *fifth* (not the *third*) volume. It is the stock and copyright of the "British Oology" that became the property of Mr. Van Voorst, not the specimens from which the work was drawn up.

LIST OF THE HEMIPTERA OF NEW ZEALAND.

BY F. BUCHANAN WHITE, M.D., F.L.S.

(Continued from p. 34).

TARGAREMA, *n. g.*

Body oblong. Head triangular, broader than long, immersed to the eyes, and with them a very little broader than the apex of the pronotum; clypeus rather produced. Rostrum passing the middle coxae, the 1st joint reaching to or nearly to the base of the head. Antennae less than half as long as the body, the 1st joint reaching beyond the apex of the head. Pronotum slightly convex, and with a slight transverse depression in the middle, length more than half the posterior breadth; front margin about half as long as hind margin, slightly concave, transversely impressed within the margin; side margins obtusely keeled, nearly straight but rounded in front, the hind angles elevated; hind margin slightly concave in front of the scutellum. Scutellum longer than broad. Elytra complete, parallel. Legs mediocre, front femora slightly thickened, with one or more small spines near the apex below; tibiae straight; 1st joint of the hind tarsus as long as, or longer than, the two other joints together. Hind margin of 3rd ventral segment curved forward on each side, and not reaching the margin.

Allied to *Peritrechus* and *Rhyparochromus*. Type *T. Stali*.

23. *T. Stali*, *n. sp.*

Dull chestnut-brown, variegated with paler; three basal joints of antennae, rostrum, elytra and legs, paler; pronotum with a spot in middle of front margin, side margins especially behind, a spot in middle of hind margin (sometimes extended to front edge of the hind lobe), and a smaller spot on each side, as well as the hind angles, scutellum with the apex and a spot on each side behind the disc, corium with a streak from the base to the middle of the claval suture, three short streaks following each other on the disc, and a fourth obscure streak between the third and the outer margin, as well as the base of the latter and the commissure of the clavus, whitish-brown or brighter brown; corium with a black streak from the middle of the claval suture to the inner apical angle; last joint of the antennae fuscous-black; membrane pale fuscous with darker streaks. The lobes of the pronotum nearly equal in length, the front obsoletely, the hind coarsely and thickly, punctured; scutellum coarsely and thickly punctured; elytra with rows of punctures, the clavus with three rows, the disc of the corium more remotely punctured; front femora with one spine; 1st joint of hind tarsus as long as the two others together.

δ ♀. Length, $3\frac{1}{2}$ —4, breadth, $1\frac{1}{4}$ — $1\frac{3}{4}$ mm.

Several specimens taken by Captain Broun. Somewhat variable in the intensity of the markings.

NOTE.—In giving names to the New Zealand *Hemiptera*, I wish to commemorate not only the entomologists who have done good work in collecting the specimens, but also some of those whose labours in this order of insects are well known to all their brethren.

[As, since the above was written, Dr. Stål has gone from amongst us, I cannot allow the opportunity to pass without expressing the sincere regret with which all entomologists must regard his untimely death.]

24. *T. electa*, n. sp.

Dull chestnut-brown, variegated with paler; rostrum, antennæ, and legs paler; pronotum with a spot in the middle of the front margin, side margins (interrupted in the middle), hind angles, and three spots on the hind margin, scutellum with the sides and apex, clavus with the commissure, corium with the base of the outer margin, a streak at the middle of the claval suture, three obscure streaks following each other on the disc, and a fourth between the third and the outer margin, paler brown; pronotum with an obscure band before the hind margin, scutellum with the apical half of the disc, clavus with a streak near the inner angle, corium with a streak from the base to near the middle of the claval suture and another from beyond the middle to the inner apical margin, as well as a large irregular patch near the outer apical angle, more or less fuscous-black; membrane yellowish-fuscous. Head very finely punctured; the two lobes of the pronotum nearly equally long, the front unpunctured except behind the front margin, the hind closely but obsoletely punctured; scutellum rather remotely punctured; clytra with rows of punctures, the disc of the corium rather obscurely and remotely punctured; front femora with three spines; 1st joint of hind tarsus twice as long as the two last joints together.

♀. Length, 6, breadth, $2\frac{1}{2}$ mm.

Two specimens taken by Captain Broun.

MARGARETA, n. g.

Body oblong, clothed with longish suberect hairs. Head rather small, longly triangular, immersed to the eyes, and with them broader than the apex of the pronotum. Rostrum reaching the hind coxae, the 1st joint attaining the base of the head. Antennæ half the length of the body, the basal joint passing the apex of the head. Pronotum anteriorly convex, somewhat concave in the middle behind, the length equal to the posterior breadth, the front and hind margins equal in length, all the sides nearly straight, the lateral rounded in front and obtusely keeled behind. Scutellum acutely triangular, longer than broad, and somewhat depressed in the centre of the disc. Elytra complete, somewhat rounded near the middle, the clavus with three and a-half longitudinal rows of punctures. Legs mediocre, the front femora somewhat thickened, and near the apex below armed with three spines; the front tibiae straight; the 1st joint of the hind tarsi more than double the length of the other two put together.

Somewhat related to the genus *Pachymerus*.

25. *M. dominica*, n. sp.

Rather dull brown, the upper surface as well as the antennæ and legs with pale brown hairs, the under-side shining pitchy-brown. The head (except the extreme apex), anterior part of the pronotum, and some streaks on the elytra as well as the membrane, darker brown; the antennæ (except the basal joint), rostrum, legs (femora excepted), and veins of the membrane, yellow-brown. Rather remotely and coarsely punctured, except on the somewhat wrinkled head, a transverse band before the middle of the pronotum, a small space within the inner angle of the corium, the middle of the sternum behind, and the under-side of the hind body, which are impunctate. The 1st joint of the antennæ gradually from the base to the middle, and the 2nd and 3rd at the apex, thickened, the 4th cylindrical, the 2nd longer than the 3rd.

♂ ♀. Length, 6, breadth, 2 mm.

Captain Broun (several specimens).

26. *Scolopostethus Putoni*, n. sp.

Dull testaceous-brown, more or less densely punctured; head, pronotum with front lobe and a spot on each side within the hind angles, scutellum with a spot in the middle, and the sternum, black; pronotum with three obscure longitudinal bands on the hind lobe, corium with the veins, a spot near the middle of the outer margin and another on the inner margin opposite it, the apical margin and a streak near it, the membrane (except the veins), the antennæ, coxae, trochanters, margins of the sternum segments, and the ventral surface, more or less intensely brown or pitchy-brown; the dilated side margins of the pronotum and the extreme tip of the scutellum, sub-translucent and dirty white. Clavus with three rows of punctures.

♂ ♀. Length, 3 mm.

Two or three specimens taken by Captain Broun. Allied to *S. contractus*, H.-S.

Tribe PHYMATINA.

27. *Phymata Feredayi*, Scott.28. *P. conspicua*, Scott. I have not seen either of these.

Tribe ARADINA.

The names of five supposed species of this section have been recorded; but two of these seem to be only synonyms. I am able to add another species to the list.

29. *Aradus australis*, Er.?

Erichson's description (made from a mutilated specimen) is so very short, that I am not certain that the New Zealand species is identical with the Tasmanian. If it is not the same, it is very closely allied.

Not uncommon. Messrs. Hutton and Wakefield.

30. *Neuroctenus Hochstetteri*, Mayr.

Not uncommon. Captain Broun.

If Walker is right in referring *Aradus thoracicus*, White, to the genus *Neuroctenus*, it is possible that *Hochstetteri* and *thoracicus* may mean one and the same insect. I do not know where the latter is described, if it has been described at all, which seems doubtful.

31. *Crimia attenuata*, Walker.

This I have not seen. Mr. Butler places the name of the other Walkerian species (*Mezira maorica*) within brackets after the name of this species, by which I understand him to mean that the two are identical.

32. *Aneurus Brouni*, Buch. White.

Three specimens taken by Captain Broun.

(*To be continued.*)

DESCRIPTION OF A NEW HOMOPTEROUS INSECT BELONGING
TO THE FAMILY CICADIDÆ.

BY W. L. DISTANT.

Tosena splendida, n. sp.

♂. Body black. Face with the lateral borders dull reddish, with a well-pronounced, central, longitudinal impression; transversely costate, with the interstices wide and irregularly punctate. Eyes prominent, luteous and fringed behind with long hairs. Pronotum deeply furrowed, much as in *T. melanoptera*, white, with four large luteous spots: two on the disc, sub-oval, converging from immediately behind the eyes towards each other, through two-thirds of the width of the pronotum, their bases widened and separated by a space of about two millimètres; the other two somewhat larger and much more irregular, occupying the posterior lateral angles. Mesonotum very sparingly pilose—excepting near lateral borders, where the hairs are much longer and more regularly abundant,—and with two sub-eordate luteous spots on disc, parallel with the pronotal central spots, and, like them, converging towards each other at base. Metanotum with two small luteous spots at base, very indistinct in ♂, but clearly exhibited in ♀. Abdomen above pilose. Rostrum black, with a small luteous spot near base, in length just reaching the posterior coxae. Body beneath and legs pilose; femora with a wide, central, rufous band, fore-femoral spines apparently well-developed (owing to a somewhat crushed condition of the fore-femora in type, I am unable to give a more complete delineation), drums of the usual generic size, but situated close together, and divided by a very slight emargination behind. Abdomen with a longitudinal discal row of sub-triangular reddish markings, the bases of which are situated on posterior borders of abdominal segments. Tegmina and wings, where not obscured by darker markings, transparent,

exhibiting varied opaline lustre, which in some lights is found to be varied with close and regular series of transverse darker striae. Tegmina at base narrowly dark fuscous. Costal area fuscous for rather more than half its length, nervures and nervules bright luteous, and, for two-thirds the length of tegmina, bordered on each side with fuscous. The apical border is also fuscous, very broadly so at apex, and narrowing towards inner margin, containing a sub-marginal row of pale luteous spots, which are the outer terminations of an equal number of narrow, transverse, linear, pale luteous striae. Claval area pale greenish. Wings pale greenish for nearly two-thirds their area from base, remaining portion shining fuscous, enclosing a sub-marginal row of pale opaline spots, of which the largest is sub-costal and irregular in shape, being somewhat sub-quadrata, hollowed out externally, and produced at base towards outer edge. Nervures and nervules pale luteous, in some places tinged with green.

♀. Differs principally from the ♂ in having all the colour markings intensified, the tegminal row of sub-marginal spots, which are luteous in the ♂, being pale opaline in the ♀. The abdomen is more thickly clothed with pilosity, and the rostrum is somewhat shorter in length than in the ♂.

♂. Long. 45 mill. Exp. tegm. 124 mill. ♀. Long. 44 mill. Long., with ovipositor exserted, 49 mill. Exp. tegm. 127 mill.

Naga Hills : alt. 2000 to 6000 ft. Khasia Hills : alt. 4500 to 6000 ft. (Chinnell).

This beautiful species is interesting as showing the alliance of the genera *Tosena* and *Gæana*, which, originally placed near each other by Amyot and Serville, were by Mr. Walker separated far apart, both in the Brit. Mus. Catalogue, and in the Brit. Mus. Coll. The late and lamented Prof. Stål, in his Synopsis of the Genera of the Stridulantia (Hem. Af., vol. iv), recognised their affinity, and I think, had he lived to have seen this species, would have agreed that there is a regular transition through the genera *Tosena*, *Gæana*, and *Huechys*. *Tosena splendida* differs apparently from the other species of the genus by its paler coloration and more transparent appearance, but the last peculiarity is shadowed in *T. albata*, Dist., whilst the pronotal and mesonotal spots, which ally it to some species of the genus *Gæana*, may be seen indicated on the pronotum of *T. melanoptera*, White, in which the two discal spots are faintly recognisable, whilst the broad, pronotal, luteous band of that species appears only as the two angular spots in *T. splendida*. I have abstained from describing the neuration of the tegmina, knowing that character in many instances among the *Cicadidæ* to be most unreliable, and, in addition to the evidence I have already collected, I may state, that the neuration of the right and left tegmina in the typical ♂ specimen above described is asymmetrical.

ON THE PUPATION OF THE NYMPHALIDÆ.

BY T. A. CHAPMAN, M.D.

From my earliest entomological experience, this subject, as an engineering problem, had a great attraction for me, and it was not long before I had succeeded in observing the whole process, by which the pupa, soft, and apparently helpless, gets hold of the tuft of silk which is to support it, not by getting through the end of the caterpillar skin, but by withdrawing the tail from the effete skin and passing it up behind it. Few years, until this one, have passed in which I have not repeated the observations, which possess an unfailing interest. It so happens, also, that some years ago I interested myself in the question as to the normal number and arrangement of the spiracles of insects, and as to how the various number of spiracles that occur are to be explained by the suppression of some and the varying position of others. Among the observations then made were some on the changes in the number and positions of the spiracles during metamorphosis. The pupation of the *Tanessidi* was not omitted in these observations, and yielded an item bearing on the "membrane" observed by Dr. W. Osborne. It is perhaps, therefore, fitting that I should state the result of my observations as the subject has been brought up for discussion.

It is to be noted that the process of casting a skin, whether by larva or pupa, is a process of vermiform creeping, *i. e.*, creeping without the aid of legs; the segments of the insect are soft and worm-like, but under powerful muscular control, notwithstanding their softness and the delicacy of their tegument. In the fresh pupa of *Tanessa*, for example, the segments are rounded with deep folds between, and not smoothed down, hard and telescoped as in the mature pupa. As the casting of the larva skin becomes nearly completed, the thoracic portion of the skin still covers the ventral aspect of the abdominal segments, whilst already the dorsal slit in the skin has passed so far backwards as to allow the removal of the terminal segment with its hooks.

At this critical point it is obvious, as the result of my observations, that the good old explanation of how the pupa is sustained, is largely true, that it is suspended by the folds of the larva skin being grasped in the intervals of the segments of the pupa. But there is another and at least as important an element in the case that has not, I think, been mentioned, and that is, that the interior of the larva skin and the surface of the pupa are damp or actually wet, so that by capillary attraction and atmospheric pressure they adhere with considerable firmness, and whilst they will gradually slide off each other by the

vermiform movements of the pupa, they strongly resist any direct separating force, and the larva skin will not readily even peel off. The capillary adhesion of a very small area is abundantly sufficient to sustain much more than the weight of the pupa. An important element in the case is that the sliding of the skin under the vermiform movement of the pupa can only take place when there is some *point d'appui*, which in the earlier stage of the process is afforded by the different segments of the pupa, one, or rather several, so to speak, holding the skin, whilst another slides along it; but at the stage of the process we are considering, such *point d'appui* fails, and no further sliding takes place until one is gained by the attachment of the terminal hooks to the silken boss. The "membrane" discovered by Dr. W. Osborne no doubt assists to some extent in the same way (by capillary adhesion), for such a membrane there really is. This membrane is neither more nor less than the linings of the tracheæ, which are drawn out at each change of skin, and trail behind over the surface of the pupa, frequently adhering to it by the dampness already mentioned. In many insects these tracheal linings form a conspicuous addition to the cast skin, forming long white threads, as they do not shrivel together in drying as the skin itself does. Whether the intestinal lining affords any assistance in supporting the young pupa, I do not know.

Binghill, Hereford : August, 1878.

DESTRUCTIVE INSECTS IN THE ISLAND OF ASCENSION.

BY R. McLACHLAN, F.R.S., &c.

This little spot in the middle of the Atlantic is suffering to an alarming extent from the ravages of caterpillars, which threaten to destroy all vegetable produce, a most serious matter, when it is considered how greatly the health of its inhabitants—and especially the prevention of that dire scourge *scurvy*—depends upon a proper supply of vegetables.

A nicely preserved collection of the perfect insects (with most of their larvæ in spirits) has been forwarded to the Secretaries of the Admiralty, and submitted to me through the authorities at Kew.

It consists of nine species—two of these butterflies, the others moths of the family *Noctuidæ*. All of them may be suspected of having been introduced with plants, &c.

The butterflies are the very widely distributed *Vanessa cardui* and *Lycæna bætica*, neither of which can cause much damage; and a *Noctua* larva was forwarded in error as pertaining to the *Vanessa*.

The most destructive of all is our too-well known *Agrotis segetum*,

known in the island as the "black grub," and, as here, nipping off the young plants just below the surface. Another is *Prodenia retina*, not known in this country, but of very wide distribution ; it appears in great numbers, and clears everything before it ; in December, 1876, the Cricket Valley Crater was grown over with wild tomatoes, which were covered with the caterpillars ; the tomatoes died off in April, 1877, and but few of the caterpillars were to be seen until last November, when they swarmed over the whole mountain. Another caterpillar, which is said to be seen in numbers, is that of a *Leucania*, apparently *L. Loreyi*, but it is not stated upon what it feeds ; probably grasses and cereals. Two pretty species of *Plusia*—*P. aurifera* and (apparently) *P. U-aureum*—with characteristic "half-looper" larvæ, are said to be destructive to garden produce. The other moths are *Cosmophila xanthindyma* and a species of *Cullopistria*, but of these the larvæ have not been observed.

Naturally the islanders seek means of ridding themselves of this plague of caterpillars ; but these are very difficult to suggest. The introduction of rooks or starlings appears to be practically impossible, on account of the treeless condition of the island. The sparrow would, I think, be useless ; if introduced, it would sure to keep to the houses, and moreover, the larvæ are large, and, in the case of the *Agrotis*, only at work above ground during the night. I have suggested the breeding of large numbers of ducks, if this can be done successfully in an island with so little water, and, failing these, the turning out of large flocks of fowls and guinea fowl, and building sheds for them in which to shelter and roost.

Strict attention to systematic alternation of crops is, I think, desirable ; and not less so is the careful collection and destruction of all larvæ and pupæ turned up by the plough or spade.

Chemical and other agents seem to be of little service ; but I know that the sprinkling of unslaked lime over the plants has been found useful in the case of *Agrotis segetum*.

An estimate of the number of land birds on the island accompanies the insects, from which it appears that there are about 25 pheasants, 400 partridges, 100 guinea-fowl, 1100 domestic fowls, 25 ducks, 50 canaries, 10 cardinal birds, and 1500 wax bills ; the guinea-fowl are said to keep about the N. E. plains, 400 feet above the gardens, and live on grasshoppers and crickets ; surely if these birds were pinioned or prevented from straying, they would find the larvæ equally to their taste.

The only immediate consolation I can give the unfortunate islanders is, that destructive insects, as a rule, only appear in extraordinary numbers in certain years.

NEW COLEOPTERA FROM NEW ZEALAND.

BY D. SHARP, M.B.

(Concluded from p. 52).

CHERODES CONCOLOR, n. sp.

Rotundato-ovalis, convexus, fere unicolor, pallide testaceus, subnitidus; pedibus posterioribus minus incrassatis. Long. $6\frac{1}{2}$ mm., lat. $4\frac{2}{3}$ mm.

Though excessively similar to *C. trachyscelides*, White, I think this is a distinct species; in *C. trachyscelides*, unicolorous unspotted forms are rare, whereas in *C. concolor* I have not seen a spotted individual, though I have received two or three dozen specimens; *C. concolor* is only about half the size of White's species, and has the legs much thinner, and there seems to be scarcely any difference in the intermediate tarsi of the two sexes, whereas in *C. trachyscelides*, ♂, the middle tarsi are much dilated.

Sent by Prof. Hutton, in numbers, from Otago.

RHIPISTENA LUGUBRIS, n. sp.

Elongata, angustula, nigra, opaca, dense subtilissime punctata et fusco-pubescent; prothorace antrosum fortiter angustato, basi profunde bisinuato, angulis posterioribus sub-prolongatis, ad humeros applicatis; elytris elongatis et angustis, apicibus vix dehiscentibus et sub-acuminatis.

Long. 6 mm., lat. $1\frac{1}{4}$ mm.

The 1st joint of the antennæ is longer and rather thicker than the 2nd; the 3rd is longer than the 1st, but similar to it in form, the 4th joint is stout, quite as long as broad, the other seven joints very short, but each giving off an appendage, and of these the first four or five are each as long as the three basal joints.

I have received a mutilated individual of this species from Capt. Broun, as No. 63, and am informed that he has found only two individuals.

I give below the characters, so far as I can see them, of this interesting species, which seems to be a very interesting form of *Rhipiphorides*, but to connect that family with the *Mordellides*; if the antennæ and head were hidden, the insect might readily be passed over as a slender *Mordellistena*.

Antennæ short, eleven-jointed, the four basal joints moderately long and stout, the other seven very short, but each giving off a long slender lobe; their insertion is a long way from the front of the elypterus near the eyes, which are somewhat emarginate on their inner edge. Head, when extended, with its posterior part laid on the apex of the thorax. Mandibles visible from the front; labrum small but visible between

the mandibles; maxillæ and labium placed in a cavity on the under-side of the head, this cavity is very defined by a margin which forms a curve extending between the front angles of the head; the labium is apparently excessively reduced, and I cannot see any mentum or labial palpi; the maxillæ are exposed; their palpi are not very large and are 4-jointed, the basal joint being, however, very minute, the 2nd joint is longer than the 3rd, and the 4th about as long as the 2nd and 3rd together, and oval in form. Thorax much narrowed in front, its anterior opening looking downwards, prosternum separated from the flanks of the pronotum by an obscure suture; front coxæ much exserted, sub-cylindrical, and perpendicular, their cavities widely open behind, but placed at a considerable distance from the front edge of the prosternum. Mesosternum rather large, with a prominence in the middle, which fits between the front coxæ; the middle coxæ separated by a prolongation of the mesosternum, which extends as far as the hind part of the coxæ, and has there a free, slender extremity. Metasternum elongate, its episterna very large, its epimera not visible. Hind coxæ large, but only about half as long as the metasternum. Hind-body slender, of five visible ventral segments, the first of which is about as long as the apical one, the three intermediate being moderately long and about equal to one another. Legs elongate and very slender, the tibiæ without spurs, the tarsi longer than the tibiæ, the front and middle ones 5-jointed, the hind ones 4-jointed. The claws have been covered with gum tragacanth, so that I cannot see their structure.

SOMATIDIA LONGIPES, n. sp.

♂. Sat elongata, fusco griseoque minus lute variegata, elytris versus apicem dilutioribus et plaga communi scutiformi fusca, setis erectis nullis, tuberculis sex minutis, setosis; prothorace sat elongato, anterius minus punctato, punctis via ad medium extensis. Long. 8 mm., lat. 3 $\frac{1}{3}$ mm.

The male of this species, though rather similar at first sight to that sex of *Parmena antarctica*, White (Gen. *Somatidia*, Bates), is abundantly distinct; it is larger and especially more elongate, and has the legs much more developed, they are much longer, and the thighs are more clavate, the punctuation of the thorax and elytra is much less, and each elytron has three minute tubercles instead of two. The coloration of the two species seems very similar, except that *S. longipes* will probably prove the less conspicuously variegated.

The discovery of this species is due to Professor Hutton, who recently sent me a single specimen, which was found in Otago.

CRYPTODACNE SYNTHETICA, n. sp.

Sub-oblonga, convexa, nitida, subglabra, fusco-ferruginea, elytrorum humeris apieque ferrugineis, pedibus testaceis, antennis robustis, pilosellis, ferrugineis; prothorace elongato, subquadrato, parcus sat fortiter punctato; elytris parcus subtiliter seriatim punctatis. Long. 4 $\frac{3}{4}$ —5 mm., lat. 2 mm.

Antennæ robust, about as long as head and thorax, formed as in

Cryptophagus; eyes convex, and with very coarse facets; front part of head much produced beyond insertion of antennæ. Thorax large, not quite so long as broad, the front margin depressed-emarginate on each side beyond the eyes, the sides nearly straight, but slightly narrowed behind, the hind angles well marked and rectangular, the surface with distant but distinct punctures, which bear very short hairs. Scutellum moderately large, impunctate. Elytra with series of fine, distant punctures, which bear excessively short setæ. Legs rather long.

The facies of this species is quite in accordance with its structural characters, for it suggests at a glance a relationship with *Dacne*, *Cryptophagus*, and *Triplax*.

I have received two specimens from Capt. Broun, as No. 4, and am informed that he found about a dozen individuals of the species in fungus, at Tairua. I can see no characters to inform me of the sex of the individuals.

As I have just remarked, this insect combines the characters of *Triplax*, *Dacne*, and *Cryptophagus*: the antennæ are those of a *Cryptophagus*, such as *C. lycoperdi*, the three apical joints, though larger than the preceding ones, can scarcely be called a club: the form of the head and the insertion of the antennæ are as in *Triplax russica*, except that the width is not so great and the length is greater; the facets of the eyes are even coarser than in *Cryptophagus*. The apical joints of the palpi are dilated, that of the maxillary ones being hatchet-shaped. The structure of the prothorax and its relations to the mesothorax are but little different from *Triplax*, the space separating the coxæ is broad, especially in relation to the width of the body; the prosternal process is not margined at the sides, except in an obsolete manner. The tarsi are all five-jointed, and not flattened, being narrower than in *Triplax*, but not so slender as in *Dacne*, the three basal joints are sub-equal, the 4th, though smaller than the others, is quite distinct, and the 5th joint is large, being as long as the four others together; the structure of the tarsi is in fact just intermediate between *Triplax russica* and *Dacne californica*.

This insect may at present be classed among the *Erotylidæ*, though as it introduces into that family the antennæ of *Cryptophagus*, it tends to complete the union of *Erotylidæ* and *Cryptophagidæ*. The chief characters by which it departs from *Triplax*, are the less clavate antennæ, the very coarsely faceted eyes, and the decidedly pentamericous tarsi.

FURTHER CONTRIBUTIONS TO THE KNOWLEDGE OF THE
CETONIIDÆ OF MADAGASCAR.

BY CHARLES O. WATERHOUSE.

The species here described were collected by the Rev. William Deans Cowan, and were forwarded by him to Mr. J. E. Harting, who has placed them at my disposal; the specimens will be found in the British Museum. The collection contained the following species of *Cetoniidæ*, from Fianarantsoa.

Heterosoma collatum, G. & P., ♀; *Heterophana canaliculata*, G. & P., males only; *Stenotarsia discoidalis*, n. sp., ♂ & ♀; *S. Scotti*, Janson, ♂; *Liostraca bella*, n. sp.; *Exixanthis novem-punctata*, G. & P.; *Parachilia melanocala*, Burm.; *Bricoptis variolosa*, G. & P.; *Pygora ornata*, Janson; *P. pulchripes*, n. sp.; *P. Cowani*, n. sp.; *Coptomia prasina*, Burm.; *C. nigriceps*, n. sp.; *C. 4-maculata*, n. sp.; *C. propinqua*, n. sp.; *C. apicalis*, n. sp.; *C. opalina*, G. & P.; *C. sex-maculata*, G. & P.; *Pogonotarsus plumiger*, G. & P.; *Celidota Stephensi*, G. & P.; *Euryomia argentea*, Oliv.

The following are the new species:

STENOTARSIA DISCOIDALIS, *sp. n.*

Atra, depressa, supra opaca; thorace quadrato, limbo fulvo; elytris deplanatis, sat crebre punctatis, regione scutellari maculisque quatuor rotundatis transversim positis atris; corpore subtus longe flavo-griseo-pubescenti; pedibus piecis.
Long. $6\frac{1}{2}$ —7 lin.

Clypeus rather thickly and obscurely punctured, only slightly emarginate at the apex. Thorax one-fifth broader than long, rather flat, obliquely but not much narrowed in front of the middle, behind the middle the sides are nearly parallel, the anterior angles are prominent and acute, the posterior angles nearly rectangles but blunt, the base arcuate, black, with all the margins orange-yellow. Scutellum black. Elytra very flat, suddenly deflexed at the sides, at the base much broader than the thorax, regularly narrowed posteriorly, irregularly, distinctly, and moderately thickly punctured, a spot on each side of the scutellum and two round spots on each elytron a little behind the middle, black.

The anterior tibiae are tridentate in both sexes, but are distinctly narrower in the male. The abdomen of the male is very slightly impressed in the middle, the legs are rather more robust, and the posterior tibiae have a slight projection on the inner side at a little distance from the apex.

LIOSTRACA BELLA, *sp. n.*

Nigra, deplanata, nitidissima; capite sat crebre evidenter punctulato; thorace longitudine $\frac{1}{2}$ latori, lœvi, antice angustato, angulis posticis omnino rotundatis, basi lœvissime sinuato; scutello angusto, lœvi; elytris thorace parum latoribus, fere lœvibus, flavis, circa scutellum apiceque nigris, humeris rufescensibus.
Long. $4\frac{1}{2}$ lin.

The thorax is rather broad, narrowed anteriorly, much rounded at the sides posteriorly, the posterior angles very much rounded, the base is broadly but very gently sinuate, nearly straight. The elytra have two or three elongate punctures at the base, and have each two pairs of fine striae beyond the middle, not reaching to the apex. The scutellar region and the apical third are black, the rest is dark yellow, except the shoulders, which are reddish. The pygidium is transverse, closely and finely strigose. The anterior tibiae have two sharp teeth.

This species is shorter than *L. bina*, with a broader thorax; the punctures at the base of the elytra are not so long, the impression behind the middle is very slight, and the pairs of fine striae are shorter.

PYGORA PULCHRIPES, sp. n.

Viridis, aureo-micans, nitidissima; singulo elytro striis quatuor, externis parum distinctis; pygidio convexo, parce punctato, utrinque maculâ albâ notato; abdomine albo-maculato; pedibus violaceis. Long. 6—7 lin.

Head rather thickly and distinctly punctured, clypeus broadly and not deeply emarginate. Thorax a little longer than its width at the base, gently convex, rather sparingly punctured, nearly smooth on the disc, strongly obliquely narrowed in front of the middle, strongly sinuate behind the middle, the base gently arcuate, the margins nowhere incrassate. Scutellum broad at the base, very acuminata at the apex, very obscurely punctulate. Elytra at the shoulders much broader than the thorax, strongly constricted below the shoulders, flat, each with four striae, the 1st a complete impunctate stria, the 2nd abbreviated and interrupted, the 3rd and 4th more obscure, consisting of a line of punctures. Pygidium rather convex, with a few punctures scattered over the surface (the ♀ with rather more), with a large white spot on each side. Legs violet, femora beneath green.

♂. Anterior tibiae with two teeth. Abdomen with a mesial impression, clothed with white, having a line of green spots on each side of the impression, and at the sides of the segments.

♀. Anterior tibiae with three teeth. Abdomen green, with white patches at the sides.

PYGORA COWANI, sp. n.

Viridis, aureo-micans, nitidissima; elytris striatis, regione suturali cyaneo; pygidio tri-tuberculato, utrinque albo-maculato; pedibus piceis; abdomine albo-maculato, segmento sexto violaceo, crebre punctato. ♀. Long. 7 lin.

Differs from the ♀ of the preceding, besides the coloration of the elytra and legs, in being a little broader, each elytron has three nearly complete striae, and the 4th is short and composed of rather close punctures. The pygidium is strongly transverse, deep blue, with an elongate longitudinal blunt tubercle in the middle, and a smaller transverse one on each side below the white spot. The 6th abdominal segment is thickly striate-punctate below.

COPTOMIA NIGRICEPS, sp. n.

Nigra, nitida, lœvis; thorace, scutello, elytris, tibiis, tarsisque flavo-piceis, elytris leviter striato-punctatis. Long. 9 lin.

General form and size of *C. mauritiana*, but the clypeus is not quite so deeply notched. The thorax is more regularly narrowed in front, not so angular in front of the middle, there is some very fine punctuation towards the sides with a few rather larger punctures intermixed, the sides are more finely margined. The elytra have five lines of distinct but fine punctures (not reaching the base or apex), the 2nd and 4th interstices are very slightly raised, the 1st and 3rd have each a short irregular line of punctures. The prosternum is as in *C. mauritiana*, but the apex is not bent down. The sides of the sterna are thickly and rather strongly punctured; and the sides of the abdominal segments are distinctly and moderately thickly punctured.

♂. Anterior tibiae narrow, simple. Abdomen strongly impressed in the middle.

♀. Anterior tibiae with three sharp teeth.

The pygidium is densely transversely striolate in both sexes, and slightly convex.

COPTOMIA QUADRIMACULATA, sp. n.

Olivaceo-viridis, nitida; elytris flavescentibus, suturâ maculisque quatuor olivaceo-viridibus. Long. 8½ lin.

♂. Tibiis anticis simplicibus; pygidio fere lœvi; abdomine medio impresso.

♀. Tibiis anticis tridentatis; pygidio striguloso.

Closely resembles *C. mauritiana* in form, the thorax is, however, a trifle more narrowed in front, the scutellum narrower, &c. The clypeus is not quite so deeply notched, and the extreme apex is tinged with red. The elytra are yellow, with tinges of green; the suture, a spot on the shoulder, and the subapical callosity, green. The pubescence on the anterior femora is yellowish. The tarsi are more or less pitchy. The pygidium in the male is smooth, not impressed, with a few punctures on each side. In the female it is impressed on each side, leaving an obtuse transverse ridge near the base, and a mesial longitudinal raised line nearly as in *C. mauritiana*; it is finely strigose, but much less densely than in that species, and the mesial raised line is smooth.

COPTOMIA PROPINQUA, sp. n.

Olivaceo-viridis (vel purpurascens), nitida; pygidio leviter convexo, subtiliter strigoso; sterno minus producto. ♀. Long. 8½ lin.

Extremely close to *C. mauritiana*, but at once distinguished from the female of that species by the gently convex, finely strigose pygidium, not impressed at the sides. The form and sculpture are nearly the same, but the thorax has not the larger distinct punctures towards the sides. The elytra have no distinct costæ, and are very smooth; the subapical callosity is closer to the suture, and the extreme apex of the elytra is transversely strigose. The sternal process is less developed, not bent over at the apex towards the anterior coxae, and anteriorly it is more perpendicular. Tarsi pitchy.

Variety—dark olive-green, nearly black in parts, with the elytra obscure reddish-purple. Legs black. This specimen is a little broader than the other, but I have no doubt as to its identity.

COPTOMIA APICALIS, sp. n.

Nigra, nitida; elytrorum apice crebre strigoso; pygidio utrinque oblique impresso, dense subtiliter transversim strigoso. ♀. Long. 10 lin.

This species is very close to *C. propinqua*, but is at once distinguished by the longer clypeus, which is more deeply notched and more distinctly punctured; the apical callosity of the elytra is very acute, and the apex of the elytron below the callosity (from the suture extending a little round the side) is rather closely strigose punctate. The pygidium is rendered opaque by reason of the density of the transverse striation, and there is an oblique shallow but distinct impression on each side. The prosternum is slightly bent over towards the anterior coxae, but not quite so much as in *C. mauritiana*.

British Museum: *August, 1878.*

Fancy prices for British Insects.—

Merton Hall, Thetford: *August 6th, 1878.*

To the Editors of the *Entomologists' Monthly Magazine*.

GENTLEMEN,—I enclose a letter which seems to throw some light upon the importation of foreign specimens of rare British insects. I am not in the habit of buying, and certainly not at fancy prices, but if collectors are to be found who will give anything approaching to the prices named in this letter, they put a high premium upon unscrupulous deception. I cast no imputation whatever upon the fortunate possessor of 41 specimens of *Pachnobia alpina*. If he can get £20 for the best of them he will be right to do so, but the investment does not recommend itself to a mere student, who seeks to learn the innumerable forms under which the creations of nature are to be distinguished and separated with precision.—I am, yours faithfully, WALSINGHAM.

The following is a copy of the letter referred to:—

— begs to inform Lord Walsingham that he has 41 fine specimens of *Pachnobia alpina*, most of them as good as bred. The prices range from £6 to £20. If his lordship would like to see them, — will forward them by post, with the prices attached. There are marvellous varieties of this fine moth, and no two are alike.—*July 31st, 1878.*

[We have great pleasure in publishing the above letter from Lord Walsingham, and a copy of that received by him, omitting name. The question of *price* (as he suggests) rests between buyer and seller. There is no standard regulating the prices of "British" insects; and if there are those willing to pay any sum asked, we do not see how it is possible to prevent the sellers from receiving it. Continental dealers (all over Europe) have, through competition, arrived at a general system of prices, varying very little individually, so far as can be judged from the lists we receive. The intrinsic value of a "British" insect should be about on a par with that of a continental specimen of the same species, varying slightly either way, on account of rarity, &c., or otherwise. From a scientific point of view it is to be regretted that insects are sold as "British" that are not of native origin; but the mischief is mainly caused by the buyers. So long as there are British idiots willing to pay fancy prices for "British" insects, it is quite certain the supply will be equal to the demand. In the particular case in question we have no reason to suspect any fraud,—quite the contrary.—EDS.]

Spercheus emarginatus in Essex.—My friend, Mr. T. R. Billups, recently brought me a beetle to name, of which species he had found four examples—by a mere accident—floating on the surface of the water in a ditch adjoining some marsh-ground at West Ham, Essex.

This beetle proved to be *Spercheus emarginatus*, which species, as far as I am aware, has not been captured in this country for many years; the retired habits of this insect, living, as it does, at the roots of aquatic plants, has, doubtless, caused it to be overlooked, and led Coleopterists in Britain to suppose it had become extinct; consequently, its occurrence here, so near London, is especially interesting.

In company with Mr. Billups (who kindly guided me to the place) I subsequently visited the locality, and here, in a long narrow ditch without any visible outlet, by the diligent use of the water net amongst some floating aquatic plants, washed out by the roots by a recent flood, we succeeded in capturing many examples of the species.—GEO. C. CHAMPION, 274, Walworth Road, London, S.E.: August 13th, 1878.

Harpalus quadripunctatus in Ireland.—I found a single specimen of the hill-frequenting *Harpalus quadripunctatus*, Dej., last June, on the summit of the "Sugar Loaf" Mountain, near Bray, Co. Wicklow; it was the only local species met with by me during six days' sojourn in that neighbourhood.—ID.

Change of nomenclature in Coleoptera.—In the Rev. Mag. Zool. (3), iii, p. 41, I described a genus of Scarabæidæ, from Australia, under the name *Neocnemis*; as this name was used by Mr. Crotch in 1867 for a genus of Coleoptera, it is necessary that the name I gave should be replaced by another, and I propose, therefore, to use *Neocnecus* for the Australian genus.—D. SHARP, Thornhill, Dumfriesshire: August, 1878.

Capture of Acidalia ochrata.—You will be pleased to hear that this species has turned up in its old haunts on the south-east coast, after a lapse of nearly twenty years. I found it tolerably common; several females laid eggs, which hatched in due course: of these you will probably hear more at a future time.—E. G. MEEK, 56, Brompton Road, S.W.: August 2nd, 1878.

Tineina observed at the Scilly Isles, July 12th to August 13th, 1877.—Mr. F. J. H. Jenkinson has sent me a list of his *Tineina* observed at Scilly last summer, from which I have made the following extracts:—

" *Tinea ferruginella*.

" *T. —————*, allied to *argentimaculella*, occurred round the house, one was taken in-doors. [This differs from *argentimaculella* in the fasciæ being broader, less defined and less silvery—the apical markings are two only, viz.: a costal drop and a spot beneath it; the cilia are whitish at the base in certain lights, the tips are distinctly whitish.—H. T. S.].

" *Gelechia diffinis*, very bright with rosy tinge.

" *G. desertella*.

" *G. mundella*.

" *G. umbrosella*.

" *G. ocellatella*, the larva living in a gallery along a flower head, usually causes a twist or pucker in its growth, first bred August 16th.

"*Cleodora cytisella*, rather common, flying among ferns as usual.

"*Oecophora quadripunctata*, rather common, beaten from overhanging tufts (*Statice*, &c.), on a bank by a village.

"*Argyresthia Gædartella*, the rich golden varieties the commonest.

"*Graeilaria tringipennella*, July 30th.

"*Elachista*. [A rather imperfect specimen, but which certainly seems to me to indicate some species as yet unknown to us.—H. T. S.].

"*Chrysocorys festaliella*, not only on Trese, but on Tear, a rather small northern island, but, from its hilly nature, capable of giving shelter."—H. T. STANTON, Mountsfield, Lewisham: *July 12th, 1878.*

Habits of Gelechia gerronella, Z.—This insect had become proverbial for being in poor and wasted condition, and it had, besides, a bad habit of occurring only singly: judge, therefore, of my surprise when, on the 13th July, 1878, I dislodged from a furze-bush, on the Common at Tunbridge Wells, a *fine* specimen of *Gelechia gerronella*; it was quite a startling apparition! A week later I captured more than twenty specimens in a single evening; they were flying at dusk amongst the furze-bushes between 7.45 and 8.30 p.m.; about a third of them were in very decent condition. The insect continued to occur up to the end of July, after which date the specimens were too wasted to be worth setting.

Mr. Machin had, however, been beforehand with me in taking *fine* specimens of *G. gerronella*, and had actually bred the insect, without, however, having made the acquaintance of the larva. His experience of the species was as follows:

Early in June, he cut from the furze-bushes, at Wanstead, a number of the webs of the larvae of *Butalis grandipennis*; the insects began to emerge about the 20th June, and continued to come out till about the 10th or 12th of July. Amongst the large number of *B. grandipennis* which he reared, two specimens of *Gelechia gerronella* made their appearance. On seeing these, he went, at the end of June, to the place where he had collected the larva, and beat from the furze-bushes *ten very good* specimens of *G. gerronella*.—ID.: *August 13th, 1878.*

Notes on Tineina bred in 1877 and 1878.—The larvae of *Gelechia viscaricella* were very abundant in the tops of a *Lychnis* at Wyre, and in various localities near Preston, during May, 1877; but this year they are almost entirely absent; in this following the example of their food-plant, which is very scarce where last year it abounded. The perfect insects emerged in limited numbers during July, being very much infested with ichneumons.

On May 13th, 1877, I collected roots of sea plantain on the banks of the river Wyre, for larvae of *Gelechia instabilella*, which mine in the roots, and, as far as present observation goes, not in the leaf or stem. From these emerged about a dozen imagos of *G. instabilella* in July, and, to my surprise, on June 30th, one specimen of a little black *Gelechia*, unknown to me, which Mr. Stanton pronounces to be probably *immaculatella*. Larvae found mining in the leaves of *Aster tripolium*, and supposed to be also *instabilella*, produced *ocellatella*; thus giving another food-plant, and even manner of feeding, to this insect.

On the cliffs at Morecombe, where *Genista tinctoria* grows, larvae of *Anarsia genistæ* were feeding in the shoots; but this insect appears so like the common form,

A. sparticella, that I am inclined to refer the difference in size and colour to the more succulent properties of the food-plant, just as *Depressaria costosa* is more deeply marked with reddish under the same conditions. It is, however, worthy of note that *genistæ* was feeding, June 8th; *spartiella*, July 5th. The larvæ were not compared in any way, nor indeed examined with the care due to them.

On the same day, at the same place, *Plutella annulatella*, in the larval state, was common on *Cochlearia anglica*; they emerged in the middle of July.

At the latter end of May, whilst collecting larvæ of *Coleophoræ* on the willows at Farrington, my attention was directed to the twisted condition of the shoots of *Lotus corniculatus* on the railway bank close by. Thinking this was owing to larvæ of *Sciaphilæ*, I neglected to gather many at the time, but afterwards, looking in the tin in which they were placed, I perceived a *Gelechia* larva, belonging to the *tæniarella* group, but darker in colour. In the latter end of June one imago of a *Gelechia* unknown to me appeared above the rubbish, and, on reference to Mr. Stainton, he pronounced it to be probably *cincticulella*, a species which feeds on the continent on *Genista*, but had not previously occurred in this country. I visited the locality this year, but only obtained one larva, which unfortunately died.

Larvæ of *Coleophora Wilkinsoni* begin to feed on birch at Witherslack about the beginning of July, and continue to do so, at intervals only, until September, when they hibernate full fed, and, if brought into the house early in the spring, will walk about as if seeking for food. This, however, they refuse, but change into pupæ, and emerge about the end of June. They are probably two-year feeders, as full-fed larvæ are to be seen whilst the moth is flying. They are thus very similar in habit to *limosiper.nella*, which, with us, never emerges in autumn, but feeds on through the summer, hibernates, and emerges a little later in the year than *Wilkinsoni*. It also feeds on birch.

After very patient and repeated search, at length larvæ of *Depressaria capreolla* were discovered feeding on leaves of *Pimpinella saxifraga*, not on the radical leaves, however, but on the higher shoots. They are deep green with black heads, and, through the plant being buried amongst larger herbage, are very difficult to find. A few perfect insects emerged early in August. The larvæ feed during July.

In July, 1877 and 1878, I had the pleasure of finding cones of *Gracilaria populetorum* on birch. At the former date one insect was bred from a miscellaneous collection of buds, mined leaves, &c., but this year, by observing the different modes of feeding adopted by the larvæ on the birches, I succeeded in taking about three dozen cones, which occupy an entire leaf, and inside which a green, semi-transparent larva was feeding. These changed to very long, taper, light green pupæ, from which emerged, in all, only five imagos, and about twenty large ichneumons. This accounts for the comparative rarity of the insect.

Some years ago, Mr. Hodgkinson bred a few *Asychna profugella* from seeds of gentian, and, as he had afterwards failed in another attempt, I tried, in addition, other seeds, such as *Pimpinella saxifraga*, wild carrot, &c. On the 29th September these were placed in a flower pot and exposed all the winter, when, to my great satisfaction, between July 1st and 30th, about two dozen imagos appeared, in company with *Semasia rufillana*, *E. flavigraculella*, and the pug, *Eupithecia denotata*. —J. H. THRELFALL, 4, East Cliff, Preston : August 14th, 1878.

Description of the larva of Miana furuncula.—For the discovery of the larva of this insect we are indebted to Mr. J. Gardner, of Hartlepool. During the first week in May last, he found a number of *Miana* larvae feeding on *Aira cæspitosa*, which he at once suspected belonged to *furuncula*. Seven or eight of them he forwarded to me, and on seeing them I had little doubt as to the correctness of his suspicion. This proved correct, as, although I was unsuccessful in getting a moth from my larvae, on the 19th July, Mr. Gardner was fortunate enough to breed the species from those he had retained for himself.

Length, about three-quarters of an inch, and of the usual *Miana* shape: head small, and very much narrower than the second segment; it is brightly polished, has the lobes rounded, but is pointed at the mouth. Body cylindrical, attenuated towards both extremities from the fourth segment, which is the widest: there is a polished plate on the front of the second, and another on the anal segment: skin smooth, but tough and rather glossy, which gives the larva a mealworm-like appearance.

The ground is a very pale straw colour, in some specimens strongly tinged with purple; head brown, the mouth still darker brown; the pale yellow pulsating alimentary canal forms the dorsal line; there are no perceptible sub-dorsal or spiracular lines; the plates on second and anal segments are a paler shade of brown than the head: spiracles large and round, intensely black. The only other marking is a faint purplish marbling in the centre of each segment, on each side of the dorsal line. Ventral surface and pro-legs uniformly of the ground of the dorsal area; the legs brown.

The cocoon is made inside the larger sheaths of the stem, near the root, and is rather strongly formed of little bits of the drier grass bitten out and cemented together.

The only *Miana* larva now undescribed is *expolita*, and I hope this may be settled next year, as Mr. Gardner, after a great deal of trouble, has supplied me with eggs of this species also: these hatched about ten days ago, and I hope the young larvae are going on well.—GEO. T. PORRITT, Highroyd House, Huddersfield: Aug. 10th, 1878.

Chrysopa tenella, Schneider.—Hagen, in his "Synopsis of the British Planipennæ," published in the Entomologists' Annual for 1858, included this species in the British List with doubt, on the authority of a single example in the British Museum. I omitted it in my "Monograph of the British Neuroptera-Planipennia" (Trans. Ent. Soc. Lond., 1868), but introduced it in the Catalogue of British Neuroptera, published by the Entomological Society in 1870, on the authority of a specimen taken by Mr. Wormald at Hampstead. It has since been found by me several times, and the indications of localities and dates are as follows:—Weybridge, 4th July, 1874; Tunbridge Wells, 28th July, 1874; Darent Wood, 3rd June, 1878; Weybridge, 17th June, 1878; Southborough, near Tunbridge Wells, 30th July, 1878. (One example from near Plymouth, end of August, 1877, is doubtful). On one occasion I found two examples on the same day, but otherwise it has only occurred singly. Schneider originally described it from a single example captured by him in the botanical garden at Breslau and I should say it is always scarce, judging from the paucity of examples from the Continent seen by me. It is a delicate little species, and the pale yellow (or whitish) dorsal vitta in living specimens gives it a resemblance

to *C. vulgaris*, from which it can at once be separated by the form of the third cubital cellule, and the partially black neuration, &c. It is apparently inodorous.—R. McLACHLAN, Lewisham : 2nd August, 1878.

Potamanthus luteus at Weybridge.—On the 6th of last month (July), I captured a large ♀ imago of this Ephemeron close to the mouth of the Wey. With the exception of a ♂ in my collection, a very old specimen obtained by me years ago (from a source I cannot now trace), the species has been only known as British by a sub-imago described by Curtis, in 1834, as *Baëtis mellea*, for which he gave no locality. A recent capture (with a definite locality) is worthy of record.—ID.

Cordulia Curtisi in Hampshire.—On the 1st July last, I caught six specimens (2 ♂, 4 ♀) of this handsome species on a heath lying to the north of Pokesdown, near Christchurh, Hants. As I understand from Mr. McLachlan that he is not aware of any specimens of this local species having been caught in this country for many years, my captures may, possibly, be considered worth recording.—H. Goss, Surbiton Hill : 17th August, 1878.

[This insect (now known as *Oxygastra Curtisi*) used to be taken not uncommonly in the New Forest District by the late Messrs. Dale and Curtis. Probably it may have been found continuously since, but I know of no recent records of its capture. On the Continent, it has been found in France up to as far north as Le Mans (lat. 48°), but is essentially southern and western, occurring only in the south of England, southern and western France, and in Spain and Portugal.—R. McLACHLAN].

Note on Trioza galii.—The sallow-pit at Lee, which, during the last thirty years, has afforded more rare species of *Lepidoptera*, *Coleoptera*, and *Hemiptera* than any other place of the same small extent in the kingdom, still exists, in spite of the near approach of houses, and its productions are not yet exhausted. On the 1st inst., from *Galium uliginosum*, which grows sparingly among the sallow-bushes, and also in the open part among the rushes,* I beat some twenty examples of the hitherto scarce *Trioza galii* into an umbrella, where they walked leisurely about, as though the domain were their own, not jumping except on persuasion; yet, on the other hand, one individual of a more venturesome or restless disposition flew down among his quieter relations. Even on the dark-coloured umbrella these black creatures, looking very like *Aphides*, were rendered conspicuous by their lustre, and by the snow-white band and spot on the abdomen. These latter are mentioned only by Flor, not by Foerster, the original describer, nor by others; and supposing the latter had to deal only with dry insects it may have been that in the process of drying the white markings were retracted under the preceding segments and thus became invisible.† Yet it should be remembered that Foerster had taken the species himself, and must, therefore, have seen the white markings noticed by Flor, which show through the closed wings, if they existed on his examples; further, that Foerster's species was found on *Galium verum*, which grows only in dry places, while Flor's species was

* *Galium palustre* also straggles up among the herbage under the bushes, and I am not sure that some of my captures did not come from it.

† Flor considers that these markings are of the nature of a secretion, but does not say they are evanescent: they are always regular in form.

common in wet meadows (food-plant not mentioned, but probably *Galium uliginosum* as recorded by Dr. Reuter). It does not, therefore, seem clear that Foerster's and Flor's species are the same. It has been surmised that the rare *T. velutina* is only a form of *T. galii*; they being confessedly very similar, but there is a discrepancy between the descriptions of the species by Foerster and Flor, like those of *T. galii* by these authors; that is, that Flor mentions conspicuous white markings on the abdomen, which are not noticed by Foerster, although he took the species himself. Provided that the difference is not accounted for by shrinking in the process of drying, as hinted above, there may here be two species instead of one, but as the food-plant is unknown, it is scarcely possible to get enough examples to settle this question or that of the identity of *velutina* and *galii*.—J. W. DOUGLAS, 8, Beaumont Gardens, Lewisham; August 9th, 1878.

The Microphone in Entomological research.—There can be little doubt but that the microphone will reveal much that is novel and interesting as regards the voices of insects. But I can scarcely agree with Mr. S. D. Bairstow's suggestion (*ante*, p. 43), that the spell by which male moths, such as *Saturnia carpini*, are attracted to the female can be a sound. There are cases on record where male moths have come eagerly to the empty cocoon or chrysalis from which a female had escaped, or even to some object upon which she had recently settled. (See *Zoological Journal*, v, p. 142). —J. W. SLATER, 3, Bicester Road, Aylesbury: August 3rd, 1878.

Reviews.

THE FAUNA OF SCOTLAND, with especial reference to Clydesdale and the Western District. HYMENOPTERA, Part i., by PETER CAMERON, Svo, pp. 52. Published by the Natural History Society of Glasgow, at their rooms in Anderson's College. May, 1878.

This is the first of a series of publications in which it is proposed to give Catalogues of the Scottish Fauna. A strong list of contributors in various branches is given as proof of the desire exhibited by the Society to make the work as complete as possible, and co-operation is earnestly invited from outsiders. This is evidently needed, and in Entomology especially, for some of the larger Orders of Insects are yet unallotted.

Mr. Cameron, who has engaged to Catalogue all the Scottish Hymenoptera (and some other more obscure groups), naturally commences with the *Tenthredinidae*, and notices 209 species, as against 360 found in Sweden, and 268 in France; but this latter numerical comparison is based upon very incomplete information.

Mr. Cameron evidently aims at making his portion of the work something more than a mere Catalogue. There is a long Introduction, with numerous very suggestive remarks upon distribution, nomenclature, &c., and most valuable notes on particular species, with descriptions of a few that are considered to be new. The table of comparative geographical distribution of the "Sub-tribes" is perhaps too extended, and liable to mislead, being, for the most part, based more upon negative than positive evidence, and there is one conspicuous omission, inasmuch as no comparison is made

with the *English Fauna*.* In endeavouring to make such a necessary comparison we have been struck with the preponderence of species of *Nematus* and the paucity of representatives in *Hylotoma*, &c., in Scotland. Some *Hylotomæ* that we in the south of England are disposed to consider "common objects" are apparently wanting across the border.

We regard this Catalogue as a good prelude to the work on British Saw-flies that Mr. Cameron is known to have in preparation for publication by the Ray Society. That it is occasionally marred by literary defects is to be regretted, such, for instance, as is shown in the note on *Eriocampa adumbrata* (p. 24), any attempt to translate which would, we think, drive an intelligent foreigner to the verge of distraction.

SYNOPSIS DES HÉMIPTÈRES-HÉTÉROPTÈRES DE FRANCE. 1er Partie, Lygæides.
Deyrolle, Paris.

The above is the title of an excellent monograph just published by the well known French Hemipterist, Dr. Puton. It is hardly necessary to say that the work is well done. All the species indigenous to France are described in it, and the genera and species are also worked out, showing their distinctive characters in very clear synoptical tables. After each species are given localities and the food-plant of the insect when known. About 157 species are described, making about three-fifths of the total number of European species, as given in Dr. Puton's last Catalogue.

The work will be of the greatest value to those who wish to distinguish the closely allied species of this family.—E. S.

Obituary.

Carl Stål. As already noted (p. 72, ante), entomological science has sustained a great and irreparable loss, the distinguished Swedish Hemipterist, Carl Stål, having died after a short illness on the 13th June last, at Frösundavik, near Stockholm, at the age of only 45 years.

He was born on 21st March, 1833, at the Castle of Carlberg, where his father, Colonel Stål, was then stationed ; was a student at the University at Upsala in 1853 ; passed the medico-philosophical examination in 1857, and then for some time studied anatomy and physiology at Stockholm. After a journey abroad he became, in 1859, Assistant to Professor Boheman in the Entomological Section of the National Zoological Museum, and, after the death of Professor Boheman in 1867, he was appointed by the Academy of Sciences Superintendent of the Section with the title of Professor. He had previously taken the degree of Doctor in Philosophy at Jena.

Both before and after his nomination he contributed by scientific excursions in his native country to the knowledge of its insect-fauna, having for this purpose visited the island Gotland in 1849 and 1863, the provinces Skåne, in 1853, and Ångermanland, in 1858. By many journeys to Germany, France, Denmark, and also to England (1862), and by studies at the museums abroad, he further extended his knowledge in entomology, and his "*Hemiptera Fabriciana*," vols. i and ii (K. Vet. Akad. Handl.,

* To a foreigner such an omission must prove especially puzzling. He will be apt to take it for granted that such genera as *Schizocera*, *Harpiphorus*, &c., do not occur in England.

1868—69), so important for the study of the Fabrician species of *Hemiptera*, founded on his examination of the Fabrician types at Kiel, bears testimony to his talent and assiduity.

Being charged to work out certain parts of the collections made in Caffraria by the celebrated traveller, P. A. Wahlberg, Stål was obliged to devote extensive study to Orders of Insects which till then were the most neglected and unelucidated, namely, the *Hemiptera* and *Orthoptera*: a part of the result is embodied in his "Hemiptera Africana," i—iv, Stockholm, 1864—66. He here gave special attention to the systematic classification of these insects, and every one who has been occupied therewith knows how difficult it is to find a clue to this, and can therefore appreciate the extreme merits of Stål in this result of enormous diligent work, and his special talent for such studies. Systematic Natural History is by no means easy; it requires a sharp eye for the essential characters significant of natural affinity, and this power of insight, which sometimes must be well nigh inspired, Stål had in the highest degree. If one only considers the enormous and almost untreated materials he has put in order, he may further observe the value of the principles he has followed, and which are now generally adopted, and cannot estimate his energy and ability too highly.

Most of the works of Stål are of a systematic character. His greatest and most significant is his "Enumeratio Hemipterorum," vols. i—v (in K. Vet. Akad. Handl., 1870—76), in which he has put together the results of all his former investigations which had been published in a multitude of papers, partly in the Öfversigt af K. Vet. Akad, Förhandl., and the Bihang till K. Vet. Akad. Handl., and partly in many foreign entomological journals. In his "Euumeratio" he became convinced of the impossibility of dealing systematically with all the *Hemiptera* of the world, at least at one time, and he has therefore treated them with respect to the great zoological regions. By this work he has erected for himself a lasting monument.

He also worked out for the European fauna some systematic sketches of great worth, namely, the "Revisio Pentatomidarum, Coreidarum, Lygaeidarum, Reduviidarum et Tingitidarum Europæ," in the Öfversigt K. Vet. Akad. Förhandl., in which is to be admired how, in a brief manner, he laid down a multitude of important characters, which had escaped the attention of others, and on which he has founded an arrangement of families and genera of which the naturalness is indeed striking.

He also devoted similar energy and ability to the *Orthoptera*, resulting in the "Recensio Orthopterorum," i—iii (1873—76)—a valuable communication concerning the systematic classification of these insects.

Among his other greater works we must especially mention the "Bidrag till Rio Janeiro traktens Hemipterafauna," i, ii (in K. Vet. Ak. Handl., 1860—62), and his "Monographie des Chrysomélides de l'Amerique," i—iii (in Nova Acta Regia Societatis Scientiarum Upsalensis, 1862—65). His smaller works we must pass by.

Stål is, without doubt, regarded by all entomologists as the most distinguished Hemipterologist of the present time, not only for the extent but for the solidity of his labours; and the museum of which he was the chief has now certainly the greatest collection of *Hemiptera* in the world.

In private life, Stål was very considerate and obliging; to manners quite without pretension, he united a warm heart, he was constant in friendship, and, in fine,

was a man of valuable and noble character ; all which qualities make the regret of those who had the delight of his personal acquaintance the deeper for their loss.—O. M. R.

ENTOMOLOGICAL SOCIETY OF LONDON : 3rd July, 1878.—H. W. BATES, Esq., F.L.S., &c., President, in the Chair.

Mr. B. S. Nevinson was elected a Member, and Mr. J. A. Finzi a Subscriber.

Mr. Paseoe exhibited a selection from his captures on a recent expedition to Algeria and the South of Spain ; including *Scorpio funestus*, *Tarisa dimidiata*, *Anthocharis Nonna*, *Typhlopone oravensis*, &c., &c.

Mr. W. C. Boyd stated that, according to his experience, the grass in which the larva of *Elachista cerusella* mines is *Phalaris arundinacea* and not *Arundo phragmites*, as is generally believed, and considered the mistake was due to the difficulty of separating these plants when only in leaf. But Mr. Stainton and others thought it was still an open question as to whether the species might not be also attached to the *Arundo*. (We shall be glad to learn the experiences of other breeders of *Micro-Lepidoptera* on this point.—EDS.)

Mr. Distant exhibited a species of *Homoptera* from New Zealand, sent to Dr. Sharp by Mr. Lawson, and which he identified as *Ricania australis*, but it was darker than Australian specimens of the same species ; it had been found on the Dahlia in New Zealand.

Professor Westwood called attention to an article by Dr. Packard in the "American Naturalist," for June, 1878 (vol. xii, p. 379—383) on "The mode of extrication of silk-worm moths from their cocoons" by means of a tooth at the extreme base of the anterior-wings, and considered by the writer (who referred especially to *Attacus luna*) to be a new discovery. He pointed out that the fact was not new but had been long ago observed by Captain Hutton with regard to *Attacus Selene* in India, and published in vol. v. of the 1st series (p. 85) of the Society's "Transactions."

Professor Westwood also alluded to a Lepidopterous larva injurious to potatoes by boring in the stems, and considered by him to belong to the *Pyralidae*.

Mr. Jenner Weir exhibited examples of *Leucania turca* from the New Forest, to the haustella of which pollen-masses of *Habenaria bifolia* were attached. Also a singular aberration of *Hipparchia Hyperanthus*, in which the eye-spots on the under-side of the wings were oval instead of round.

Mr. Dunning exhibited living examples of the spider *Thomisus citreus*, sent to him by Mr. Nottidge, of Ashford, as a good instance of mimicry, the white colour serving a purpose useful to the spider (a hunter, and not a spinner) by concealing its presence in the flowers it frequents.

Sir S. S. Saunders communicated notes sent to him by Mr. J. Haselden, from Egypt, relating to the habits of a honey-bee (probably *Apis fasciata*), in which he had observed several females and attendant "swarms" issue from the same hive at short intervals.

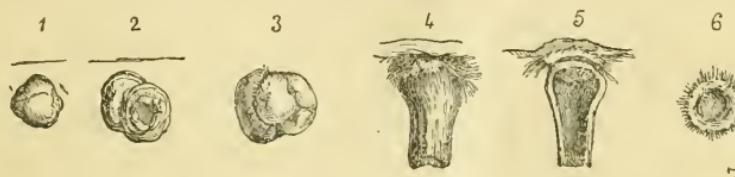
Mr. C. O. Waterhouse read a paper on New *Coleoptera* from Australia and Tasmania in the collections of the British Museum.

NOTES ON LEAF GALLS ON *PARINARIUM CURATELLIFOLIUM*.

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

The accompanying figures represent two kinds of leaf-galls on *Parinarium curatellifolium* of Central and West Africa, which, though unaccompanied by specimens of the gall-makers, may be of some interest from their complicated structure.

The trees of this genus (perhaps best known in the species called the gray plum of Sierra Leone) belong to a sub-division of the *Rosaceæ*, occurring for the most part in the tropical regions of Amer-

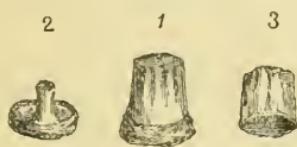


E.O.

Fig. 1

rica and Africa; and the African specimens which I have had an opportunity of examining in the Herbarium of the Royal Gardens at Kew shew a considerable variety in the nature of the galls, which are formed for the most part on the leaves, but in some cases on the stem, or the pedicels of the inflorescence. Of the leaf-forms, one bears much resemblance to the *Phytophterus* nail-gall of the lime tree (*Tilia intermedia* and *T. grandifolia*), though differing in some points of structure.

Another causes a swelling of the leaf-surface about an eighth of



E.O.

Fig. 2

an inch or more in horizontal diameter, glabrous on the upper side of the leaf, and mealy below, corresponding with the remarkable mealiness or roughness of the under surface of the leaves.

Internally, these galls are spongy and sometimes two- or more-chambered, and, in this case, a few specimens of *Chalcididae* were still present, but too brittle, from lapse of time, to bear removal for identification. A third species is almost similar in size and general appearance to our own *Neuroterus lenticularis* gall, the common oak-spangle. This species shows, when magnified, a central disc surrounded by a well-defined ring, the whole being covered with orange-yellow pubescence, and the insect-chamber remarkable, in the specimens I examined, for extending as a horizontal slit of an equal width throughout, across the whole breadth of the central disc.

A fourth species appears as a mass of upright orange-yellow hairs,

somewhat drawn to a blunt point (not unlike the lower half of a camel's hair pencil cut off and set up on end), but in this case I had no opportunity of examining the nature of the central gall-mass.

One, or possibly two, other woody knob-like forms were noticeable on the twigs and the pedicels, but the most unusual forms were those of the leaf galls given in figs. 1 and 2.

Of these, fig. 1 shows a form occurring on the under surface of the leaves of *Parinarium curatellifolium*, of which the progress of development may be traced from the commencement.

Here the first stage consists simply of a blister-like swelling shown at (1). This is followed by the appearance of the future gall, pressing forwards as a minute, fleshy, lobed ring, of a deep reddish colour (2) through the first grey blister-like swelling, the growth of the red gall and its grey basal involucrum continuing until the former, through the stage of a lobed bud-shaped mass (3), gradually lengthens into a flask-shaped gall (4), about three sixteenths of an inch in length. Internally, this gall is single-chambered and smooth, closed at the mouth of the tube by a thick mass of downy yellowish hairs, and another mass of straight and centrally-pointing hairs is placed at the bottom of the chamber (5). The gall, in its fully developed condition, is of a deep red colour, and hangs from the leaf like a miniature acorn in its cup, for the growth of the blister-like swelling through which it sprung keeps pace with it, and now forms a pubescent socket distinct in colour and structure from the gall itself, from which it is ultimately freed by the fall of the gall to the ground, whilst the socket remains permanently attached to the leaf (6).

In the leaf-gall given at fig. 2, which, like the previous one, is on *Parinarium curatellifolium*, and magnified to about four times its natural size, the growth is still more peculiar. Here the appearance of the gall when complete resembles a miniature tumbler-glass inverted and set in a ring. At maturity, the two parts separate, or are separable, the cap falling off and leaving (as shown at 2) the base formed of a ring enclosing a concave disc, with flutings from the circumference to the centre, which rises in an upright cylinder, of a width of about a quarter of that of the gall, and a length of somewhat more than twice its own diameter. The fallen cap is merely a truncated cone, flat or slightly concave at the top, and slightly fluted vertically downwards from the summit for about half the length. The hollow central cylinder is presumably the gall-chamber; but insect presence was so totally non-existent in the few specimens attainable for examination, that I cannot hazard a conjecture as to the gall-maker. It would be of

much interest to discover from fresh specimens what parasitical or other exigencies the very peculiar and apparently defensive structure is intended to serve.

In the case of the flask-shaped gall (fig. 1), there was also no clue by determinable insect-presence to the gall-former; but in all probability it belonged to one of the *Psyllidæ*.

Spring Grove, Isleworth :

September, 1878.

NOTES ON AFRICAN HEMIPTERA-HETEROPTERA.

BY W. L. DISTANT.

SCUTATA.

Genus *ASPONGOPUS*, Lap.

ASPONGOPUS INTERMEDIUS, n. sp.

Greenish-black, corium and membrane dull purplish. Pronotum and scutellum thickly and coarsely punctured, the scutellum transversely rugulose, corium thickly and finely punctured. Pronotum with the lateral edges broadly reflexed and luteous above and below, border of corium, at base only, of the same colour on both sides. Antennæ black, 2nd and 3rd joints sub-equal, 4th somewhat incrassated and sulcated, a little shorter than apical joint, which is the longest, and clothed with pale pubescence. Rostrum piceous, 1st joint sulcated, 2nd joint the longest. Abdomen above pale olivaceous, with a marginal segmental row of alternate quadrate black and luteous spots. Under-side shining dark olivaceous, very thickly and finely punctured, with a marginal row of quadrate luteous spots occupying the centre of the outer edges of the segments. Femora and tibiæ strongly sulcated.

♀. Long. 17 mm.

Madagascar (Crossley).

This species is allied to *A. flavo-marginatus*, Sign., and *A. rotundatus*, Sign., its place being between the two. It differs from the first by its very much smaller size, the very strongly reflexed and rounded lateral edges of the pronotum (sinuated somewhat in *flavo-marginatus*), and in the luteous costal border of the corium being confined to the base only. From *A. rotundatus* it is distinguished by its very much larger size, and Stål, who seems to have examined the species, thus writes (Hem. Afr., i, p. 217), "articulo secundo antennarum tertio sub-breviore," and, in comparison with *A. flavo-marginatus*, the pronotum is "marginibus lateralibus multo minus late flavescentibus." The general colour also seems to be different.

ASPONGOPUS FARLEYI, n. sp.

Castaneous, with obscure green reflexions, thickly and coarsely punctured. Antennæ black, 1st and 3rd joints sub-equal, shorter than 2nd, 4th longest, incrassated, obsoletely sulcated, apical joint somewhat shorter than preceding, narrowly fuscous at tip. Head emarginate at apex, sides sinuated. Rostrum piceous, apical joint paler. Base of pronotum and scutellum somewhat rugulose. The green reflexions are principally observable at base of pronotum, apex of scutellum, and apical half of corium. Membrane castaneous. Abdomen above rufous.

Long. 17 mm.

North Nyassa (Farley).

This species is allied to *A. viduatus*, Fab., from which it is structurally distinguished by the length of the 2nd joint of the antennæ, and the strongly incrassated and sulcated appearance of the 4th joint. The colour of the abdomen above, and absence of the black frontal markings of the pronotum, also prevent confusion.

REDUVIIDÆ.

Genus *PLATYMERIS*, Lap.

PLATYMERIS CONFUSA, n. sp.

Black, a large sub-quadratae spot about centre of corium, and femora near apices banded with luteous. Pronotum with frontal lobe armed with a short spine on each side, and deeply excavated and furrowed. Posterior lobe with the disc elevated, on which is a faint central longitudinal impression, and the lateral angles produced into acute spines directed backwards. Antennæ, with the exception of the basal joints, obscure castaneous, pilose. Legs pilose, the femoral luteous bands broadest on fore femora, and narrowest on the posterior. Abdomen above rufous, with the sides and apex black. Membrane somewhat paler, and obscure fuscous.

♀. Long. 41 mm.

Nyassa.

This species is allied to *P. Rhadamanthus*, Gerst., from which it is separated by the armature of the anterior lobe of the pronotum. The three allied East African species can be thus identified :

- A. Lateral angles of posterior lobe of pronotum produced into acute spines.
 - a. Anterior lobe of pronotum unarmed *Rhadamanthus*, Gerst.
 - b. Anterior lobe of pronotum with spine on each side.....*confusa*, Dist.
- B. Lateral angles of posterior lobe of pronotum rounded.
 - c. Anterior lobe of pronotum with spine on each side.....*guttatipennis*, Stål.

I have lately received from the northern end of Lake Nyassa five specimens (♂ & ♀) of *Platymeris Rhadamanthus*, Gerst. They differ from the figure of that species in the "Reise in Ost-Afrika" in having the spot on the corium, as well as the femoral markings, rufous. They are also rather larger in size.

Derwent Grove, East Dulwich :
July 13th, 1878.

DESCRIPTIONS OF NEW SPECIES OF *ERYCINIDÆ*.

BY HERBERT DRUCE, F.L.S.

ABISARA ROGERSI, n. sp.

Allied to *A. Gerontes*, but differs as follows: the ground colour of the wings much paler brown, the white band on the anterior-wing broader and straighter, between it and the apex a second narrow white band, indistinct near the inner margin, the black spot near the apex wanting. Posterior-wing: the white band much broader, and extending almost to the outer margin, and only separated from the white tail by a narrow brown line. On the under-side all the brown markings are very indistinct, almost white.

Exp., 1½ inch.

Hab.: Angola (H. Rogers).

Mus. Druce.

MESOSEMIA THYESTES, n. sp.

Allied to *M. Jeziela*, differing as follows: the white band of the anterior-wing very broad, bordered inwardly with light blue, not reaching the costal margin, but only to the end of the cell. Posterior-wing the same as *M. Jeziela*, but with the outer margin broadly black, bordered inwardly with pale blue. Exp., 1½ inch.

Hab.: Chanchamyo, Peru (H. Whitley).

Mus. Druce.

MESOSEMIA SYLVIA, n. sp.

Upper-side: anterior-wing dark brown, crossed at the middle by a broad band of greyish-white, a narrow white band crossing the middle of the greyish band from the anal angle to the end of the cell, a small black ocellus at the end of the cell, and an elongated black spot below. Posterior-wing, from the base to the middle, dark brown, from the middle to the outer margin greyish-white, the apex brown, a narrow white line crossing from the apex to the anal angle. Under-side pale brown, with the white bands more distinct than above. Anterior-wing: the ocellus and black spot surrounded by three waved lines of darker brown; the posterior-wing is crossed from the costal to the inner margin by nine waved lines of dark brown, the outer margin is broadly brown.

Exp., 1½ inch.

Hab.: Bolivia (Buckley).

Mus. Druce.

EURYGONA PHELINA, n. sp.

Upper-side uniform pale brown; under-side pure white. Anterior-wing crossed from the costal to the inner margin by five narrow bands of pale brown, the outer margin brown. Posterior-wing crossed by three brown bands not reaching below the cell, a large black spot in the middle close to the outer margin, and one small spot nearer the anal angle, the space between the spots yellow; a waved submarginal band of brown crossing the wing from the apex to the anal angle. Exp., 1¼ inch.

Hab.: Maracaibo, Venezuela (Moritz).

Mus. Druce.

EURYGONA ALCMENA, n. sp.

Upper-side dark brown, palest at the apex of the anterior-wing. Under-side

pale drab-brown, both wings crossed at the middle by a narrow orange coloured band, a faint waved brown line between it and the outer margin ; the posterior-wing with a submarginal row of small black spots, the fifth the largest. Exp., $\frac{3}{4}$ inch.

Hab. : Ecuador (Buckley).

Mus. Druce.

EURYGONA JULIA, n. sp.

Upper-side : anterior-wing dark brown, shaded from the base to the middle with rufous-brown. Posterior-wing dark rufous-brown, with the outer margins dark brown. Under-side dull white, the margins rufous. Both wings crossed by a continuous curved rufous line, slightly broken near the inner margin of the posterior-wing. Anterior-wing crossed by a submarginal faint brown line. Posterior-wing with a submarginal line of five black spots, minute, except the one nearest the costal margin.

Exp., 1 inch.

Hab. : Santarem, Amazon (H. H. Smith).

Mus. Druce.

The Beeches, Circus Road, St. John's Wood :

September, 1878.

NATURAL HISTORY OF EBULEA VERBASCALIS.

BY W. BUCKLER.

In the Entomologist's Weekly Intelligencer, vol. x, p. 71, is recorded the first information of *Teucrium scorodonia* being the food plant of *verbascalis* by Mr. McLachlan, who mentions therein the fact of his finding in the autumn of 1860 "larvæ, evidently *Pyralidæ*, on this plant," which, with true prophetic instinct, he refers to this species ; from the brief description there given of the characters he observed in those larvæ, I have the fullest evidence now to offer in proof of the correctness of his judgment.

Dr. Hofmann, in his "Kleinschmetterlingsraupen," published in 1875, quotes first the Vienna Catalogue, wherein *Verbascum* is given as the food plant, and, secondly, adds that, according to Rössler, the larva should rather be sought on *Teucrium* ; Rössler's work is dated 1864—66, four years after Mr. McLachlan had published his discovery.

On August 8th, 1877, I had the pleasure to receive from my friend, Mr. W. R. Jeffrey, two dozen eggs of this species, being part of a batch laid, a few days before, on both sides of some leaves of *Teucrium scorodonia*, beyond doubt their proper food plant, which had been ascertained the previous season by Mr. Jeffrey, who on this occasion kept a few of the eggs for himself, with advantage to our object of elucidating the history of this hitherto unknown larva.

The eggs hatched on 11th and 12th of August, and the young larvæ were supplied with *Teucrium*, on which they soon settled themselves, creeping under the leaves, each one by itself choosing a place

whereon to spin a small layer of silk to secure its footing and soon to convert into a most minute tubular kind of gallery, which, in some instances, slightly united one leaf to another, if they were at all in contact. In a few days, they ate small holes through the leaves, and, after a moult or two, the holes became more conspicuous, so that as the larvæ grew their ravages indicated sufficiently well their situations on the plant ; and, by the end of August, they had grown to be a quarter of an inch long, still protecting themselves with a little silk under the leaves ; but as their growth increased, they no longer made any elaborate retreat, beyond occasionally turning down a part of a leaf with a few threads of silk, or more often by similar means attached one leaf to another as a screen or hiding place in which to lie sheltered : they were in their last coats when about thirty to thirty-five days old, and were full fed by the fortieth and spinning themselves up, mine in earthen cocoons, those of Mr. Jeffrey in sand, which his local knowledge enabled him to give them to make up in. Judging from the behaviour of the larvæ in captivity, they should be easily dislodged from the plants by shaking or beating, indeed, the first two larvæ I had to figure in 1876 were obtained in this way by Mr. Jeffrey at Folkestone as late as September 27th.

As to the moths, Mr. Jeffrey fortunately bred a few this summer on June 27th, 30th, and July 8th, although some of his larvæ, like the whole of mine, died in their cocoons during hibernation.

The egg of *verbascalis* is circular, flat and scale-like, colourless and semi-transparent ; two days before hatching it begins to fill out gradually with some degree of plumpness on the upper surface, showing opaquely the embryo through the shell, which has on it numerous little glistening pits.

When first hatched, the larva is whitish, semi-translucent, and rather lively ; when seven days old, it becomes slightly tinged with pale bluish-green, and about the nineteenth day, when a quarter of an inch long, shows faintly a stronger green dorsal stripe between two lines of whitish, some light brown freckles on the head, and most minute black dots sprinkled over the body : at the age of twenty-five days, its length is from three-eighths to nearly half-an-inch, when the pale head is more distinctly freckled with brown, the green stripe on the back and broad band of the sides are brighter, darker and broader than before, the two white stripes of the back appear more purely white, and a whitish spiracular line is seen extending from the third segment to the side of the anal legs, while beside the black dots, previously noticeable, one on either side of the third and fourth segments is now conspicuously larger than the others.

The full grown larva measures from six-eighths to seven-eighths of an inch in length, tapering at each end, the segments well divided, and beyond the fourth each is sub-divided by a deep transverse wrinkle on the back into two nearly equal portions; on the belly they are more deeply divided and very plump; the ventral and anal legs slender, the anal pair extended behind in line with the body: in colour the head is of a pale watery drab, finely dotted on the crown with black, and freckled with brown on the sides of the lobes, and a pair of blackish dots are a little above the mouth; the second segment has much the same pale ground colour as the head, and is also freckled with light brown on the side, where there is a conspicuous black elongated dot, and on the dorsal region is broadly marked, somewhat triangularly, with rich semi-translucent full green, which continues from thence as a broadish dorsal stripe of equal breadth as far as the eleventh segment, from whence it becomes gradually narrower to the thirteenth, having within it a darker pulsating vessel; this green stripe is bordered on either side by a rather narrower stripe of opaque-whitish, with its outer edge a little ragged and slightly melting into the rich translucent full green of the sides, inclining a little in part to bluish-green, this is again relieved by the spiracular stripe of yellowish-white, extending to the anal legs, having throughout its course along each segment a straight lower edge and a concave upper edge, thickening the stripe at each segmental division and thinning it in the middle of a segment, just where each round black spiracle is placed on it; the belly is of a very pale watery tint of greenish, and has the faintest possible paler line a little below the spiracles; the tubercular warts are of the ground colour on which they occur, each having a small central black dot with a fine hair; the whole skin very glassy and shining.

The cocoon is more or less of an oval shape, about half-an-inch in length by a quarter in breadth, externally covered with fine grains of sand or of earth, and internally lined smoothly with greyish-white silk, very tough in texture. The pupa measures three-eighths of an inch in length, is moderately slender and quite of the usual pyralideous form, the thorax being slightly keeled, the spiracles on the fixed rings of the abdomen rather prominent and larger than those on the flexible rings, the wing covers long, the leg and antenna cases longer still, extending a little free beyond them, the bluntish tip of the tapering abdomen has a more pointed dorsal prolongation, furnished with two very minute converging bristles; its colour is ochreous-brown and rather shining.

ON THE PUPATION OF THE NYMPHALIDÆ.

BY J. A. OSBORNE, M.D.

Whilst thanking Dr. Chapman for his information on this subject in the last number of your Magazine, I can by no means accept his suggestion that the membrane described by me "is neither more nor less than the linings of the tracheæ," because I find it existing along with, and in addition to, these exuviae and those of the alimentary canal, which, moreover, I find not to have any influence in the support of the chrysalis; also, the attachment of this membrane to the chrysalis is at a point where no spiracle or other opening exists. I send herewith a few specimens, a look at which I think is sufficient to settle the point. The chrysalis of *Vanessa* was prepared last year, and is still in good condition; those of *Pieris brassicæ* were made a few weeks ago. One of these, in which the larva-skin has been turned inside out, shows the linings of the last tracheal tube on each side, and in the middle the triangular shaped ligament of suspension. Its apex is more pointed than it should be, because its attachment to the chrysalis is at two adjacent points, from one of which it had separated before drying. In removing the specimen, the second point of attachment has now given way also, but the dried skin retains its shape; and the two whitish points on the chrysalis, to which the membrane was originally attached, may be very easily seen. I do not think this membrane can be made out by simple observation, without a little manipulation. My method was to remove the caterpillar pupating, or about to pupate, from its attachment, lay it on its back, and when exclusion was somewhat more than half advanced, whilst making counter extension on the chrysalis, with a pair of pliers to seize the larva-skin on the ventral aspect and gently draw it down over the tail. The caterpillar skin will then turn inside out, like a stocking drawn off the foot, the linings of the tracheæ may be seen coming out of the spiracles, and that of the intestine from the anus, whilst the tough and persistent "larvo-pupal" membrane will be clearly defined. It is difficult, however, to preserve it longer than a few minutes, owing to the twistings and writhings of the insect, and its own tendency to rupture after desiccation, or rather to part smoothly from the chrysalis like the jointed petiole of a leaf; but when still fresh, considerable force may be used without detaching it, so that the chrysalis will be drawn out threatening to be torn asunder before the ligament will break. At this time of course there is nothing else holding the chrysalis and larva-skin together—no pinching of the folds of the latter between the rings of the former. The membrane is quite sufficient of itself.

This year I have reared several hundreds of the caterpillars of *Pieris brassicæ*, and, after cutting the loops and making them hang by the tail like *Suspensi*, I have watched their subsequent exclusion. Some 200 succeeded in fixing their tails in the silk, and remained suspended; while about 150, after a few *minutes'* endeavour, fell down, having failed to reach the silk with their hooks; some difference in the relative length of the tail and membrane probably determining the result. In some of the batches as many as two-thirds were successful in hooking themselves on by the tails, and I have no doubt, with more careful management, the proportion would be still higher. In several instances these *Pieris* caterpillars spun a *double loop*. I enclose a pupa of one of these.

Is not this membrane a persistent and specialized portion of the general subcutaneous connective tissue? persistent in part, as Dr. Chapman observes, for want of a *point d'appui* from which to act upon it before the tail of the chrysalis is fixed. In that case one would look for it, or something like it, even where no such purpose could be served by it as in the case of the *Suspensi*. Last year I watched the pupation of a small beetle (*Gastrophysa raphani*) in a great many instances, and found that it occupied very nearly about twelve minutes. But, whilst the pupa was completely excluded in about six minutes, something held the old skin so firmly to the tail of the pupa, that the rest of the twelve minutes was occupied in getting rid of it altogether. The old skin was not merely resting there, or adherent to a hair, but firmly attached, and not to be removed by a camel's hair brush. Of course, in the natural circumstances, where the insect would have crept under dead leaves or grass when fed up, and could have acted against these, it might have been able to rid itself sooner of the exuviae.

Milford, Letterkenny :
September, 1878.

[We have forwarded to Dr. Chapman the preparations above referred to.—Eds.]

Pieris rapæ attacked by *Microgaster*.—Believing that the exhibition by Mr. Boyd of a larva of *Pieris rapæ* attacked by *Microgaster*, at a Meeting of the Ent. Soc. on November 7th, 1877, is the only evidence brought forward of that parasitism, I beg to say that I have to-day found a shrunken larva of the butterfly surrounded by some twenty cocoons of the familiar parasite.

I have this month bred several specimens of a Chalcid from a pupa of *P. rapæ*; and have, in former years, bred many specimens of a *Tachina* from pupæ of the same butterfly.

If it be desired, I think all three of these parasites may be introduced into America. The *Microgaster* could be sent as soon as its cocoons are formed; and numbers of the pupæ of the butterfly could be collected and forwarded, and though most of them would yield butterflies (which could be destroyed on emergence), some would be likely to yield *Tachinæ* and Chalcids.—J. E. FLETCHER, Happy Land, Worcester: *August 19th, 1878.*

Acherontia Atropos and *Thecla quercus* near Bedford.—I wish to record the capture of a specimen (♀) of *Thecla quercus* on the 17th of this month, at an oak wood near the village of Stagsden, about four miles from here. From enquiries which I have made, it would appear that no specimen of this butterfly has been taken in the county of Bedford for at least many years past. It was about 5 p.m. when I took it, and the afternoon was very dull and cloudy.

A friend of mine also obtained a fine larva of *Acherontia Atropos* the day before, near the same place. This is also unusual here.—W. GREENWELL-LAX, 101, Tavistock Street, Bedford: *26th August, 1878.*

Acherontia Atropos in the Isle of Man.—This afternoon, about 3 o'clock, a large moth flew past me in one of the principal streets of Douglas, and settling upon the trousers of a boy, I was able to secure it. It proved to be a female specimen of *Acherontia Atropos*. This being, I believe, the first record of the occurrence of the insect in the Isle of Man, and the singularity of the place and hour of its flight, will perhaps excuse my troubling you to insert this notice.—EDWIN BIRCHALL, Douglas: *August 29th, 1878.*

Leucania extranea at Walmer.—I took a specimen of this rare British Noctua at sugar on the night of September 1st, at Walmer, in the precise locality where I took *L. albipuncta* last year. So far as I can ascertain, this makes about the fourth recorded British example of *L. extranea* (= *unipuncta*, Haw.).—R. MELDOLA, 21, John Street, Bedford Row, W.C.: *16th September, 1878.*

Acronycta alni in the New Forest.—Perhaps the following may be of some interest to your readers. My son beat a very fine and healthy larva of *Acronycta alni* from an oak tree at Lyndhurst, on the 9th inst. It fed up, and is now going into the pupa state.—HENRY NEALE, 45, The Canal, Salisbury: *August 23rd, 1878.*

Pachnobia hyperborea (*alpina*).—I think it may be well for me to make public the fact that I know all the specimens of *Pachnobia alpina* mentioned in the letter addressed to Lord Walsingham, and published by him in your Magazine, to be British.

I have spent the whole season in Scotland this year, visiting various parts of the country, and, during my tour, I formed the acquaintance of Lord Walsingham's correspondent. He was working for *P. alpina* during the time I was staying in his neighbourhood, and I saw some of his specimens taken, and all of them after being taken. I myself took some beautiful specimens.—JOHN B. BLACKBURN, Forres, N.B.: *9th September, 1878.*

[We do not imagine that any one doubted the British origin of the specimens alluded to.—EDS.].

Miana furuncula.—In the present (September) number of this Magazine (at p. 91), the discovery of the larva of *furuncula* has been erroneously assigned to Mr. J. Gardner; whereas, in point of fact, this discovery was really made by Dr. Knaggs eleven years ago!

A brief account of the circumstance, together with a description of the larva while it retained all its characteristics, will be found in volume iv, p. 137.—W. BUCKLER, Emsworth : September 2nd, 1878.

Ennomos alniaria at Alverstoke.—On looking over a small collection made by a young friend resident here, I was surprised to see three specimens of *E. alniaria*, all of which he took last autumn on the gas lamps about here. I hope, if I remain, to be similarly fortunate.—E. F. HEATH, The Brooklands, Bury Road, Alverstoke : August 27th, 1878.

Description of the larva of Acidalia imitaria.—On the 13th July last, at Thruxton, Hants, I captured a ♀ *A. imitaria*, which laid eight eggs on the following day. These hatched on the 22nd July, and the young larvæ fed up rapidly on lettuce, which they seemed to prefer to *Polygonum*.

When first hatched, the larva is extremely slender and thread-like, more so than the larva of any other species of the genus with which I am acquainted. Of the eight larvæ one was lost, and another died from the effects of a bite received from one of its companions, the remaining six attained maturity about the middle of August.

The full-grown larva may be thus described: length about one inch and a quarter, the head rather narrower than the 2nd segment and indistinctly notched on the crown, the face flat with the lobes rounded; the segments gradually taper from the 12th to the 2nd, they are transversely ribbed throughout and overlap each other at the divisions; the colour of the head is wainscot-brown, and of the dorsal surface of the body dirty greenish-ochreous, paler at the sides, especially on the skin-fold; the medio-dorsal stripe is very pale and hardly perceptible on the 2nd and 3rd segments, but on the 4th and succeeding segments is of a greenish-brown colour, which increases in intensity at the division of the segments and at the anal extremity; on each side between the medio-dorsal stripe and the spiracles are two very pale, indistinct, and irregular lines; the ventral area is pale dirty greenish, and there is a faint indication of a central line throughout its length; the spiracles are black, and there is a minute black dot on each side of the medio-dorsal stripe on the 4th, 5th, 6th, and 7th segments. On several of the segments there are a few, irregularly scattered, bristly hairs.

The larva spins a light cocoon of loose threads, mixed up with morsels of dried leaves. The pupa, which is about five lines in length, is of a golden-brown colour, excepting the wing-cases, which are ochreous-yellow.

The first four imagos emerged on the 10th instant, and the remainder on the 12th.

Notwithstanding the unusual food of the larvæ, the imagos do not differ, either in size or colouring, from the ordinary type of the species.—H. GOSS, The Avenue, Surbiton Hill : 14th September, 1878.

Note on Coccycx distinctana, Wilkinson.—In his Notes on British Tortrices in this Magazine (vol. x, p. 65), Mr. Barrett, speaking of *Coccycx distinctana*, says that Prof.

Zeller considers it to be only a variety of *hyrciniana*, and he further writes me word that this is the general opinion of continental entomologists ; but, from what follows, there can be no longer any doubt that it is a good species, and abundantly distinct from *hyrciniana*.

The perfect insect occurs here about midsummer among silver firs, and on these same trees in the autumn are to be found little larvæ which it would seem natural to infer are the progeny of the moths ; but, inasmuch as they are very subject to the attacks of ichneumons and hibernate full-fed, the difficulty has been to prove the connection, and for three seasons I have tried in vain to rear them.

Under these circumstances, I have attempted the problem in another direction, and this summer enclosed a female moth in a bottle with a small sprig of silver fir. After a time, the spray became dry and mouldy, and was put aside as a failure. However, picking up the bottle by chance one day at the end of August, I saw that some larvæ had been at work after the manner of those I had been so long familiar with on the fir trees, and as the precaution had been taken to gather the spray from an isolated tree, on which neither the moth nor larva had ever been seen, and upwards of a mile from the locality of the insect, there could be no other conclusion but that they were the produce of the moth that had been imprisoned, and that at last the problem had been solved.

Distinctana differs from *hyrciniana* far more in the larval than in the perfect state. First, as to the difference in habits of the two larvæ. The food plant of *hyrciniana* is spruce ; that of *distinctana* silver fir. The former feeds more or less through the winter ; the latter becomes full fed in the autumn, though it does not pupate till the spring. Both feed within the needles of their respective trees, drawing several of them together with silk ; but whereas *hyrciniana* does this in a loose and untidy manner, with no approach to the formation of a chamber, and makes use of a brown coloured silk in which much frass gets entangled, *distinctana*, on the other hand, draws the needles neatly and closely together, forming a small and compact chamber, quite free of frass inside and out, and with silk of a whitish colour. I may observe, it would be easy to overlook the larva of *distinctana*, and throw away one of its domiciles as untenanted, for the larva does not reside in the chamber (well adapted and even designed as it would seem for this purpose), but invariably within one or other of the excavated needles.

Second, as to the difference of the larvæ themselves. *Distinctana* : colour a very pale green, semi-transparent ; head and plate on 2nd segment pale amber coloured ; legs green ; the usual spots are brown, and there is a dark dorsal line, but no other markings. *Hyrciniana* : colour at first green, but darker in tint and less transparent than in *distinctana* ; head and plate on 2nd segment black ; legs black ; dorsal line not apparent, subdorsal line distinct and rather broad, reddish-grey ; no other markings. When full fed the colour changes to a pale pink, and the head becomes brown.—JOHN H. WOOD, Tadcaster : *September, 1878.*

[The "silver fir" is *Abies picea*.—EDS.]

Mr. Moore's "Revision of the Lithosiidæ."—In the first part of the Zoological Society's Proceedings for the present year (pp. 3—36) Mr. F. Moore, of the India Museum, has published "A Revision of certain genera of European and Asiatic Lithosiidæ, with characteristics of new genera and species." As it is probable that

a large number of English Lepidopterists do not see this work, I have thought that it might be useful to abstract from Mr. Moore's paper such parts as concern the arrangement of the British species of this group: (p. 9), *L. rubricollis* is the type of the genus *Atolmis* of Hübner (1816), which has precedence over Stephens' *Gnophria* (1829); (p. 14), *L. quadra* is the type of *Lithosia* of Fabricius (Ent. Syst. Suppl., p. 459, 1798); (p. 16), *Collita* is a new genus with *L. griseola* for its type, and including *L. complanula* and *stramineola* (? also *complanata*); (p. 16), *Katha* is a new genus, including *L. helvola*; (p. 17), *L. caniola* is the type of *Eilema* of Hübner (1816); (p. 18), *L. aureola* is the type of the genus *Systropha* of Hübner (1816); (p. 27), *L. muscerda* is the type of the genus *Pelosia* of Hübner (1816), which takes precedence over *Samera* of Wallengren. Differential characters, founded chiefly on the neuration of the wings, are given for all these and many other genera, the family *Lithosiidae* being divided into two sub-families, *Hypsinæ* (all exotic) and *Lithosiinæ*, which latter again is divided into seven minor groups.—W. A. FORBES, St. John's College, Cambridge: August 15th, 1878.

Food of Tinea ferruginella.—The last week in August, 1876, I obtained a quantity of *Artemisia absinthium* (wormwood), and as it was gathered it was placed in a linen bag, for the purpose of obtaining the larvæ of *Cucullia absinthii*; the following week I searched it and found three; it was at once replaced, tied up tightly, hung up and remained until the 21st February following. I then searched it, with the view of finding *Eupithecia* pupæ, but was disappointed. During the search about half-a-dozen *Tinea ferruginella* flew out, which I captured; I then collected all the cases I could find; some were in pupa, others in the larva-state and feeding. Mr. C. G. Barrett, to whom some of the cases were sent, in a communication to me, says, "it was a "welcome and startling sight to find it cleverly clearing out the seeds from every "flower-head of the dry wormwood." The problem—on what does the larva of *Tinea ferruginella* feed?—is at last solved, so far that it is a seed-feeder, it may not always select *absinthium*, for I am informed that it has been taken where that plant is not known to grow, and, as my friend suggests, may it not feed on other composite plants? or is it confined to the species of *Artemisia*?—G. C. BIGNELL, Stonehouse, Plymouth: 6th September, 1878.

Gracilaria phasianipennella.—This species we have generally only obtained as hibernated specimens flying in the sunshine in March and April, although Mr. Threlfall and I have long sought industriously for the larvæ on *Polygonum* and *Rumex*. Mr. Threlfall was searching for the larvæ at Witherslack, in the middle of August, with the usual result, when Mr. Murray (only a beginner), who was with him, found amongst some *Polygonum*, growing in a ditch, some cones of this species. Mr. Murray forwarded some of these cones to me, and on my opening the box *phasianipennella* flew to the window, and also several ichneumons.—J. B. HODGKINSON, 10, Torr Street, Buxton, Derbyshire: September 1st, 1878.

Lepidoptera at Wicken.—On July 22nd last, I went, accompanied by the Rev. T. W. Daltry, M.A., of Madeley, to the above locality, and we remained there collecting until August 3rd: for the time of the year we were fairly successful. Of the now rare *Orgyia cænosa* we took five fine specimens at light in the Fen. *Nonagria Helmanni* was abundant, and we each secured a fine series. A few *Aglossa cuprealis*

occurred about old stables and thatch ; this species is probably pretty common in Cambridgeshire, as we found odd specimens in various localities miles apart. A *Nascia cilialis* came to the light on July 26th, and another was taken by a local collector the same night, though this was a late date for the species. *Tortrix dumetana* was not uncommon flying on the Fen at dusk, and also came to the lights later. Two *Macrogaster arundinis* were taken one night by a local collector during our stay, but we failed to get the species. The less rare species we took or noticed included *Zenzena esculi*, *Cossus ligniperda*, *Nudaria senex* in abundance, *mundana* much less common, *Lithosia complanula*, *griseola*, very plentiful, several *stramineola*; *Epione apicaria*, common, *Hemithea thymiaria*, *Hyria auroraria*, *Acidalia immutata* was about the most abundant geometer on the Fen ; *emarginata* tolerably common, *Eupithecia succenturiata* and *absinthiata*, *Coremia unidentaria*, in abundance, *Phibalapteryx lignata*, common at light, *Ptilodontis palpina* in fine condition ; *Thyatira derasa*, *Leucania pudorina*, *phragmitidis*, very common, *Apamea fibrosa*, plentiful at sugared flowers ; *Miana furuncula*, *literosa*, and *arcuosa* ; *Caradrina alsines*, *Agrotis rufida*, *Tryphaena fimbria*, *interjecta*, common, *Noctua rubi* and *umbrosa* ; *Hydrelia unca*, *Herminia cribralis*, *Pyralis glaucinalis*, *Paraponyx stratiotatis*, not uncommon, along with the three more common "china-marks;" *Scoparia cembræ*, *mercurialis*, very abundant about thatch, several *lineolalis* in similar situations, *pallida* plentiful on the Fen, but mostly in bad condition ; *Crambus pinetellus*, *perlellus*, *selasellus*, and others ; *Chilo phragmitellus* abundant ; *Melia sociella*, *Peronea Shepherdana*, common, *Orthotania antiquana*, *Bactra uliginosana*, *Anesychia funerella*, &c. Of larvæ, we found *Papilio Machaon* pretty freely in all stages of growth, mostly on the wild carrot, but some were feeding on *Angelica* ; *Smerinthus ocellatus* on willow ; *Chærocampa Elpenor* (both varieties), *Cossus ligniperda*, one crawling on the floor inside the inn ; *Saturnia carpini*, *Eupithecia valerianata*, common in the valerian flower-heads ; *Cidaria sagittata*, full-fed, on the seeds of *Thalictrum flavum* ; *Sinyla venosa* on sedge ; and *Pterophorus microdactylus* in stems of *Eupatorium*.

June had evidently been a good month at Wicken, as we saw three *Hydrilla palustris* in the local collector's boxes ; and *Macrogaster arundinis*, *Meliana flammea* and *Nascia cilialis* had been taken in fair quantity.—GEO. T. PORRITT, Highroyd House, Huddersfield : September 4th, 1878.

Habits of the larvæ of Tipula oleracea.—During the last twenty-one years I have resided in a house overlooking the north side of London fields, Hackney, and in almost every year there has been a flight of that most undevout of insects, the "daddy long-legs." Some three years since, a large section of the ground was ploughed up and sown with grass by the Metropolitan Board of Works, and a few months later it became apparent that the larvæ of the crane-fly existed in the soil by millions. According to a habit I have, I watched their customs, and the efforts made to extirpate them. In spite of fences, trenches, salt, &c., they succeeded in destroying acres of grass, apparently feeding above ground by night and under ground by day. How there came to be such a wonderful accession is unknown, and we asked whether the eggs came in the grass-seed, whether the bird-catchers who haunted the place had removed the natural enemy of the grub, &c., &c. Anyhow, there they were, nor did they confine themselves to the least trodden parts, but were specially abundant in

some of the places most used as a playground. In the last case the indurated surface formed a roof over their heads, and through it they bored holes by myriads for their nocturnal raid. Though spreading from many small centres, their general advance was towards the north, until their course was stayed by a long narrow trench on that side. I now come to the one fact which struck me most. There are gas-lamps by the side of the main paths over the field, and I found that the lights attracted the larvæ which moved by night in immense numbers to the lamps, where, in some cases, they accumulated in writhing masses. The chief scene of this voluntary exposure to certain death was near a path which had wattled fences on each side, and under these fences, in close proximity to the lamps, they could have been thrown into heaps with a shovel. I thought that if lanterns had been hung up by night and shallow trenches drawn round them much might have been done to clear the ground, but the experiment was not tried. Thinking it desirable to protect the birds, an order was obtained to that effect; and this year the ground has been regularly frequented by a few rooks, a large colony of starlings, and a larger flock of sparrows. It is worth noting that the industry of the birds has been wonderful, that practically no harm has been done by the larvæ, and that, although daily on the watch, I have scarcely seen a single winged specimen.—B. H. COWPER, 250, Richmond Road, Hackney : 28th August, 1878.

Neuroptera from France.—The Rev. A. E. Eaton, recently returned from a collecting tour in the Pyrenees, and the mountains of the southern central regions of France, that will be memorable in the annals of European Neuropterology. Starting towards the end of May, nearly a week was spent at Blois (Loire et Cher), "just to get his hand in" before proceeding to wilder districts. From May 30th to June 18th he collected in some of the best parts of the Basses Pyrénées, proceeding thence to the Department of the Haute Garonne where he remained till the beginning of July, working the mountain region, afterwards paying a flying visit to Quillan in the Aude. The week comprised between the 15th and 22nd of the last-named month was passed at Toulouse, at which town not much was done, owing to intense heat and slight indisposition; from the 24th to the end of the month was spent in the Cantal, chiefly at the auberge termed "Le Lioran," the district around which has become familiar of late to our French colleagues. To this succeeded a few days' hunting in the rich (but little known) country about Mont Mezène in the Haute Loire, the tour finishing (entomologically), on the 8th August, in the more barren Puy de Dôme.

During this time considerable hardship and some amount of privation had naturally to be endured, but the results have been such as to fully compensate for all. Mr. Eaton has amassed a host of materials for his forthcoming new memoir on the *Ephemeridae*, many of them obtained by stripping and entering the water with a dredging net. In *Trichoptera* (and other groups of so-called *Neuroptera*) he has brought back vast stores, both pinned and preserved in fluid, to aid me in my work on the European *Trichoptera*, which, with an amount of self-sacrifice to which it is impossible for me to do justice in words, he has presented to me, to the extent of probably 1,400 specimens.

So important a contribution towards a knowledge of French *Neuroptera* has never before been made, and with its help, that of minor collections made by myself in France at various times, and the as yet too scanty materials collected by our neigh-

bours in their own country, I hope it will soon be possible to form an idea in outline of the Neuropterous riches of France. I will only say here that there are probably many new species of *Trichoptera* in Mr. Eaton's collections: at present no systematic examination is possible, almost my whole time being occupied in relaxing and preparing the insects for study.—R. McLACHLAN, Lewisham: 12th September, 1878.

Rhophites quinque-spinosus and *Acronycta alni* near Hastings.—I have been fortunate enough to meet with a second specimen of *Rhophites quinque-spinosus*, having taken a specimen here (a female) on the afternoon of the 4th of August. It was at rest in a head of *Centaurea nigra*, and was so sluggish that it did not move when touched with my finger. On August 21st, I took a larva of *Acronycta alni* on some palings near Baldshow Mill. It was, I think, full fed, and would not eat after I got it.—E. N. BLOOMFIELD, Guestling Rectory, Hastings: September 18th, 1878.

Is "*Cyllocoris flavonotatus*," Boh., a *Globiceps* or a *Cyllocoris*?—When Professor Boheman described the above-mentioned insect under the name of *Cyllocoris flavonotatus* in "Nya Svenska Hemiptera," p. 71, the close relations between the genera *Cyllocoris* and *Globiceps* were not set out, for this we have subsequently to thank Fieber. These genera are characterized by him in the "Europäischen Hemiptera," pp. 69 and 282: to the first he refers only *C. histrionicus*, Linn., the genus *Globiceps* consisting of the following species: *sphegiformis*, Rossi, *Picteti*, Fieb., *dispar*, Boh., *flavonotatus*, Boh., *flavomaculatus*, Fabr., and *selectus*, Fieb.

I would now examine the characters which Fieber gives for the genus *Globiceps*: at page 69 (No. 51), he puts "Kehle sehr kurz" as being a character common to *Cyllocoris* and *Globiceps*. *Globiceps sphegiformis* has, however, a very long gula; further, on the same page (No. 52), is "Kehle schief;" and concerning the genus *Cyllocoris* it is said: "Kehle aufrecht." But this difference does not exist in reality, and the *gula* in *Cyllocoris* is also oblique. There is, however, a difference between the structure of the *bucculae* in *Cyllocoris histrionicus* and *Globiceps flavonotatus* on the one side, and the other species of *Globiceps* on the other side. In the former, the *bucculae* on each side of the base of the rostrum are greatly extended (laminato-explanatae), while in the latter they are very narrow, linear, and often scarcely distinguishable; further on, in the description of *Globiceps*, is "Schnabel an das Ende der Hinterbrust reichend, schwach-gliederig, Wurzelglied dick, etwas auf den Xyphus reichend;" and the genus *Cyllocoris* is characterized, "Schnabel an das Ende der Mittelbrust, Glieder stark, 3 und 4 verdickt, Wurzelglied weit auf den Xyphus reichend." In *Globiceps flavonotatus*, the rostrum reaches only to the apex of the mesostethium; the difference between the thickness of the joints of the rostrum in *Cyllocoris* and *Globiceps* is very difficult to make out, and the same is the case concerning the difference of the length of the first joint. The last two joints of the rostrum in *Cyllocoris* are by no means "verdickt," although they appear to be thicker than the second joint, if this is wrinkled after death, which often happens. I have, however, specimens of *C. histrionicus*, in which the second joint is distinctly stronger than the last two. We read further, "Mittelbrust hinten breit ausgeschweift;" and concerning *Cyllocoris*: "Mittelbrust hinten eingekerbt." The mesosternum of *Globiceps flavonotatus* is quite similarly constructed as in *Cyllocoris*, and in these two species it is very much more convex than in any other species of

Globiceps. Further: "Hinterfussglied 2 länger als 3;" in *Cyllocoris* it is "Hinterfussglied 3 länger als 2," in effect, in *Globiceps*, the last two joints of the tarsi are almost of equal length, but in *Cyllocoris* and also in *Globiceps flavonotatus* the third joint is distinctly longer than the second.

I pass now to the description, page 282, Gatt. 211, *Globiceps*, and cite here some of the characters: "Kopf in Nacken mit deutlicher Leiste." The neck in the females of most of the species is without ridge, and this is the case also with the male of *Gl. dispar*. "Fühlerwurzel etwas länger als der Kopf." In *Gl. sphegiformis* the first joint is about four times shorter than the head, and reaching not nearly to the apex of clypeus (♀). "Fühlerglied 2 beim Weibchen von der Hälfte an nach oben stärker keulig." This latter determination by no means accords with *Gl. flavonotatus*, which, on the contrary, has the antennæ in ♂ and ♀: "nur allmählig dicker," just as in *Cyllocoris*; but in the other species the above-mentioned character is common.

From what is now said, two conclusions might be drawn: the first, that the diagnoses of Fieber require an exact examination before they can be adopted as right; and the 2nd, that the limits which he has marked out are not always correct. It is, therefore, not wonderful if, in a new revision of the *Hemiptera* of Europe, many genera receive modification and change of place; nor that an author, who now treats on the difficult systematic characters of these insects, can come to other conclusions than an earlier writer, but this proceeds only from closer examinations and studies.*

Further, I find many reasons for believing that *Globiceps flavonotatus* does not belong to *Globiceps*, but is a true *Cyllocoris*. In my "Revisio critica Capsinarum," p. 120, I have already stated that *Glob. flavonotatus* is very different from the other species, and I have therefore formed for it a special sub-genus, *Dryophilocoris*, which was characterized thus: "Corpus supra pilosum. Caput maris et feminae haud globosum, consimile. Vertex utriusque sexus marginatus. Rostrum coxas intermedias haud superans. Pronotum confertim punctatum, callis obtusis sed elevatis, pilosum, angulis posticis productis, sub-reflexis. Coxæ posteriores distantes. Hemelytra utrinque sexus completa. Mas et femina consimiles;" the characters, now italicised, being common also to *Cyllocoris*. This sub-genus is, however, not accepted in the "Catalogue des Hémiptères d'Europe" by Dr. Puton, but the species is still referred to the genus *Globiceps*. My examination has now, I think, brought to light that

* For instance, many examples of this are to be found in the first volume of my "Hemiptera Gymnocerata Europæ;" and those, at p. 20, *ante*, have been made the subject of a disapproving remark, coupled with the expression that "modern genera are the most unstable idealisms, &c." Before I say more, I wait for the promised further remarks, and I should be grateful for the information they could give; at the same time they would furnish a greater reason for the more speedy development of the system on which my arrangement is based. At present I would only say that I also am not blind to the "idealism" of "modern genera," but I may perhaps take occasion to speak of this another time.—O. M. R.

[The remarks referred to will not appear in any definite time. We did not advert exclusively to Dr. Reuter's genera, although his work furnished the occasion for our observations. It must now suffice to say that in all cases genera are the idealisms of their authors, however natural the characters adopted as their basis, and there being no absolute rule for constructing or limiting genera, authors differ in estimating the generic value of the characters presented. Fieber, Stål, and Reuter may hereafter be shown to have taken too narrow views of genera, or Flor and Thomson be demonstrated to be too wide in theirs, yet in no case arising from any want of close examination and study, but from a different point of view of given factors. In the instance we cited, the genus *Psallus*, now made to include Fieber's genera *Apocrennus*, *Psallus*, p., *Atractonotus*, p., *Agaliastes*, p., *Liops*, p., is no longer *Psallus* of Fieb., but is the *Psallus* of Reuter, whose name is also appended; and if a future reviser, from another stand-point, again alter the genus, and still retain the name, it will be "*Psallus*, Fieb., Reut., Aliquis;" in this way genera are unstable, and, as far as the name is concerned, unsatisfactory.—Eds.]

Gl. flavonotatus, cannot be considered as forming a sub-genus of *Globiceps*, but that it is a true *Cyllocoris*, or at least a sub-genus of that genus. I give the comparative characters of these two genera :—

CYLOCORIS.

Body very elongate, or almost oblong, *without* silvery-scaled spots. Head almost vertical, in ♂ and ♀ similarly constructed; *bucculae extended*; clypeus more or less prominent. Rostrum reaching to the apex of *mesosternum*. The first joint of antennæ *at least as long as the head*, and reaching more or less beyond the apex of clypeus, distinctly curved at the base; the second joint in ♂ and ♀ almost similarly constructed, towards the apex by degrees *incrassated*. Pronotum with the callosities *not or scarcely* prominent, the base before the posterior angles *depressed*, so that the angles appear *a little reflected*. Hemelytra developed in both sexes. Mesosternum *very convex*. Metasternum with an obtuse tubercle at the exterior angle of orifice. Posterior coxae *distant*. Posterior tarsi with the third joint *longer than the second*.

GLOBICEPS.

Body elongate, mostly *with* silvery scales. Head vertical, in ♂ and ♀ *dissimilar*, in ♀ more or less globose; *bucculae linear*; clypeus not or scarcely prominent, *in the same plane* as the almost vertical frons. Rostrum reaching to the apex of *metasternum*. The first joint of antennæ *shorter than the head*, and reaching not to, or very little beyond, the apex of clypeus, *straight*; the second joint, *in the female*, from the middle *suddenly considerably thickened*. Pronotum with the callosities prominent and mostly *very convex*, posterior angles *not reflected*. Hemelytra very often abbreviated *in the female*. Mesosternum towards the apex *slightly convex*. Posterior coxae *not distant*. Posterior tarsi with the third joint *not longer than the second*.

I think that the above-mentioned characters will be sufficient to show that *Gl. flavonotatus* is not a *Globiceps*, but a *Cyllocoris*, for all the characters given for this last genus accord with this species. I have found more than once, in the harmony of certain marks of colour, further evidence of the near affinity of some species; and wherefore should this not be the case, this accordance depending on a common derivation or descent? I have for a long time observed that the yellow cuneus in *Gl. flavonotatus* is black, *not on the apex*, as in *Gl. flavomaculatus* and *fulvipes*, but is marked with a black band *before* the apex, and I find that just such a similar marking exists in *Cyll. histrionicus*. A whitish spot or line is also to be found on the posterior margin of the vertex, both in *Cyllocoris* and *Gl. flavonotatus*, and the silvery scales, characteristic of *Globiceps*, are wanting in *flavonotatus*. Further, this latter species shows a greater accordance in habits with *Cyllocoris* than with the other *Globiceps*, for it lives on trees (oaks), while the species of *Globiceps* occur on low plants.

Finally, a few words on the synonymy of this species. On account of the description given by De Geer of his *Cimex flavoquadrimaculatus*, and which is rather exhaustive, I have already (Bidrag till Nord. Caps. Synon.) regarded it as certain that this description refers to *flavonotatus*, Boh., and not to *flavomaculatus*, Fabr., and having since, in Stockholm, examined the typical specimens of De Geer, I found my belief confirmed. Being so, it will be proper to call the species **CYLOCORIS FLAVOQUADRIMACULATUS**, De Geer, although the name is rather long.—O. M. REUTER, Berggatan 8, Helsingfors, August 12th, 1878.

Vegetable moth trap from Brazil.—I have a large plant of *Physianthus albicans* (*Asclepiadæ*) trailing up the porch at my front door here, which grows rapidly, and, in the autumn, flowers in profusion. It is one of the most deadly moth-traps I know. Every day I find from two to eight humming-bird hawk-moths caught by the proboscis in the flowers, and they appear to die in about two minutes. I often find other insects dead in the flowers.—W. SIMPSON, Dartmouth: August 30th, 1878 (extracted from "The Field," 7th September, 1878).

Living Beetle Ornaments.—“We have recently seen, on the shoulder of Mrs. J. Randolph Clay (wife of the Hon. J. Randolph Clay, so well known as a political representative of the United States), a living specimen of a beetle, worn partly as a decoration, partly as a pet, by the ladies of Central America. The tropical custom of confining living luminous insects in gauze, and wearing them in full dress, is doubtless well known to most of our readers; and the employment of the dead bodies of various species of *Buprestis* and other brilliant beetles as natural jewels or adornments for the trimming of dresses is also familiar. But the custom now under notice has, we believe, not before been recorded in this country, though doubtless known to American entomologists, and is exceedingly curious. The beetle employed is not, as might have been expected, one of resplendent hues or brilliant and highly contrasted markings. It is a large and somewhat cumbrous species of the *Tenebrionidæ* or *Heteromera*, a *Zopherus*, of considerable rarity in collections, as the genus to which it belongs is restricted to Central America from Mexico to Venezuela, probably living in very arid and desert localities. Mrs. Clay's specimen came from Merida, Yucatan, and is an inch and a half long, something like the well known *Pyrophorus* or luminous *Elater* in build, black beneath, with black legs and antennæ, and yellowish-grey on the upper side, with elevated shining black spots on the interstices of the wing-cases and on the thorax. It is confined by a slight encircling gold band at the base of the wing-cases, to which is fastened a thin flat strip of gold running down the suture, bent under the beetle at the tip, and having attached to it a slight gold chain, which is pinned to the shoulder of the wearer. It was received so decorated, in what is evidently the fashionable and usual method. A great peculiarity in it is its power of living for a very long time without food. Fanciful names are given to it, based upon a belief of its subsisting upon light, air, and other impalpable articles of diet; but the English naturalist, recalling the records of longevity in our own common cellar-beetle, *Blaps*, also belonging to the *Tenebrionidæ*, will probably see nothing poetical in this capability of the insect. Mrs. Clay has had her beetle six weeks only, and is ignorant for how long a period it was fasting before being sent to her; but it has eaten nothing during her ownership or during the voyage. The Mexican ladies amuse themselves by attaching their rings to the chain, and watching the beetle's efforts in dragging his precious load. One is irresistibly reminded of Gulliver in the fair toils of the Brobdingnagian princess and her suite.”—(Extracted from "The Queen," 24th August, 1878).

On the larvæ of Lytta vesicatoria.—I succeeded this year in the breeding of four larvæ (*triungulina*) of the *Lytta vesicatoria*.

I got the eggs from a female caught, *in copula*, about the 1st of June, and which laid them on the 6th in a little burrow in the earth. The eggs hatched a fort-

night afterwards, and the little *triongulina* were left without any food until the 9th of July. On that day I had the luck to find in briars some cells of *Ceratina chalcites*, with honey and eggs or small larvæ of that melliferous bee over it. I presented the contents of the cells just as they were to my *triongulina*. They at once attacked, all four (each separately in a glass tube), first the larva or the egg of the *Ceratina*, and seemed to enjoy very much that animal feeding. Five days afterwards the *triongulina* changed their skin and made their appearance as soft white larvæ, without caudal setæ and their pointed mandibles changed to broader form, fit for eating honey; they left from that very moment the dead larvæ of the bee and resorted to the honey; another change of skin takes place five days after, and the head of the larva increases considerably while the eyes become obsolete. After five days more the larva, which begins to look very much like that of *Melolontha* (of small size of course), burrows in the earth and prepares a little cell, where it changes, in another five days, to a chrysalis or nymph, of the form of a *Meloe* pseudo-nymph. It becomes gradually of a chestnut colour, and

I am waiting to see what will become of it, as it is yet now without any change since the 9th July.

I note that the chrysalis extrudes some little drops of a liquid which I cannot examine, as the pupa is in a glass tube, and I will not disturb it. I do not know if it is normal or the effect of some illness.—J. LICHTENSTEIN, Montpellier: August, 1878.

/ On the stridulation of some Hemiptera, Hymenoptera, and Coleoptera.—The species of stridulating *Hemiptera* (*Reduviidae*) that I have taken this summer in Italy, all performed similarly by placing the termination of their short and thick rostrum in a lenticular, striated groove, extending from the front edge of the prosternum to the insertion of the first pair of legs, and then rubbing this angulate point backwards and forwards by a nodding motion of the head from its prothoracic articulation;* the length and celerity of the movement perceptibly regulating the fulness and pitch of the notes, while the organic structures and frictional surfaces determined the gamut.

The first stridulator, the pupal form of *Reduvius personatus* ?, was taken, begrimed with particles of dust, within the folds of a muslin window blind at Ana Capri; the second, *Oncoccephalus notatus*, Ramb., was captured in a railway carriage near Foggia: both in the month of May. During captivity, these would perform somewhat reluctantly on seizure: the notes of the first had the musical *timbre* of minute longicorn *Coleoptera* (*Leptura*, Fabr., and other anthophilous genera); those of the latter had a more rustling sound, which caused me repeatedly to think they arose from my having inadvertently crumpled the elytra. The third species, *Harpactor iracundus*, Scop., taken on the banks of the Po at 6 a.m. one June morning, when engaged in sucking the juices of a *Forficula*, was a more sturdy performer, with a sharp, creaking stridulation. And, although if retained for more than a second in the hand, its music would often subside to a tone scarcely perceptible by the human ear, yet, if the insect was then allowed to slip just a little through the fingers (this action apparently conferring some sensation akin to pleasure at release) the rostrum

* As already noticed in *Coranus subapterus* and *Reduvius personatus*: vide Mitth. schw. ent. Ges., iv, 159.—Ens.

was seen at once to elongate its strokes in the channel, and the notes came out again loud and clear. When suddenly seized, it had also the power of emitting a strong vinegary scent. This species, and the one taken in the railway carriage, employed their rostrums to prick their captor sharply. A fourth stridulator, which is evidently the perfect winged form of *Reduvius personatus*, Wolff, I captured on the 18th July, at Madonna del Pilone, behind my window shutter; it performed readily, and its notes were sharp and distinct. This species is said to emit a disagreeable mouse-like odour (Suites à Buffon, Hemipt.). The fifth example (larva of *Harpactor iracundus*, Scop.) was taken under a hedge at Spezia at the commencement of May, with a small milky-winged insect on its right fore-tibia (which I subsequently gummed to the part)*; but notwithstanding the suggestive structure of the rostrum and the existence of the sub-thoracic groove, it would not stridulate on handling. These three musical species I have now noticed, with *Pirates stridulus*, *Reduvius testaceus*, and *Coranus subapterus*, will augment the number of *Reduviidae* which have been observed to stridulate to six; while it may be also remarked, that this group of *Hemiptera* have hitherto evinced only one incentive to stridulate, namely, fear on seizure, although one species, like *Cryptorhynchus lapathi* among the rhynchophorous *Coleoptera*, was most disposed to do so when the paroxysm was passing off; and, further, that it has yet to be determined whether the several species, viewed in regard to sex and stage of development, present gradations in their capability for music or not.

As regards Hymenopterous stridulators, I was able to procure females of *Mutilla hungarica*, F., at Ana Capri, some wandering on clayey spots, and others taken, covered with honey, emerging from the cells of a small violet bee, *Chalicodoma muraria*, F. These *Mutillæ* stridulated loudly on seizure, the sound produced by the captive drawing in and out beneath the hinder edge of the much elongated second segment of the abdomen, the striated raised and rounded shield on the front of the articulating surface of the third segment, by the contraction and protrusion of the last four segments that form a conical termination to this part. When first seized, they would produce a sharp sound—*tip! tip!*—by drawing this shield half under the second segment and then pausing; this note was then lengthened by a complete movement of the segment forward; and then the action lapsed into a quickly reciprocating double stroke, causing the note to rise in pitch. On seizure they also threatened with an elongate sting. Their organs of music closely resemble those of the longicorn *Coleoptera*, except in being placed on the abdominal rings in lieu of those of the thoracic division, and that the single *lima* is here the active agent, while there it is the passive.

I also took, at the commencement of July, on a willow sapling near Turin, where *Lucanus cervus*, some longicorn beetles, and insects of other Orders were collected sucking or licking sap, a stridulating male of the *Elateridæ*. This individual (*Lacon murinus*, L.), while I had it in captivity, would, on seizure, invariably lift its head, like others of this group, when preparing for a spring, but, instead of immediately afterwards depressing it to insert the elastic pro-sternal spine in the meso-sternal groove, it first nodded the head and thorax thrice with a movement and noise resembling that of a longicorn—*whee! whee! whee!*—a sound, I conceive, originated by the rounded superior surfaces of the twin claws that constitute the spine-point, which are faintly striate, vibrating over the entrance of the meso-sternal groove.—A. H. SWINTON, Turin: July 25th, 1878.

* An *Aleurodes*.—ELS.

CHARACTERS OF NEW GENERA AND DESCRIPTIONS OF NEW SPECIES OF *GEODEPHAGA* FROM THE HAWAIIAN ISLANDS.

BY THE REV. T. BLACKBURN, B.A.

II.

In resuming the subject commenced by me in this Magazine (vol. xiv, p. 142), I propose to furnish descriptions of the Hawaiian *Geodephaga* added to my collection during the interval, as well as of several previous captures that I have only recently been able to determine. The number of species is twenty-five; of which nine occurred on this island, the remaining sixteen on the great extinct volcano Haleakala (on the island of Maui). These latter were all collected upwards of 4000 feet above the sea, during four days in February, 1878. The altitude of Haleakala (10,000 feet) is much greater than that of the Oahu mountains, to which fact I attribute the considerable number of novelties among the insects I found on the former; for, during a week spent in other parts of Maui (similar in character to this island), I did not observe any new *Geodephaga*, and only two or three new *Coleoptera*. On Maui, as here, *Anchomenus* seems to be the prevalent Geodephagous type; all the *Geodephaga* I observed there (save one) belonging to that group.

The principal difficulty I have experienced in dealing with the following species, is their generic apportionment. Reluctant as I am to constitute new genera in groups where generic limits are already puzzling, I am obliged to do so in two instances. There are several species, moreover, of those which I have attributed to previously existing genera, which (it is my strong conviction) must be otherwise treated eventually; and on these a few comments seem desirable.

The last two species described under the name *Anchomenus* (*Sharpi* and *ruplicola*) are remarkable insects. They differ from all *Anchomeni* known to me in the following points, viz.: the great development of the hind-body (head and thorax together making up less than one-third of total length), and the form of the mesothoracic epimera (which, instead of being very narrow and parallel according to the habit of *Anchomenus*, are triangular, almost as in *Bembidium*; indeed, barring form of palpi and tarsi, and shape of prothorax, *A. Sharpi* is extremely similar in build to *B. eques*, Sturm, with, however, the relative length of elytra not a little exaggerated). The latter of these two characters reads like something tangible; but Dr. Sharp informs me that he has observed a tendency to variation in the shape and development of these epimera among species accepted as *Anchomeni*. These two species (*Sharpi* and *ruplicola*) are pretty closely allied to each other, and I think are both near to *A. mysticus*, mihi, and *Dyscolus Tantalus*, mihi (the latter of which, some slight tarsal

peculiarities relegate to *Dyscolus* rather than *Anchomenus*, if these two genera are to stand. Without expressing any further opinion on that point, I may say that the four Hawaiian species mentioned above seem to me too closely allied *inter se* to be satisfactorily parted, and that as members of either genus they must rank among the most extreme of its aberrant forms).

Blackburnia frigida, I have located with some hesitation. Its eyes (though feebly developed in comparison of, say, a typical *Anchomenus*) are much more strongly developed than those of *B. insignis*, Sh., and *blaptoides*, mihi, and the defined suture between the 2nd and 3rd ventral segments constitutes a further perplexity. Moreover, the striation of elytra, and punctuation in general, are totally unlike those of the other species of *Blackburnia*. The form of the head, however, the very deep ventral sutures, the close adaptation of the elytra to the hind body, and the general "distinctiveness" of facies, accompanied by scarcely any tangible structural difference from *Anchomenus*, all point to this as its place.

HARPALIDÆ.

ATRACHIYCNE MIS, gen. nov.

Mentum transversum, emarginatum, dente medio parvo instructum.

Palpi articulo ultimo elongato-oblongo, apice vix acuto.

Mandibulæ robustæ, productæ, minus arcuatæ, apice obtuso.

Labrum transversum, parum emarginatum.

Caput permagnum, thorace vix angustius nequâquam brevius, pone oculos parum contractum.

Antennæ capite thoraceque conjunctis vix longiores, articulo tertio pubescenti sequentibus longiore.

Pedes graciles, nec spinosi; tibiis anticis (maris solum?) arcuatæ, intus profunde emarginatis; maris tarisorum anticorum intermediorumque æqualiter nec fortiter dilatatis.

Segmentorum ventralium suturæ solito profundiores.

Prothorax et elytra ut in Harpalis.

A. SHARPI, sp. nov.

Sat convexus, glaber, opacus (totâ corporis superficie æqualiter subtilissime confertissimeque punctatâ), piceo-niger, antennarum basi, palpis, pedibusque plus minusve rufescentibus; prothorace transverso, subcordato, canaliculato, antice parum emarginato, basi utrinque late (nec profunde) foreolato, vase profunde punctato, angulis posticis acute rectis; elytris parum elongatis, subparallelis, postice attenuatis, sulcatis, sulcis grosse punctatis, angulis humeralibus subrectis; prothoracis superficie inferiore, sterno, et abdominis parte anticâ grosse punctatis.

Long. 7 mm.

Haleakala, Maui. At an elevation of 4000—5000 feet.

ANCHOMENIDÆ.

DISENOCHUS, gen. nov. (*Argutoris aspectum simulans*).

Mentum transversum fortiter emarginatum, dente medio obtuso instructum.

Palpi articulo ultimo oblongo, apice rotundato.

Mandibulæ minus arcuatæ, nec fortiter apice acuminatæ.

Labrum transversum, vix emarginatum.

Caput breve, latum, pone oculos haud angustatum.

Antennæ mediocres, ab articulo tertio pubescentes, articulo tertio parum elongato.

Prothorax subquadratus, convexus.

Elytra convexa, ovata, striolâ scutellari distinctâ.

Pedes robusti, breves; tibiis anticis fortius emarginatis, apice vix dilatatis.

D. ANOMALUS, sp. nov.

Convexus, nitidus, niger, antennis palpisque rufis; pedibus (præcipue genibus tarsisque) plus minusve rufescens; prothorace subquadrato, leviter transverso, antice vix emarginato, postice leviter angustato, basi utrinque impresso parceque punctato, angulis posticis leviter obtusis, lateribus minus rotundatis angustissime marginatis, margine basali medio convexo; coleopteris ovatis, striatis, striis (antice fortiter, postice obsolete) punctatis, interstitiis planiusculis, humeris sub-rotundatis.

Long. 8½—9 mm.

Haleakala, Maui. Two examples, at an elevation of about 5000 feet.

ANCHOMENUS.

A. INSOCIABILIS, sp. nov.

Convexusculus, nitidus, niger, pedibus (plus minusve) palpis, antennis mar- gineque reflexo rufescens; capite magno; oculis prominulis; antennis corporis dimidio plane longioribus; prothorace vix transverso, obsolete subcordato, canaliculato, antice fere truncato, postice utrinque foveolato, lateribus parum rotundatis, angulis posticis obtusis; elytris ovalibus, fortiter striatis, interstitiis leviter convexis, humeris prominulis; tarsorum articulo quarto parum emarginato. Long. 8 mm.

A. epicuro aliquanto affinis.

Haleakala, Maui. One example, at an elevation of 4000 feet.

A. ERRO, sp. nov.

Præcedenti affinis, subconvexus, parum nitidus, piceo-brunneus, marginibus pal- lessentibus, antennis palpis pedibusque flavo-testaceis; capite mediocri; oculis pro- minulis; antennis corporis dimidio multo longioribus; prothorace leviter transverso, subcordato, canaliculato, antice leviter emarginato, postice utrinque breviter foveolato, lateribus parum rotundatis, angulis posticis obtusis; elytris elongato-ovalibus, sub-tiliter striatis, interstitiis planis, humeris prominulis; pedibus elongatis, tarsorum articulo quarto parum emarginato.

Long. 8½—9 mm.

Haleakala, Maui. Elevation of 4000—5000 feet.

A. SHARPI, sp. nov.

Alatus, parum convexus, niger, antennis palpis pedibusque rufo-piceis; capite mediocri; oculis magnis convexis; antennis corporis dimidio paulo longioribus; prothorace fortiter transverso, canaliculato, antice emarginato, basi utrinque foveolato, lateribus parum (angulis posticis fortiter) rotundatis; elytris elongatis, parallelis, striatis, intersticiis planis, angulis humeralibus rectis. Long. 15—17 mm.

Haleakala, Maui. Not very rare, at an elevation of 4000—5000 feet.

A. RUPICOLA, sp. nov.

Apterus, convexus, piceus, antennis, palpis, pedibusque obscure rufescentibus; capite sat magno; oculis magnis convexis; antennis corporis dimidio paulo longioribus; prothorace transverso, canaliculato, antice sat fortiter angustato et leviter emarginato, basi utrinque foveolato, lateribus mediocriter (angulis posticis fortiter) rotundatis; elytris ovalibus, striatis, intersticiis planiusculis, humeris rotundatis, sine angulis distinctis. Long. 15—18 mm.

Haleakala, Maui. A few examples near the summit.

CYCLOTHORAX.

C. MONTIVAGUS, sp. nov.

Parum convexus, subnitidus, piceus, antennis, palpis, pedibus anguste, thoracis elytrorumque marginibus suturâque rufo-testaceis; capite mediocri, oculis prominulis; antennis corporis dimidio longitudine æqualibus; prothorace fortiter transverso rotundatoque, leviter canaliculato, antice haud emarginato, trans basin rage nec fortiter punctato, basi utrinque obscure foveolato, angulis posticis minutis, subdentiformibus; elytris breviter ovalis, subtiliter striatis, striis confertim fortiterque punctatis (marginem apicemque versus obsoletis), intersticiis planis, angulis humeralibus rotundato-rectis. Long. 5½—6½ mm.

C. (Olisthopo) insulari, Mots., differt thorace basi minus fortiter punctato, elytris brevioribus, latioribus, &c.

Haleakala, Maui. Elevation, 4000—5000 feet. Not rare.

C. MICANS, sp. nov.

Parum convexus, nitidus, piceus, antennis, palpis, pedibusque testaceis, marginibus suturâque obscure rufescentibus; capite mediocri; oculis prominulis; antennis corporis dimidio brevioribus; prothorace minus fortiter transverso rotundatoque, leviter canaliculato, antice leviter emarginato, trans basin sparsim punctato, angulis posticis minutis subdentiformibus; elytris ovalibus, subtiliter striatis, striis (marginem apicemque versus obsoletis) minus fortiter punctatis, angulis humeralibus rotundato-rectis. Long. 4—4½ mm.

Haleakala, Maui. Two specimens, at an elevation of 9000 feet.

C. MULTIPUNCTATUS, sp. nov.

Subconvexus, subnitidus, rufo-piceus, antennarum basi, palpis pedibusque (femorum basi, tibiisque nihilominus infuscatis) rufo-testaceis; capite mediocri; oculis convexiusculis; antennis corporis dimidio longitudine æqualibus; prothorace fortiter

transverso, breviter subcordato, canaliculato, antice parum emarginato, trans partem anteriorem subtiliter rugato, trans basin rage fortiter punctato rugatoque (nonnullis exemplis rugato solum), utrinque basi foreolato, angulis posticis subacute; elytris oratis, fortiter striatis, interstitiis planiusculis, serie duplii vel triplici profunde foveolatis, angulis humeralibus rotundato-rectis. Long. 5½—5¾ mm.

Haleakala, Maui. Two examples, at an elevation of about 4000 feet.

C. BREVIS, Sharp (*in litt., nec descr.*), *sp. nov.*

Convexus, subnitidus, piceus, antennarum basi, palpis (plus minusve), pedibusque testaceis; capite mediocri; oculis parum convexis; antennis corporis dimidio paulo longioribus; prothorace fortiter transverso rotundatoque, canaliculato, antice leviter emarginato, trans basin confuse rugato vel punctato, utrinque basi foveolato, angulis posticis obtusis; elytris breviter ovatis, fortiter striatis, striis obsolete punctatis, interstitiis convexis, humeris leviter rotundato-productis, lateribus apiceque obscure rufescentibus. Long. 4½—5 mm.

Mountains of Oahu. Usually at elevations of about 2000 feet.

C. OARUENSIS, *sp. nov.*

Convexus, nitidus, piceus, antennarum basi, palpis (plus minusve), pedibus thoracis elytrorumque marginibus lateralibus, suturā apiceque testaceis; capite mediocri; oculis parum convexis; antennis corporis dimidio paulo longioribus; prothorace minus fortiter transverso, leviter solum rotundato, canaliculato, antice parum emarginato, trans basin obsolete punctato, basi utrinque foreolato, angulis posticis obtusis; elytris ovatis, striatis, striis obsolete punctatis, interstitiis planiusculis, humeris rotundato-rectis. Long. 4½ mm.

Mountains of Oahu. Rare.

C. SIMIOLUS, *sp. nov.*

Præcedenti affinis, at minor, colore obscurior; prothorace fere subcordato, leviter solum transverso, trans basin distincte punctato, angulis posticis acutis, subdentiformibus; elytrorum striis (marginem apicemque versus minus profundis) distinctius punctatis, humeris minus prominulis. Long. 3¾ mm.

Mountains of Oahu. Rare.

C. OBSCURICOLOR, *sp. nov.*

Convexus, subnitidus, piceus, thorace et elytrorum marginibus suturāque obscure rufescentibus, palpis (plus minusve), antennarum basi pedibusque (femorum basi tibiisque nihilominus plus minusve infuscatis) testaceis; capite mediocri; oculis parum convexis; antennis corporis dimidio longitudine æqualibus; prothorace fortiter transverso rotundatoque, breviter subcordato, canaliculato, antice parum emarginato, antice et trans basin confertim rugato, angulis posticis subacute rectis; elytris ovalibus, fortiter striatis, striis obsolete punctulatis, interstitiis convexis, humeris parum prominulis. Long. 3¾—4 mm.

Haleakala, Maui. Elevation, 4000 feet. Rare.

(*To be concluded in our next*).

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY H. GOSS, F.L.S., F.G.S.

No. 3.

Palæozoic Time.

[*On the Insecta of the Devonian period, and the animals and plants with which they were correlated.*]]

In my second* paper I called attention to the sequence in which the existing orders of insects made their appearance on the Geological horizon. In this and the following papers I propose to enumerate some of the principal genera and species by which the existing orders were represented in past ages, and to allude to the other classes of animals, and to the plants with which they were correlated. I shall follow the ascending order of Geological succession, beginning with the oldest rocks *in which insect remains have been discovered*, and proceeding upwards to those of most recent date.

The six oldest known fossil insects were, as already† stated, obtained by Mr. C. F. Hartt, from the Devonian rocks of New Brunswick. The locality in which they were found has been named by their discoverer, "Fern Ledges," and is situated about a mile west of the town of Carleton, near St. John's. The rocks at this place are described as forming a series of ledges, exposed on the sea shore between high and low water mark, and consisting of beds of sand-stone and fossiliferous shales, rich in plant remains. Some doubt as to the age of these rocks has been expressed by Dr. Geinitz, who considered them as probably belonging to the Carboniferous formation, from the fact that one of the insects obtained from them was associated with a fern, characteristic of that formation; but Dr. Dawson‡ believes that from their containing beds "richly stored with Devonian plants," and underlying unconformably the oldest portion of the Carboniferous series, they belong most unquestionably to the Devonian formation, and his opinion has been accepted by all the leading geologists in Europe and America.

As these Devonian insects are the most ancient representatives of their class, *yet discovered*, they are especially interesting, and are probably worthy of a more detailed notice than can be bestowed, in these papers, on the majority of those obtained from rocks of subsequent

* *Antea*, pp. 52—56 of this vol.

† *Antea*, pp. 52, 53 of this vol.

‡ Geol. Mag., vol. iv, 1867, p. 386. "Acadian Geology" (2nd edit.), by Dr. Dawson, F.R.S. The Quat. Journ. Geol. Soc., 1862 and 1863. Geol. Mag., vol. v, 1868, p. 175. "Manual of Geology," New York, 1874, by Professor Dana.

date. They have all been described* by Mr. Scudder, and respectively named by him: *Xenoneura antiquorum*, *Gerephemera simplex*, *Platephemera antiqua*, *Lithentomum Hartti*, *Dyscritus vetustus*, and *Homothesetus fossilis*.

Xenoneura antiquorum and *Gerephemera simplex* were obtained from a lower portion of the shales than any of the others, and are, therefore, presumably, the oldest of the six. The first named fossil, *X. antiquorum*, appears to be the basal portion of a small wing, which was probably about two inches in expanse. From the peculiar nature of its neuration†, Mr. Scudder is of opinion that it represents an extinct family of *Neuroptera*, and probably belonged to a group constituting a synthetic type between the *Orthoptera* and *Neuroptera*; he observes that the most striking peculiarity in this specimen is the development of apparently independent veinlets, forming portions of concentric rings, at the base of the wings, which he compared to the stridulating organ of some male saltatorial Orthopteron. Dr. Dawson‡, in alluding to this peculiarity in this specimen, remarks that, "nothing is more "curious than the apparent existence of a stridulating or musical "apparatus, like that of the cricket, in an insect otherwise allied to "the *Neuroptera*. This structure also," continues Dr. Dawson, "if "rightly interpreted by Mr. Scudder, introduces us to the sounds of "the Devonian woods, bringing before our imagination the trill and "hum of insect life that enlivened the solitudes of these strange old "forests."

The second specimen, *G. simplex*, consists of a fragment of the tip of a large broad-wing, which appears to have belonged to a member of the *Ephemerina*.

The third specimen, *P. antiqua*, is believed to be a portion of the upper wing of a gigantic species of the *Ephemerina*, which must have measured five inches in expanse of wings, and from its combination of peculiarities|| of structure, now only found in different groups, must also be regarded as a "synthetic type."

The fourth specimen, *L. Hartti*, is supposed to be a portion of the lower wing of a Neuropterous insect, measuring about $3\frac{1}{2}$ inches in expanse of wings, and allied to the *Sialina*, but not belonging to any family represented among existing forms.

* Geol. Mag., vol. iv, pp. 387, 388; v, pp. 175, 176. Acadian Geol., *antea cit.*, p. 525, and Dana's "Manual," *antea cit.*, pp. 273, 274.

† Cf. J. W. Kirby, "On the remains of Insects from the Coal-measures of Durham," Geol. Mag., vol. iv, pp. 388—390, plate xvii.

‡ Geol. Mag., vol. iv, 1867, p. 387, and Acadian Geology, pp. 524, 525.

|| Mr. Scudder observes of this specimen: "the intercalary nervules, which in *Ephemerina* "generally originate independently, arise here from a bent cross-vein, much as in *Odonata*." Geol. Mag., vol. v, 1868, p. 175.

The fifth specimen, *D. vetustus*, is represented by so small a fragment of a wing, that Mr. Scudder considers it impossible to determine the approximate size of the insect, or the family to which it belonged; though its characters are clear enough to shew that it was Neuropterous, and to distinguish it, with certainty, from the other specimens.

The last specimen, *H. fossilis*, consists of the greater portion of the upper wing of an insect, which Mr. Seudder believes to be the representative of another new family of *Neuroptera*, "synthetic in nature, combining features of the *Odonata* and *Sialina*;" and he adds that though it is in a mutilated condition, the extent and character of every principal nervure can be determined.

Although these Devonian insects are the oldest *specimens* yet discovered, and consequently belong to the oldest known *species*, the *families* of which they were members had possibly existed for ages; and it must not be assumed that even their family types necessarily, or even probably, represented the earliest forms of insect life.

The appearance* of insects on the earth was probably synchronous† with that of land plants; and as remains of this division of the vegetable kingdom have been discovered in rocks belonging to the Silurian‡ period, the existence of a land flora, long before the date at which these Devonian insects lived, is proved. The fact of the existence of land§ plants at as early a date as the Lower Silurian period, appears to me to be an additional reason, to those previously given||, for assuming the probability of the first appearance of insects at an earlier age than that of the Devonian shales at "Fern Ledges."

The other classes of animals, whose remains have been obtained from the same beds as the insects before described, are the *Crustacea*¶ and the *Annelida*;** and the plant-remains include *Sigillaria*, *Stigmaria*, *Calamites*, *Asterophyllites*, *Annularia*, *Psilophyton*, *Cordaites*, &c., and ferns of the following genera: *Cyclopteris*, *Neuropteris*, *Sphenopteris*, *Hymenophyllites*, *Pecopteris*, and some others undetermined.

Although the number of species of animals and plants, immediately

* It is not impossible, however, that insects *may* have appeared before land plants, which were not absolutely necessary to the existence of groups similar in their nature to the *Odonata* and *Ephemera*, as they are essentially carnivorous, and aquatic in their early stages.—H. G.

† The theory of the existence of insects at an earlier age than the Devonian period would, however, be inconsistent with Hückel's opinion as to the date of the first appearance of the class. See *ante p. 3* of this vol.—H. G.

‡ Dana's "Manual," *antea cit.* p. 245. "The origin of the world," by Dr. Dawson, F.R.S., p. 330, London, 1877; and Proceedings of the American Philosophical Society, vol. xvii, p. 163 (October, 1877).

§ Remains of land plants have been obtained by Dr. Scoville, Dr. Rominger and others, from rocks of Lower Silurian age. Proc. Amer. Phil. Soc., vol. xvii, *antea cit.*

¶ *Antea p. 53* of this vol.

|| *Amphipeltis paradoxus*, *Eurypterus pulicaria*, and *Trilobita*.

** Shells of *Spirorbis*.

associated with these insects in the plant beds at "Fern Ledges," appears, from the remains which have been preserved, to have been inconsiderable, the total number up to the present time recorded from Devonian strata in various parts of the world, amounts to upwards of 5,600*. Of this number more than 5,300 belong to the Animal Kingdom, and are distributed amongst the *Protozoa*†, *Cœlenterata*, *Echinodermata*, *Vermes*, *Arthropoda*, *Mollusca* and *Vertebrata*.

The *Protozoa* of this period are represented by *Foraminifera*; the *Cœlenterata* by *Spongia*, by a great number of species of *Actinozoa* (corals, &c.), and by one genus of *Hydrozoa*. The *Echinodermata* of the Devonian age are represented by *Crinoidea* (sea-lilies); the *Vermes* by *Annelida* (worms) and *Polyzoa* (lace corals, &c.); the *Arthropoda* by *Crustacea* (*Trilobita*, *Ostracoda*, &c.) and *Insecta* (*Neuroptera*, or *Pseudo-Neuroptera*); the *Mollusca* by *Brachiopoda*, *Lamellibranchiata*, *Gasteropoda*, *Pteropoda*, and *Cephalopoda*.

It will be observed that of the four classes of the sub-kingdom *Arthropoda*, two are represented, viz.: *Crustacea*‡ and *Insecta*§; but of the *Myriopoda* (centipedes) and *Arachnida* (scorpions and spiders) no remains have, so far as I am aware, been discovered in the Devonian rocks, and it is possible that animals of these classes had not at this period appeared.

The only *Vertebrata* of which the remains have been discovered in the Devonian rocks, are *Pisces*, the majority of which belonged to the order of the Ganoids: of this class upwards of 260|| species have been determined; and it may be remarked that at this period the higher orders of the class appear to have been the dominant tribe of animals,—hence the Devonian period has been frequently called the "Age of Fishes."

The vegetation of this period seems to have been almost confined to Gymnosperms and Cryptogams—including *Coniferæ*, *Sigillariæ*, *Calamites*, *Asterophyllites*, *Lepidodendra*, &c.; and ferns of the genera *Cyclopteris*, *Neuropteris*, *Sphenopteris*, *Hymenophyllites*, *Pecopteris* and *Rhachiopteris*. There were also numerous *Algæ*.

The Avenue, Surbiton Hill:

7th October, 1878.

* This calculation is of course liable to daily alterations as discoveries of new species are made known. See Introduction (p. 8) to "The Flora and Fauna of the Devonian and Carboniferous Periods," by Dr. Bigsby, F.R.S., London, 1878.

† I have followed the nomenclature and arrangement adopted by Mr. Pascoe in his "Zoological Classification" (1877).

‡ About 300 species of *Crustacea* have been obtained from the Devonian rocks.

§ The 6 species before described.

|| "Flora and Fauna of the Devonian, &c., Periods," *antea cit.*, pp. 100—106.

DESCRIPTIONS OF THREE NEW EUROPEAN EPHEMERIDÆ.

BY HERMAN ALBARDA [COMMUNICATED BY THE REV. A. E. EATON].

CENTROPTILUM TENELLUM, *n. sp.*

Imago ♂. Oculi turbinati atri, inferiores fusci. Thorax fuscus, politus. Alæ vitrinæ: anticae nervis longitudinalibus prope basin, nervuloque humerali, castaneo-margiuatis; posticæ ligulatae, obtuseæ. Pedes cretacei, coxis fusca, femoribus tibiisque ad basin et apicem atro-fuso-cingulatis, femore antico insuper cingulâ præapicali ejusdem coloris. Abdominis segmenta 2—6 cretacea, puncturis furfurosis; cætera saturate castanea, subtus virescenti-grisea. Setæ forcepsque albæ.

Long. corp. ♂, 3; al. 4; set. 4 mm.

Hab.: the single male in my collection was taken by Mr. Van Medenbach de Rooy near Arnhem, Holland, on the 8th September, 1878.

This pretty little species may be easily separated from *C. luteolum*, Müll., by the obtuseness of its hind wings, which are rather like those of *C. stenopteryx*, and from *C. pennulatum*, Etn., as well as *C. lituratum*, Pict., by its small size and dark markings.

ISONYCHIA FERRUGINEA, *n. sp.*

Subim. ♂ et ♀. Oculi maris fuscis (♀ pallidiores). Thorax luteo-piceus. Alæ luridæ, ad margines fumatae, nervis transversalibus nigris, fusco-margina-tis; anticae prope costam nebulis fuscis spatia pallidiora inclaudentibus. Pedes antici atro-picei, articulis tarsorum ad bases testacei; posteriores testacei, tarsis fuliginosis, unguibus nigris. Abdomen fuscum, juncturis line-isque longitudinalibus abbreviatis in apices segmentorum binis obscurioribus. Setæ saturate testacea, ad bases obscuriores, pube brevi appressâ nisi ad iuncturas ibique eâdem in verticillis divergenti. Forceps fusca.

Imago ♂. Oculi fuliginosi [inter vitam opacæ, vel brunneo-carnei, cingulâ ex diametro ochraccâ, muculâ rotundâ (lineâre curvatâ) mobili nigrâ interruptâ intersecti.—A. E. EATON.] Thorax piceo-luteus. Alæ vitrinæ, areâ pterostigmatica vix lurido-tinctâ: nerrorum longitudinales subtestacei, transversales nigri, tenues, iis tamen in areâ supra dictâ parum incrassatis exceptis. Pedes antici atro-picei, articulis tarsorum ad bases pallide tes-tacei; posteriores flavo-testacei, articulo unguinali infuscato. Abdomen ferrugineum, juncturis et in apicibus segmentorum lineis abbreviatis binis piceis. Setæ pallide cervinæ, apud bases fusco-obscuratæ. Forceps fusca, articulo terminali pallidiore.

♀. Mari pallidior. Tarsus anticus articulo unguinali piceo, cæteris albis, apicibus anguste piccis. Processus ventralis profunde emarginatus.

Long. corp. 12—15; al. 10—14; set. ♂ ♀ im. 25, subim. 16 mm.

Hab.: Holland: Arnhem, Vasserbeck (Van Medenbach de Rooy);

South Holland (Van Walcheren); Rotterdam (Fransen). France: Amboise (Lelièvre); Toulouse, at gas lamps (Eaton). July and August.

AMETROPUS, gen. nov.

Imago. Tarsi posteriores quinque-articulati, tibiæ adnati suturâ subdiscretâ, articulo proximo modice longo. Abdominis segmentum penultimum (♀) haud infra in laminam productum. Setæ tres longæ. Alæ quatuor. Oculi maris integri; forceps quadri-articulata, articulo proximo paulo (sere dimidio ipsius longitudinis) secundo breviore.

[♂. *Tarsi antici femore tibiâque conjunctim duplo, vel hâc solâ quintuplo, longiores; articulo proximo pâne duplo longiore tibiâ, in subimagine tamen eidem subæquali: postici articulo proximo dimidio longiore secundo, hoc quinto, pariterque tertio quarto subæqualibus, tertio breviore secundo.**

♀. *Pedum anticorum tarsi longitudine femori tibiæque conjunctim subæquales; tibia vix longior dimidio femoris; proximo articulo tarsorum tibiâ parum breviori, cæteris decrescentibus et longitudine conjunctim tibiæ cum primo subæqualibus. Pedum posticorum tarsi femore parum breviores, femore tibiâ duplo longiore; articulo proximo et ultimo subæqualibus, singulis longitudine dimidio tibiæ æqualibus, secundo vel tertio duplo longioribus (his paribus), quarto omnium brevissimo.*

Affinities with the *Siphlurus-Heptagenia* series of genera, approaching *Oniscigaster* and *Bætisca* in the structure of the hinder legs, *Siphlurus* in the absence of the usual ventral lamina of the ninth abdominal segment of the female, and *Heptagenia* in the distribution of the veins adjacent to the inner margin (post-costa) of the anterior wing. The peculiarities of this neuration cannot be defined verbally in an intelligible manner.—A. E. EATON.]

AMETROPUS FRAGILIS, n. sp.

Subim. ♀. Thorax supra dilute hepaticus, subtus testaceus. Alæ pallide fumatae, nervis longitudinalibus pallide flavescentibus. Pedes testacei, tarsis, tibiis, femorum anticorumque apicibus infuscatis. Abdomen fuscum, juncturis late testaceis. Setæ testaceaæ.

Imago ♂. Oculi fuliginosi. Tergum thoracis fusco-piceum. Alæ vitrinae; nervi longitudinales pallide electro-colorati vel testacei, transversales limpidi atque in areâ pterostigmaticaâ numerosi subsimplices lenteque curvati. Pedes antici testacei, femoribus post medium tibiisque obscure piceis: posteriores pallide flavescenti-lutei. Abdomen supra saturate fuscum, ad latera juncturasque testaceum; subtus flavescentis, segmentis ultimis duobus infuscatis. Forceps testacea. Setæ albidæ.

* These proportions are stated somewhat in detail in the absence of figures. Even in figures of the legs of *Ephemeridae* it is always necessary to make allowances for possible minor variations in the exact proportional lengths of the parts in individuals and in different species.—A. E. E.

♀. *Alarum nervi longitudinales testacei. Pedes antici rufo-picei, femoribus ad bases et juncturas, articuloque unguinali tarsorum, testaceis. Setæ pallidissime cervinæ, ad bases rubiginosæ.*

Long. corp. ♂, 15, ♀, 13; al. ♂, 14, ♀, 15; set. ♀ im. 22, subim. 12 mm.

Hab. : of this delicate looking species 1 ♂ im. and 2 ♀ subim. were taken near Arnhem (Holland) by Van Medenbach de Rooy, and 1 ♀ im. near Rotterdam by Fransen, all of which are in my collection.

Leeuwarden : *September, 1878.*

LIST OF THE HEMIPTERA OF NEW ZEALAND.

BY F. BUCHANAN WHITE, M.D., F.L.S.

(Continued from page 76).

Tribe CAPSINA.

Professor Hutton mentions no *Capsina* in his list of New Zealand insects, but Mr. Walker described three, which are reduced to two by Mr. Butler. Amongst the species now before me, none agree with the descriptions of the Walkerian species.

33. *Megaloceræa (Megaloceræa) Reuteriana, n. sp.*

Linear, elongate, pale testaceous ; head with a central longitudinal line and a line behind each eye, pronotum with the front margin, a longitudinal band on each side of the central line (running on to the apex of the scutellum) and an indistinct band on each side between that and the margin, scutellum with the basal angles, sternum with a longitudinal band on each side, sometimes continued on the abdomen, back of abdomen with a broad longitudinal band, fuscous-brown ; last three joints of antennæ dusky reddish, especially upwards ; antennæ (especially the stout basal joint) and legs with short black spiny hairs ; middle and hind femora with indistinct small pale brown spots ; apex of tarsi pitchy.

♂ ♀. Length, ♂, 5, ♀, 7 mm. ; breadth, ♀, 1 $\frac{3}{4}$ mm.

Three specimens from Mr. Wakefield. The markings vary much in intensity ; the hemielytra seem a little clouded with brownish. A broken (♂) specimen is altogether much darker, but in too bad condition to describe.

MORNA, n. g.

Body oblong-oval, robust, nearly glabrous, punctate. Head shortly triangular, clypeus rather prominent. Eyes large, situated near and extending beyond the apex of pronotum, slightly emarginate on their inner side. Rostrum reaching to the mesosternum, the first joint attaining the base of the head. Antennæ inserted in front of

the eyes, pilose, first joint stout, reaching far in front of the head, second thickened towards the apex, third and fourth slender and together much shorter than the second. Pronotum broadly convex, flattish on the disc, and with a distinct callus on each side anteriorly; posterior breadth nearly double the length and more than double the anterior breadth; distinctly collared; sides distinctly margined and subreflexed; hind margin slightly overlapping the scutellum. Scutellum nearly equilateral, with a sharp, narrow, transverse depression near the base; apex shortly spinosely pointed. Hemielytra with a longish triangular cuneus, with well marked fracture. Tibiae scarcely spinulose. First joint of tarsus stout, about twice as long as the second.

Resembles in facies *Capsus*, F., Fieb. (*Deræocoris*, Kirsch., Reut.). Type, *M. capsoïdes*.

34. *M. capsoïdes*, n. sp.

Shining testaceous-brown, more or less tinted and clouded with wine-red; antennæ, apex of rostrum, of femora, and of tibiæ, tarsi, and a patch on the corium in front of the cuneus, usually more intense in colour; sides of pronotum and a line from the clypeus to the apex of the scutellum (which on the pronotum and scutellum is more or less unpunctured) generally yellowish-testaceous. Head sub-rugose, impunctate, clothed with fine pale hairs; antennæ with many black hairs, the slender last two joints together about one-half the length of the second; side margins of the pronotum callous, and distinctly concave, the collar and the callousities on the disc impunctate; scutellum transversely rugose, punctures rather obsolete.

δ ♀. Length, 7–8 mm.; breadth, 3– $3\frac{1}{2}$ mm.

Captain Broun. Four specimens, more or less broken. Judging from them the species varies much in intensity of coloration.

35. *M. Scotti*, n. sp.

Shining reddish-brown, with variable blackish and bone-white markings, very sparingly clothed with fine pale hairs; clypeus and vertex with various irregular spots often confluent, pronotum with irregular spots anteriorly and a more or less distinct transverse band posteriorly, and sometimes some small spots of the scutellum, pitchy-black; hemielytra pitchy-black, clavus at the apex with more or less confluent spots, corium with the basal half of front margin broadly and an irregular band extending from the base to the inner apical angle, cuneus (except the apex and some spots), more or less distinctly creamy-white; membrane whitish, spotted with fuscous; hind margin of the pronotum and indications of a central longitudinal line from clypeus to apex of scutellum, whitish or brownish-white; legs pitchy-black; femora with apex and ring near it, tibiæ with rings, whitish. Second joint of antennæ longer than the rather slender last two joints together; sides of pronotum rather acute, reflexed, nearly straight. δ ♀. Length, 5 mm.; breadth, 2 mm.

Messrs. Hutton and Wakefield. Four specimens, very variable

in the intensity and distribution of the coloration. The much smaller size and different colour, as well as the shape of the pronotum, at once distinguish this from the preceding.

36. *M. sp.* ——?

Three specimens from Captain Broun seem to belong to a third species, allied to *M. Scotti*, but smaller and differently marked. I reserve a description till I have seen more and better specimens.

REUDA, *n. g.*

Body oblong oval, nearly glabrous, coarsely impressedly punctate. Head longly triangular, clypeus produced for about half its length in front of the side lobes. Eyes prominent, not very close to the apex of the pronotum, and extending beyond it for nearly all their breadth. Rostrum reaching to the metasternum, and the first joint to the base of the head. Antennæ inserted in front of the lower anterior angles of the eyes, pilose, first joint not attaining apex of head, second thickened upwards, third and fourth very slender, together about half the length of the second. Pronotum broadly convex, elevated posteriorly, posterior breadth more than double the length and about four times the anterior breadth; distinctly and rather broadly collared; sides rather obtusely margined, with a rounded expansion behind the collar, then straight to the rounded hind angles; hind margins nearly straight, overlapping the base of the scutellum; disc anteriorly with a tubercle on each side behind the collar. Scutellum equilateral, with a transverse depression behind the base, disc with a broad, shallow, longitudinal channel, apex produced into a broad short spine. Anterior margin of corium broadly expanded and slightly reflexed; cuneus with a well-marked suture. First joint of hind tarsus longer than the second.

Somewhat allied to *Capsus*, Fieb.

37. *R. Mayri*, *n. sp.*

Brownish-testaceous, with numerous irregular brown spots; disc of the pronotum with an irregular V-shaped mark, and the anterior margin of the corium and base and apex of the cuneus with rather larger spots; antennæ dark brown, base of second joint, and base and spot on the inner side of the first, yellowish-white; legs yellowish with dark brown rings, tarsi dark brown; membrane fuseous with paler streaks; venter dark brown with pale spots; pronotum with a callous elevated longitudinal central line, irregularly expanded on the disc and interrupted before the hind margin, pale yellow. ♀. Length, 5 mm.

Of this curious species I have seen one tolerably perfect example, and fragments of two others, all taken by Captain Broun.

38. *Capsus laticinctus*, Wlkr. (*C. ustulatus*, Wlkr.).

39. *Leptomerocoris maoricus*, Wlkr.

This and the preceding I have not seen.

In addition to the species mentioned above, I have three (or more) others belonging to this tribe, and apparently referable to two new genera, but as they seem extremely variable, it will be better to merely indicate their occurrence till I have seen more and better specimens.

40. *sp.*—, or perhaps two species. Messrs. Broun and Wakefield.

41. *sp.*— } or possibly four species. Messrs. Broun and Hutton.
42. *sp.*— }

(*To be continued*).

ON A NEW HORN-DEVOURING *TINEA*.

BY H. T. STAINTON, F.R.S.

Lately I received a box of insects to determine for Mr. W. Machin : amongst them were three specimens of a very large *Tinea*, with the information that they were taken by Mr. C. W. Simmons in his conservatory.

After duly examining the specimens, and coming to the conclusion that though nearly allied to my *Tinea gigantella*, from South Africa (*Scardia vastella*, Zeller), it was a distinct and unknown species, I wrote to enquire if there were any *horns* in Mr. Simmons's conservatory, and, if so, from what part of the world they came.

In due course I heard as follows from him :

"Some time since, I had a piece of buffalo horn given to me in "order to cut a handle for a walking stick, but not having time to spare "just then, I put the piece of horn in the green-house on one of the "top shelves, which was then partially empty. Shortly afterwards, the "shelf was filled with flower-pots and the horn became obscured from "sight, and, until the arrival of your letter, I did not think anything "more about it.

"Upon looking at the piece of horn I find that it bears evident "signs of the presence of larvæ, or perhaps I ought to say of the *late* "presence of larvæ ; and beyond this I found some empty pupa-cases, "one of which I have saved, lying alongside of it.

"I have made enquiries and have ascertained that this piece of "horn came from Singapore ; and I have no doubt the *Tinea* is a species "which has been imported from there."

For this novelty I propose the name of—

TINEA ORIENTALIS,

and have thus described it:

Exp. al. 8—11 lines, the largest specimens fully equalling the smaller specimens of the South African *vastella*, Zeller (*gigantella*, Stainton). Anterior-wings grey, rather glossy, with a faintly darker discoidal spot—the male specimen, which is rather worn, is paler and more ochreous-grey)—no black at the base of the costa; cilia dark grey. Posterior-wings with a tuft of long scales at the base, dark grey, with a purplish gloss; cilia pale grey. Head and face ochreous-yellow. Thorax dark grey. Antennæ rather thick, dark grey. Palpi with the 2nd joint dark brown, the short terminal joint ochreous.

Three specimens (1 ♂, 2 ♀), taken by Mr. C. W. Simmons, at Poplar, in his conservatory, in which was a buffalo horn from Singapore.

Mountsfield, Lewisham, S.E. :

October 16th, 1878.

Harpalus tenebrosus at Bridlington.—At the end of August, I took a fine specimen of *Harpalus tenebrosus*, at Bridlington, Yorkshire; as far as I know, it has not before been recorded from a locality so far north. *Nebria livida* was abundant at the same time and place: on hot days, it seemed to prefer sandy places part way up the low cliffs, and was then very easily obtained—as a rule, however, it was to be got by splitting the clay boulders, an operation requiring a good deal of hard work and perseverance. It was invariably concealed, and never to be seen running in the sun: it seemed, too, though abundant, to be gregarious and local.—W. W. FOWLER, Repton, Burton-on-Trent: October, 1878.

More enquiries about Plant-lice.—Following up my ideas about the cycle of life of the Aphidians, I bred this year a good quantity of plant-lice, mostly of the family of the Pemphigians (*Pemphiginae*, Passerini). My last and most important discovery was the sexuated forms of the apple tree-louse (*Schizoneura lanigera*); they consist of small insects without rostrum and with five-jointed antennæ, the length being, for the ♀, 0·63 mm., and for the ♂, 0·50 mm. As with *Phylloxera*, and, in fact, with all Aphidians I am aware of, these sexuated little creatures are laid by a winged-louse, of what I call the “pupiferous” form. The act of depositing the little pupa, out of which the sexuated insects come almost immediately, takes place in the same way as the laying of an egg; yet the best proof that it is not an egg but really a pupa, is that with this louse, and still more clearly with the poplar leafstalk-louse (*Pemphigus spirothecæ*), the pupa is so transparent that the sexuated female and the large egg which she carries in her abdomen are perfectly visible. Now, as the true egg is inside, the skin in which it is enveloped, along with the female, represents a chrysalis or pupa, and not an egg.

An Englishman, Sir Joseph Banks, has given, in 1819, in the Trans. Hort. Soc., vol. ii, pp. 162—169, a note on *Aphis laniger*. I should like to know, as I cannot procure the work here, if he speaks of the sexuated insects, or if they were unknown to him.

It is most striking, that while the sexuated forms are deprived of rostrum in *Schizoneura lanigera*, they possess that organ well developed in the closely allied *Schizoneura corni*, and also that this last insect has two winged forms in the course of its life, the *emigrant* and the *pupiferous*; but *Schiz. lanigera* has only the last form winged, and the *emigrant*, or second larval form, is apterous.

Up to this day, I know the males and females in 14 species, viz. :—

WITH ROSTRUM (*Sexuata rostrata*).

- 1.—*Schizoneura corni* discovered by Leuckart 1858.
- 2.—*Vaccuna dryophila* „ „ „ Huxley 1858.

WITHOUT ROSTRUM (*Sexuata erostrata*).

- 3.—*Phylloxera coccinea* discovered by Balbiani 1874.
- 4.—*Pemphigus cornicularis* „ „ Derbes 1872.
- 5.—*Phylloxera vastatrix* „ „ various persons 1875.
- 6.— „ *quercus* „ „ myself 1874.
- 7.— „ *acanthochermes* „ „ „ 1875.
- 8.—*Pemphigus filaginis* „ „ „ 1878.
- 9.— „ *Boyeri* „ „ „ 1877.
- 10.— „ *cærulescens* „ „ „ 1877.
- 11.— „ *spirothecæ* „ „ „ 1877.
- 12.—*Tetraneura ulmi* „ „ „ 1877.
- 13.—*Schizoneura lanigera* „ „ „ 1878.
- 14.—*Aploneura* n. sp.? (*lentisci*?) „ „ „ 1878.

I should feel very obliged by any information about the sexuated forms of the following species, which are unknown to me, viz. :—*Pemphigus lactucarius, vesicarius, bursarius, coluteæ, follicularius, semilunarius, cornicularius, utricularius. Schizoneura ulmi, lanuginosa, venusta. Phylloxera corticalis. Vaccuna alni.*

By keeping winged lice in a glass tube, they generally give birth to their *proles* in a few days. If the young ones look all alike, it is not the sexuated generation, but if some are small and others about a fourth part larger, then it is surely the sexuated period, and the winged insect is the *pupiferous* form.—J. LICHTENSTEIN, Montpellier: 17th September, 1878.

Developed membrane in British Pyrrhocoris.—In the valuable “British Hemiptera,” p. 164, Messrs. Douglas and Scott, when describing the scarlet, black-spotted *Pyrrhocoris apterus*, from South Devon, say :—“Membrane (in all British examples) rudimentary; when developed, it has (according to Herrich-Schäffer, ‘Wanz.’ ix, 173) two somewhat regular cells in the middle of the base, from which eight irregular forked nerves spring.” It may, therefore, be not uninteresting to note that among five examples of this species, sent to me from South Devon for naming, is one in which the left elytron has a large and most perfectly developed membrane, not truncate, but ovate at the apex. It is smoky-brown in colour, with the nerves somewhat darker; at the base are four oblong cells, that nearest the front margin the broadest; the two middle cells have a small cell between their united apices, springing from which, and from the broadest basal cell, three other cells are clearly to be traced; there are also indications of others; but the neuration becomes so evanescent towards

the margin that definition is scarcely possible. The right elytron has a slight tendency to development, as in another of these specimens ; the thin truncated apex being longer than in ordinary examples.—E. C. RYE, 70, Charlwood Road, Putney, S.W. : 29th September, 1878,

Hemiptera near Norwich.—The almost unprecedented amount of wet weather which has prevailed in this district throughout the past season has made insects very scarce. The following, however, may be worth recording : *Idiocerus Heydeni*, off Lombardy poplar in one locality near here, in company with *I. H-album* and *populi*. *Chilacis typhae*, one example by sweeping near some pits at Swanton Morley. *Psylla visci* : I had no opportunity of looking for this insect in May, but took a few examples of the summer brood at East Carlton in August. It remains most unaccountably scarce, as I have worked its food-plant well on three occasions, but have not taken a dozen specimens in all. *Typhlocyba Douglasi* : I took several examples of both sexes on beech and lime a few days since. I have mounted one of the males for the microscope, and find my former observations and figure (vol. xiv, p. 248) verified in every respect, so that I am more than ever certain of the distinctness of the species. *Typhlocyba debilis*, Douglas, one ♀ on beech.—JAMES EDWARDS, Bracondale, Norwich : 20th September, 1878.

On the pupation of the Nymphalidæ.—I have carefully examined the specimens prepared by Dr. Osborne, and forwarded to me by the Editors of this Magazine. They shew very plainly that the “membrane” he describes is by no means the spiracular lining as I had imagined, but is a structure certainly possessing special relationship to the suspension of the pupa, and that Dr. Osborne has really made a new and interesting observation. I speak subject to correction, possible on observing fresh specimens, but the specimens seem equally clearly to show that the “membrane” is not a special and separate structure, that it is not a third, or part of a third, envelope, distinct from the larval and pupal skins, and that its triangular form is due to Dr. Osborne’s method of preparation. The 13th segment (8th abdominal) consists of two portions (strictly two segments), the segment proper and the anal tubercle, the latter forms the hook-covered tubercle, by which suspension takes place ; the segment proper is reduced on its ventral aspect in the pupa to a narrow line, presenting two distinct small rounded tubercles. In the specimens, these tubercles are distinctly hitched into a fold of the larva-skin, and must thereby give increased security to the suspension of the pupa, this must be by the portion of skin posterior to them. In Dr. Osborne’s specimens, a triangular ligament is shown by the reflection of the skin backwards, the triangle having its apex at these tubercles, and consisting of the double fold of the skin, the anterior portion being thrown back over the truly suspensory posterior portion.—T. A. CHAPMAN, Hereford : 7th October, 1878.

Leucania vitellina at Torquay.—On the evening of the 14th September, in company with my friend, Mr. A. H. Jones, of Eltham, I captured at Torquay a very fine male specimen of *Leucania vitellina*.—R. S. STANDEN, Holmwood Lodge, Surbiton : October 4th, 1878.

Leucania extranea and *vitellina* at Torquay.—I had the good fortune to capture at Torquay, on the 13th September, at sugar, a very perfect *Leucania extranea* ♂, and on the following evening a *Leucania vitellina* ♀. On the 16th, I found at rest on grass a second specimen of the last named species.—A. H. JONES, Shrublands, Eltham: 1st October, 1878.

Heliothis scutosa in Co. Donegal, Ireland.—I took a specimen of this rare insect on the 19th of August last, in the North of Co. Donegal. It was hovering over heather in bloom about 3.30 in the afternoon. The sun was very strong at the time, and there were a great many insects on the wing. I did not know the species, so I sent it to Mr. Birchall, who kindly named it for me.—W. H. CAMPBELL, Ballynagard House, Londonderry: 23rd September, 1878.

Description of the larva of Selidosema plumaria.—Several specimens of this species I took in the New Forest, on July 31st last year, deposited eggs. These began to hatch during the third week in August, and the larvae fed well until autumn on the common ling. By the first week in December the largest specimen was about an inch long, but the majority were from half to three-quarters of an inch. They fed sparingly on withered ling shoots and leaves through the winter, and by the end of March the largest was nearly full grown.

Length about an inch and a quarter, and moderately stout in proportion: head narrower than the second segment, into which it can be partially withdrawn; it has the face flat, and there is a slight depression on the crown. Body of nearly uniform width throughout, and cylindrical; the segments overlapping each other however, and each being divided into sections by transverse ribs, together with a somewhat prominent ridge along the spiracles, give it a rather uneven appearance; the anal segment ends in a rather sharp triangular appendage, and the anal legs, being set widely apart, are very conspicuous: skin smooth, but tough in texture.

Ground colour uniformly pale stone-grey; head of the same colour, with a dark crescentic mark surmounting each mandible, and another dark brown crescentic mark above these; the mandibles are brown, of a still darker shade. A double, very dark brown, almost black, line extends through the dorsal area; on the anterior segments it is paler and more uniform, but after it reaches the fifth it becomes swollen and darker in the middle of each segment, which gives it a conspicuous and rather interrupted appearance; sub-dorsal and spiracular lines pale grey, the latter rather prettily edged above and below with chocolate-brown, the brown being most noticeable on the anterior segments: the spiracles, and four very distinct dots on the dorsal area on each segment, intensely black.

Ground colour of the ventral surface of a yellower-grey than the dorsal area; it has a broad central pale grey band, enclosing a fine double reddish-brown line; outside the band, but adjoining it, on segments 6, 7, 8, 9, and 10, is a conspicuous dark smoky mark; and between the central band and the spiracular region is another faint pale line.

About the middle of April the first went below the surface, and the moths emerged at the end of July.—GEO. T. PORRITT, Highroyd House, Huddersfield: October 4th, 1878.

Larva of Acidalia imitaria.—I used to find the larvæ of *Acidalia imitaria* feeding on privet (*Ligustrum vulgare*) ; they seemed to affect the lower twigs, quite near the ground.—R. SOUTH, 277, Camden Road, N.W. : October, 1878.

Vegetable Moth-trap.—Seeing a notice in this month's Magazine of the vegetable moth-trap, I send you a specimen. Though this moth was dead when I took it from the climber, as a rule they are alive and apparently uninjured the morning after their capture, and I have released as many as eighteen *Plusia gamma* from one plant of a morning. The sensitive portion of the flower appears to be quite at the base, closing, when touched by the proboscis of the victim, and holding it there like a vice. CHARLES R. DIGBY, Studland Rectory, Wareham, Dorset : October 9th, 1878.

[The example of *Plusia gamma* sent by our correspondent, caught by a flower of *Physianthus*, was not dead as he supposed, but was alive and fluttering when the box was opened on the 11th ; it was dead the next day. It appears probable that the fertilization of the flowers necessitates the capture of moths. Riley has recorded the same habit in America (Proc. Ac. Sci. St. Louis, vol. iii, p. cxv, Dec. 1st, 1873), and with regard to insects even more powerful than *Macroglossa*. He remarks that when they do escape, it is at the expense of part of their haustella.—EDS.].

ENTOMOLOGICAL SOCIETY OF LONDON : 7th August, 1878.—H. W. BATES, Esq., F.L.S., &c., President, in the Chair.

Mr. McLachlan communicated a note to the effect that the larvæ in the haulm of potatoes, noticed by Professor Westwood at the Meeting of July 3rd, were probably those of *Gortyna flavago*, which is known to feed in the stems of a variety of herbaceous plants.

Mr. S. Stevens exhibited living examples of *Teretrius picipes*, found on palings at Upper Norwood, and parasitic on *Lyctus oblongus*. He also mentioned that Mr. Clark had bred ♂ ♀ of *Pachnobia hyperborea* from pupæ found under stones on the mountains near Rannoch.

Mr. Enock exhibited several remarkable varieties of British *Lepidoptera*.

Mr. Rutherford stated that he had bred the parasite on the larvæ of *Anaphe* exhibited at the Meeting on the 5th June. It proved to be an ichneumon, determined by Mr. F. Smith as *Cryptus formosus*, Brullé, known to be parasitic on *Anaphe reticulata*. He exhibited a series of colour-varieties of *Aterica meleagris*, an African butterfly, as an illustration of protective resemblance, the colours varying according to the nature of the soil in the districts frequented by the insect.

Mr. Jenner Weir thought the colour-variations of *Hipparchia Semele* might be attributable to the same cause. Mr. Elwes was of opinion that too much stress was attached to so-called protective resemblances. Mr. Distant and the President also took part in the discussion.

Mr. Jenner Weir exhibited varieties of *Argynnis Paphia*, captured this year in the New Forest, the most interesting being males, which, from their dark coloration, showed a tendency toward the ♀ variety known as *valezina*, and he was of opinion that they were potentially males of this form. He remarked that although the

species was much less common than usual this year, the numbers of *valezina* were proportionately greater.

Prof. Wood-Mason read a paper on the difference between the form of the antennæ in the males of *Idolomorpha* and other genera of *Empusidæ* (*Mantidæ*).

Mr. Dunning read a paper on the genus *Acentropus*.

Mr. Butler communicated descriptions of several new species of *Myriopoda* of the genera *Sphaerotherium* and *Zephronia*.

Mr. Baly sent descriptions of new genera and species of South American *Eumolpidæ*.

4th September, 1878.—F. SMITH, Esq., Vice-President, in the Chair.

David Price, Esq., of Horsham, was elected a Member, and Captain Thomas Broun, of Auckland, New Zealand, a Subscriber.

Mr. Rutherford exhibited two specimens of an Orthopterous insect (*Palophus Centaurus*, Westwood) from Mount Camaroons, remarkable for its nocturnal habits, and for the perfect resemblance shown between it and the twigs of the tree it frequents.

Mr. Meldola stated that he had remarked, in *Hipparchia Semele*, an amount of protective resemblance analogous to that noticed at the previous Meeting in the case of *Aterica Meleagris*: specimens of the *Hipparchia* from the sand hills of Lancashire differing perceptibly on the under-side from those of the chalk of the South of England. Mr. Weir remarked that he had been able to detect Jersey specimens of this butterfly which had been mixed with ordinary British examples. Mr. Boyd alluded to the pale colour of *Hepialus lupulinus* at Margate.

Mr. Smith exhibited a fruit of the "Locust tree" of British Guiana, which was found to contain living specimens of a weevil (*Cryptorhynchus stigma*, Linn.), and a small ichneumon. He also exhibited a specimen of *Melolontha vulgaris* found recently in the perfect state in a box in which a larva had been placed last April.

Mr. Champion exhibited a series of *Spercheus emarginatus* from West Ham.

Mr. Spiller exhibited a collection of so-called "jumping seeds" from Mexico, containing larvæ of *Carpocapsa saltitans*.

The Secretary exhibited a photograph of *Prodryas Persephone*, Scudder, a fossil butterfly of the tertiaries of Colorado, which showed a remarkable degree of preservation.

Mr. F. Smith stated that having recently had occasion to consult the Linnean collection of insects, he found that it had been allowed to fall into a state of complete neglect, and that after having consulted the Council of this Society, he proposed that immediate steps be taken to remedy such a state of affairs, which was agreed to unanimously.

Mr. Swinton communicated a paper "On the vocal and instrumental music of insects."

Mr. C. O. Waterhouse read a paper on *Coleoptera* from Jamaica and other islands of the West Indies.

2nd October, 1878.—H. W. BATES, Esq., F.L.S., &c., President, in the Chair.

Mr. J. L. Hamilton, M.R.C.S., of 34, Gloucester Terrace, Hyde Park, was elected a Subscriber, and Mr. T. Nottidge, of Ashford, a Member.

Mr. F. Smith stated that he had communicated with Sir J. Lubbock, who, in his turn, had written to the President of the Linnean Society, respecting the state of the Linnean Collection of insects, and had received an assurance that its preservation should be attended to.

Mr. McLachlan read a statement on the condition of the so-called Linnean Collection and its present scientific value. He expressed his surprise that Mr. Smith should have taken the course he had done, instead of first communicating privately with the Officers of the Linnean Society, who are responsible for the safety of the Collection. The opinion that it had been allowed to fall into a state of complete neglect was so contrary to Mr. McLachlan's own experience from frequent examinations during a period of fifteen years, as to induce him to make an independent inspection two days previously. He found nothing whatever to justify Mr. Smith's statement or the course taken by the Society. There were no traces of mites, *Psoci*, or *Anthreni*, and in fact nothing but a few traces of mould, probably the result of some former neglect. He did not consider the collection of any special importance, owing to the treatment it had received before it came into the possession of the Linnean Society, and any value it now had, could only exist if it be maintained in connection with Linne's annotated copies of his own (and other) works in his library.

Mr. Stainton said he had examined the collection the previous day, and found those portions of it in which he was specially interested in the same condition as when he first consulted them thirty years ago. If Mr. Smith was of the opinion he stated to the Meeting on the 4th ulto., he did right in bringing the matter under the notice of the Linnean Society.

Mr. Jenner Weir exhibited specimens of *Hipparchia Semele* from the New Forest, Lewes, the Righi, and Russia, in illustration of the variation on the underside mentioned at the previous Meeting.

Mr. McLachlan exhibited the eggs and young larvæ of *Ascalaphus longicornis*, found by M. E. L. Ragonot in the Forest of Lardy near Paris; the eggs were arranged (as usual) in two rows on a grass stem, to the number of twenty-three in each row. He also exhibited (on behalf of Mr. Edwin Birchall) the specimen of *Heliothis scutosa* captured in Ireland by Mr. Campbell, and recorded in the present No. of this Magazine.

Mr. Champion exhibited specimens of *Amara infima* from Chobham.

Mr. W. A. Forbes exhibited a collection of insects from the neighbourhood of Chamounix, captured at an elevation of 5—6000 feet.

Mr. Rutherford read the description of a new species of Goliath beetle (which was exhibited) from West Africa, which he proposed to call *Ceratorrhina Batesi*. He also exhibited an example of *Rhomaleosoma Ruspina*, nearly a third of the wings of which (on both surfaces) was hyaline, and considered it had been bred in that condition.

Prof. Wood-Mason read notes on the hatching period of *Mantidæ* in East Bengal, and on the discovery of a stridulating apparatus in this family of *Orthoptera*, consisting of the serrated margin of the tegmina. He stated that he had discovered an instance of viviparity in the *Orthoptera* in *Panesthia javanica* (*Blattidæ*), from the abdomen of a ♀ of which he had extracted young insects, proving that in this case there is no egg-capsule.

NOTES ON BRITISH TORTRICES.

BY CHAS. G. BARRETT.

(Continued from Vol. xiv, p. 241).

In former notes (vol. xiii, p. 159), I stated that *Eupœcilia hybrida*-*ella* had been reared by Mr. Thos. Wilkinson, of Scarborough, from seed-heads of sow-thistle (the printer made it *cow-thistle*)—*Sonchus oleraceus*. Upon this, my friend, Mr. W. R. Jeffrey, pointed out to me that the occurrence of the larvæ of this species (under the name of *carduana*) “upon one of the *Hieracea*” had been recorded by him in the Entomologist’s Weekly Intelligencer, vol. viii, p. 124, and he expressed a decided opinion that the food-plant of this species was not a *Sonchus*. By good fortune I found a few seed-heads of the plant which had been sent me with larvæ by Mr. Wilkinson, and these, on examination, proved to belong to *Picris hieracioides*. Following the clue so fortunately obtained, I searched the seed-heads of *Picris hieracioides* in the quarries late in September, 1877, and succeeded in finding in them a very few full-fed larvæ, from one of which I reared a most lovely imago on July 17th of this year. In the quarries, however, the moth was out a week or two earlier, and on July 27th I found plenty of young larvæ in the *Picris* heads. By the middle of August most of them were full-fed, but a few might still be found till late in September.

The young larvæ are of a buff colour, but when full grown pale pink, whitish beneath, sufficiently transparent to render the internal dorsal vessel visible. Head light brown, jaws black, dorsal plate yellowish with a chain of four black dots across it, anal plate light brown. In form it is short and stumpy, thickest in the middle, but moderately active and immoderately restless and impatient of confinement.

It feeds on the seeds of the *Picris*, lying concealed in the seed-head, and passes freely to a fresh head when necessary, but without uniting them together or spinning any web. When full-fed, it leaves the seed-head and spins a tough cocoon, probably among rubbish or rotten wood, but it is difficult to manage in confinement, biting its way remorselessly through almost any covering.

I have not yet seen the pupa. That state is probably assumed about June.

Eupœcilia atricapitana, Steph.—I am aware that this species has already been reared by Mr. Howard Vaughan and others from ragwort, but I have seen no account of its habits. I found larvæ in the ragwort plants, on one of the slopes of the coast sand-hills, rather

commonly on July 15th, and they continued to feed until the end of July, producing the second brood of moths in August, but so terribly were they infested with ichneumons that, although I brought home two large bundles of plants and planted them in flower-pots, only six specimens emerged. This accounts for the scarcity of the moth along this coast.

The larva is short and thick, thickest towards the head and rather attenuated behind, somewhat wrinkled and excessively sluggish—not to say stupid,—dull pale yellow, faintly tinged with reddish on the back, spiracles brown, head light brown, plates faintly brownish, the dorsal plate having a brown bar across its posterior margin. Abdominal legs very small and inconspicuous.

Feeding within the growing stems of *Seneeo jaeobæa*, eating the pith and stopping the growth of the central shoot so that it becomes thickened and covered with a bunch of leaves, while the side-shoots grow up past it. From appearances, the larva must commence to feed in the heart of the shoot and eat down into the pith of the stem where it forms a chamber, in which it assumes the pupa state in a cocoon of white silk. The pupa is of a light chestnut colour, and is extruded from the burrow when the moth emerges. This habit of assuming the pupa state *in the feeding place* is very unusual in this group.

I have not yet met with the second brood of larvæ from which the early summer brood of moths is produced.

Dr. Hofmann quotes from Gartner to the effect that the larva of *atricapitana* feeds “in October in the root-stocks of *Hieracium umbellatum* either on the surface of the root, covered with a web, or in a “silken tube within, several larvæ not unfrequently being together.”

But I think this must refer to some other species. Certainly the insect shows no partiality for *Hieracium umbellatum* in this country, but is always found among ragwort.

Eupœcilia angustana, Steph.—I hear from Mr. Jeffrey that he once reared this species from pink larvæ found in the seed-heads of *Plantago lanceolata*, on the cliffs of Scarborough, in the first week in September. This partly agrees with Gartner's account (under the name of *cruentana*),—“Not unlike the larva of *dubitana*, the anterior margin of the “dorsal plate not whitish, but like the head, dark brown, and the elevated dots on the back not so conspicuous. In August, among the “seeds of *Plantago media*, in an ascending web. Pupa short, dark “brown, shining.” (*Dubitana*, he describes, “brownish-yellow, naked, “with isolated short hairs. Head heart-shaped, flat, rust-yellow; “dorsal plate bistre-brown, lighter in front, edged and divided with

"pale)." Probably the discrepancy in colour arises from the age of the larva described. The other food plants of *angustana* mentioned are flowers of *Achillea* and *Origanum*, and no light is yet thrown upon the food plant or larva of the (supposed) second brood of this species found abundantly on heaths where the (supposed) first brood is never seen!

Eupaecilia curvistrigana, Wilk.—Larva short and rather stumpy, thickest in the middle, not active, pale yellowish-pink, but deeper pink when full grown, with grey internal dorsal vessel ; hairs very delicate, spiracles pink. Head light brown, eyes and jaws blackish, plates pale amber colour. In flowers of *Solidago virgaurea*, eating out the young seeds and passing from flower to flower, sometimes uniting them slightly with silk. When full grown, leaving the flowers and spinning a tough cocoon among rubbish or rotten wood.

I found larvæ in September of last year, but failed to rear them. This autumn I have a good number, with which I hope for better success. Mr. Machin has reared a few specimens annually for the last few years, but finds them very scarce.

Eupaecilia affinitana, Doug.—This species was reared from flowers of *Aster tripolium* by Von Heinemann some years ago, and since by several English entomologists, but I am not aware that any description of the larva has been published. It is stumpy, sluggish, dirty whitish, faintly tinged on the back with grey, through which the dorsal line is visible, and with a faint grey spiracular line. Head brown, dorsal plate black, anal plate pale brown. In blossoms and seed-heads of *Aster tripolium*, eating out the young seeds and doubtless moving to a fresh head when the food is exhausted, and quitting the seed-heads to spin up. As its food plant is apt to be submerged at high spring tides, it must either travel some distance to spin up, or make a cocoon which enables it to set salt water at defiance. I found a few larvæ at the end of September last year, and reared two specimens in July last. At the end of July I found larvæ, from which I expected to rear a second brood in August, but was disappointed, and suppose they are lying over until next spring. I cannot blame them for this, for the weather last August in this neighbourhood was not attractive.

Eupaecilia implicitana, H.-S.—The food plants of this species have already been recorded by several writers, but my friend, Mr. W. West, of Greenwich, has supplied me with so interesting an account of the habits of its larva, that I make no apology for reproducing his observations. He says, "The food is the common chamomile (*Pyrethrum "inodorum*) ; the larvæ feed in the seed-heads and also in the stems,

"eating their way in from the joints. I have examined hundreds of "joints, and find that about an inch is sufficient for each larva. They "are to be found very small (I have seen them feeding when very "minute) as well as full-fed in the stems, and pupate in them and in "the seed-heads. I have seen five or six pupa-skins sticking out of "the joints of a single plant. In June, when the first brood of larvæ "is feeding in the stems, there are no seed-heads, but I found them in "seed-heads *and stems* in August, and again in October. The larvæ of "this last brood hibernate. I put three larvæ into a chip box and they "remained in that state under a web until May 5th, then changed to "pupæ, and emerged about the 20th. I also found two larvæ on the "18th searching for a comfortable place to change in. There are three "broods—the moths appearing in May, July, and September, and these "three broods do not differ, but there is exactly the same variation in "size and colour in each."

Mr. West kindly sent me larvæ two years ago, from which I noted the following description: "When young, dull greenish with a black "head, but when full grown, pale yellow, with light brown head, and "with two black dots at the posterior margin of the yellowish dorsal "plate. Eating round the seed-heads of *Pyrethrum inodorum*, devouring "the seeds and also boring into the joints of the stem, which they hold "low out, going into pupa in the spaces."

But Dr. Hofmann describes the larva as follows: "Yellow, with "shining black head, dorsal plate brown, posteriorly black; anterior "legs black, ventral and anal pro-legs yellow-brown, the latter with "a light brown horny plate; raised dots yellowish with very fine white "bristles. In autumn, in the seeds of *Chrysocoma linosyris*; according "to Rössler, on *Gnaphalium* and *Solidago*; according to Zeller, on " "*Pyrethrum*. (The food plants are, at any rate, exclusively *Compositæ*)."

It certainly is found also in this country among *Solidago*, and Mr. Machin has once reared it from that plant.

Rössler, I believe, adds that it flies among *Artemisia campestris* and *vulgaris*, *Gnaphalium* and *Tanacetum*, and Heinemann that it feeds in seed-heads of *Anthemis cotula*, which, if correct, would identify it with Curtis's *anthemidana*, with his description of which the female of this species closely agrees. In this view I see that I am corroborated by Heinemann himself.

Eupæcilia roseana, Haw.—Wilkinson, after describing the larva of this species pretty accurately, says, "before attaining its full dimensions it eats its way into the centre of the teasle-head, spinning a

" silken web over the entrance, it there feeds on the pith, and goes " into pupa at the top of the stem, first spinning a loose white " silken web."

This is surely an error! The loose white silken web is that of the larva of *Penthina gentianana*! As far as my observations go the larva feeds transversely through the seeds of the teasel until full-fed, then makes a tough cocoon in the hollowed seeds, and when the moth emerges the pupa-skin is drawn out among the spines at the side of the seed-head.

Cochylis straminea, Haw.—On July 25th, I found larvæ of this species inhabiting the base of the flower-heads of *Centaurea nigra*, eating the young seeds and lying curved in the cavity formed, or when disturbed (particularly if young) retreating into the thickened portion of the stem immediately beneath, the pith of which seems to have formed their first food, and in the side of which was a hole for the extrusion of frass. These larvæ when full grown are very sluggish and plump, thickest in the middle, rather shining, very pale yellowish, or almost white, with faintly grey internal dorsal vessel. Head deeply lobed at the back, black, dorsal plate brown, divided and narrowed at the sides so as to form triangles, anal plate light brown, anterior legs black. When young, however, the head and dorsal plate are dark brown and without lobes or divisions. When the larva is removed from the flower-head it stands with its anterior segments raised, and head turned with a most comical look of surprise and attention.

These larvæ produced moths in August, the May and June brood being in the larva-state in September.

The larva of this species must be tolerably well known, but I have been particular in describing it in order to compare it with that of the next species, which has sometimes been looked upon as doubtfully distinct.

Cochylis alternana, Steph. (*gigantana*, D. & S.).—For this species I am indebted to Mr. Howard Vaughan, who sent me five buds of *Centaurea scabiosa*, each containing a larva, in the beginning of July. These were short and thick—obese in fact—and very sluggish, pale yellow, with the spots small and black; head chestnut-brown, dorsal plate black-brown, divided by a yellow line in the middle, anal plate dark brown, very small. In buds of *Centaurea scabiosa*, eating out the immature seeds and almost the whole contents of the bud, and surrounding themselves with a tough silken tube or pouch as they fed. In this pouch they assumed the pupa-state within the buds. I supplied fresh buds, but not one of the larvæ touched them; those in which they reached me

contained sufficient nutriment to enable them to feed up, but I cannot think that one bud would serve a larva for its entire growth. The moths emerged at the end of July ; the pupa, which is of a dark chestnut, being then extruded from the bud.

The insect is only found (with us) in the south-eastern corner of England, and I have had no opportunity of observing it at large ; but, as far as I can learn, there is only *one* brood, which is on the wing as nearly as possible between the two broods of *straminea*.

Coccyx Ochsenheimeriana, Zeller.—In the latter part of last May, Lord Walsingham met with several specimens of a very beautiful little *Coccyx*—allied to *strobilella*, but smaller—among *Pinus cephalonica* at Merton. The species was then quite unknown to me, but, by the kindness of Professor Zeller, I have since been able to identify it as *Ochsenheimeriana*, Zeller. A short description may be useful :—

Al. exp., $4\frac{1}{2}$ lines. Head, palpi, and antennæ black, thorax and abdomen smoky-black. Ground colour of fore-wings *apparently* dark olive-grey, but *actually* black, closely irrorated with minute yellow scales. The greater part of the costal margin occupied by seven black spots, within each intermediate space a short, bright silvery streak. Outer edge of the usual basal blotch indicated by a nearly straight, oblique, faintly blackish fascia. Central fascia deep black, arising at the third costal black spot and bending outwards, and then, while still near the costa, turning across the wing *perpendicularly* to the dorsal margin. This fascia is edged on both sides with bright silvery. Before the hind margin is a black, perpendicular streak, edged with silvery, and occupying the place of the usual ocellus. Apical spot black. Cilia extremely glossy, silvery-black, but with a deep black line at the base. Hind-wings dark grey, with slightly paler cilia.

Although resembling *strobilella*, this species is easily distinguished from it by its much shorter fore-wings, and the absence of most of the silvery transverse lines, but more especially by the strongly marked central fascia, *perpendicular to the dorsal margin*. In *strobilella* the central fascia is angulated in the middle.

Wocke gives as its localities, "Germany and Livonia," and the type sent me by Prof. Zeller is from the latter country ; but, according to Heinemann, it is found at Vienna, Bohemia, Ratisbon, and Brunswick in May and June, among *Pinus picea*, and also in woods in which there is no fir. But I am not very sure that Heinemann's remarks really refer to this species, for besides other discrepancies, he describes the palpi as *whitish*, whereas they are black, or nearly so.

Nothing appears to be known of its larva, and Lord Walsingham has not as yet found any probable trace of it. No doubt it has been introduced into this country with ornamental trees, and I hope that it

has effected a permanent settlement in his lordship's woods. I am indebted to his kindness for specimens, and for the opportunity of recording this beautiful little novelty.

Orthotænia striana, Schiffermiller.—On the 19th of March last, having an hour to spare, and a fern-scoop at hand, and being close to a large field of old pasture abounding, in the summer, in *Dicroramphæ* and other *Tortrices*, I determined to devote the time to promiscuous digging for root-feeding larvæ. Accordingly, all manner of plants were turned up—thistles, plantains, ragweed, knapweed, hawkbit, hawkweed, *everything* that could boast a substantial root, even to the common dandelion, and before long, to my great surprise, I found a small larva burrowing into the skin of the root of the last-named and most despised of plants, the common dandelion (*Leontodon taraxacum*). This larva was so small that I hoped it might produce *Dicrorampha sequana*, and by digging up hundreds of dandelion roots on this and a subsequent occasion, I succeeded in finding from a dozen to twenty larvæ. Most of them were placed in flower-pots in which bunches of the dandelion plants dug up in the search were placed and tied over with gauze, but that no chance of rearing them might be lost, I put one larva into a tin box with some bits of root, sufficient, as I supposed, for it to feed up on, and it was no more visible until May 8th, when I was astonished to find a plump active larva more than half an inch long in the box, where, having hollowed out its stock of roots, it was eagerly hunting for more. More were supplied, and it was placed in a glass-covered gallipot, when it immediately burrowed into one of the roots, proceeding to show a healthy appetite by the quantity of frass extruded from one end, and by the end of May it was full-fed, and had made a tough cocoon of earth and silk, not attached to the roots. The idea of a *Dicrorampha* had—from its size—long been given up, and having no idea what was likely to be produced, it will readily be understood that I was not gratified when, on opening the gallipot a few days after, a dipterous parasite (*Tachina*) flew out. However, the dandelions in the flower-pots had not been thriving, and were indeed dying one by one, and on June 30th, from one of them emerged the first specimen of *Orthotænia striana*. A dozen more appeared in the course of a fortnight, some of them—the females especially—being of very pretty reddish and pink varieties.

The larva, when small, is of a dirty whitish colour, with a large, dark grey, internal dorsal vessel, very visible, head light brown, plates both very pale brown. At this time it feeds at the surface of the dandelion root, burrowing under the skin, and protecting itself with

a slight web; when larger, it becomes of a more yellowish-white, and burrows *into* the substance of the root, hollowing it out and killing the plant. The favourite place of pupation in the case of healthy larvæ, appears to be the upper end of the hollowed root, close under the dead crown, through which the light brown pupa is pushed when the moth emerges.

I am not aware that the larva of this species has before been noticed, but I am inclined to suspect that it feeds also on the roots of allied plants, for I remember once finding both sexes in abundance in a field at Norwich, in which some composite plant, which I did not recognize (probably *Crepis* or *Borkhausia*), was growing in plenty. The moths, the females especially, constantly settled upon these plants, and I have no doubt that as larvæ they had fed in the roots.

Orthotenia antiquana, Hübner.—I think that I have already recorded finding this species with *O. cricetana*, Westw. (*trifoliana*, H.-S.), and *Euchromia purpurana*, commonly in some of the clover fields here. The larvæ of the last two species being quite unknown (for Möschler's record of *cricetana* "on aspen," is obviously incredible), I took the opportunity, when one of these fields was ploughed up in February, of examining every root that I could find exposed by the plough. Scattered commonly over the field were pieces of what might be called long thin tuber, rather than root, since they were fleshy and brittle, without internal fibre, and totally devoid of fibrous roots or attachment to any kind of stem. They were of about the thickness of a goose quill, eight or ten inches long, rounded off at the ends, and regularly *constricted* at about every inch of their length. These roots (or tubers) were quite strange to me, but I soon found that many of them were tenanted by a slender larva which moved rapidly up and down a burrow exactly in the middle of the root, and extending to nearly its entire length. The burrow of a young larva was small and regular in width, but when larger they hollowed out one end of the root and caused it partially to decay. I collected a lot of these roots and laid them with mould in a large garden-pot tied down with gauze. In the spring these roots or tubers sent down plenty of fibrous roots into the earth, and threw up shoots which soon declared themselves to be *Stachys arvensis*, and made the identity of the larvæ pretty certain. They fed up entirely in the roots—apparently without affecting the vitality of the plants—and were full-fed about June 10th, when they deserted the roots to spin up in moss, hollow sticks, rolled paper, between a leaf and the side of the pot, anywhere in fact that was dry and convenient, and on June 28th, the first specimen of *antiquana* emerged, others appearing for more than a fortnight afterwards.

When young, the larva is rather slender and long, white, with a faint yellowish tinge, dorsal line slightly darker and very narrow, dorsal vessel visible, slender also. Head clear light brown, its two halves oval, plates hardly visible, very faintly tinged with brown. Altogether an unusually clear, white looking larva. In the middle of April, when nearly full grown, three quarters of an inch long, clear, shining, yellowish-white or creamy, with a quadrate pink internal spot, visible through the skin of the 9th segment, head and dorsal plate light brown, anal plate grey. Pupa light brown, very restless.

Perhaps I should apologize for going so much into detail respecting a larva which has repeatedly been reared before, which is described and its food given by Mr. Stainton, in the "Manual," in about ten words, and which has been more particularly described by Colonel Gonreau in the Ann. Soc. Ent. Fr., 1851, p. 323, but its habits are so peculiar that they interested me very much. It seems reasonable to conclude that the eggs are laid on the stems of the food-plant, and that the young larvæ mine down them into the roots, but no trace of the place of entrance is discernible.

Finally, as an encouragement to further effort, one specimen of *O. ericetana* actually emerged from the same pot. Its larva must have fed in the same roots, there being no other plant in the pot.

Pembroke : 9th October, 1878.

DESCRIPTION OF THE LARVA OF *EUPŒCILIA MACULOSANA*, AND ITS HABITS.

BY JOHN H. WOOD, M.B.

On several occasions I had found when opening the dry stems of *Umbelliferæ*, in the winter, a larva, from which I had bred *Eupœcilia maculosana*. The larva always occupied a short gallery, or rather chamber, in the pith, and the limited amount of frass present, as well as the absence of extensive workings, showed that it must have fed up elsewhere; but where that was, remained a puzzle till the summer of 1876.

I was collecting *Tortrices* in a moist place in one of the woods here, one afternoon in the month of June, and had boxed such insects as *P. fuligana*, *S. euphorbiana*, *S. puncticostana*, &c., when I saw a specimen of *E. maculosana* alight on a seed-vessel of the common bluebell (*Agraphis nutans*), and apparently deposit an egg. It then flew to another plant, and so on to another. I was unable to follow up the clue that season, but the following July, towards the end of the month,

I found the full grown larvæ feeding not uncommonly on the seeds of this plant. It was necessary to open the vessels to find them, as the larvæ gave no outward indication of their presence, excepting in the rare instances, when a larva, having exhausted one vessel, had entered a second, in which case the point of entrance, though closed as it always was with silk, was easy to see. Usually it finds food enough in a single vessel, and makes no visible communication with the outside, till it becomes full-fed and eats its way out to go in search of winter quarters. My own larvæ were supplied for this purpose with cork and dead bramble-shoots, into which they readily burrowed, or rather, I should say, ate, for they swallowed the removed material, and did not simply turn it out, as most larvæ do under similar circumstances. Probably this is merely an expeditious way of getting rid of the refuse material, for it can scarcely be that it is swallowed as food, since the chamber is completed in a very few days and then all production of frass ceases. At any rate, it is a curious feature in its œconomy, and I can call to mind no other larva that acts in the same way.

The markings of the larva are unusually distinct and abundant for an internal feeder. The colour of the body is white; that of the head pale brown. There is a black plate on the 2nd segment, and another on the 13th. The dorsal and spiracular lines are pale rust-colour, and well marked. The usual spots are also of the same colour, and distinct. There is no sub-dorsal line, but below the spiracular line are two other rust-colour lines, the lower one running along the base of the legs and claspers. Both these lines are interrupted, and are also paler in tint than the dorsal and spiracular ones. The larva, when full-fed, eats, as has been said, into some soft woody substance, and there remains till the spring, when it assumes the pupal-state.

Tarrington, Herefordshire :
26th October, 1878.

Autumnal pupation of Abraxas grossulariata.—As I have never seen any reference to the above subject in any books which have come under my notice, I venture to forward you a few remarks, which you will perhaps think interesting enough to publish. In November, last year, I found, in a friend's garden near London, about seven dozen pupæ of this species on some old gooseberry and currant bushes. I at first thought they were old and empty, but, on pulling one or two off, found them fresh and alive. I tried to rear them, but unsuccessfully. In October this year I found, in the same garden, altogether about forty dozen, and also the larvæ in all sizes, from a quarter of an inch in length to some actually spinning up. The imago has been reared freely from the pupæ taken this year.—H. SILCOCK, 22, Randolph Street, Camden Town, N.W., and West London Entomological Society : November, 1878.

DESCRIPTIONS OF SIX NEW BUTTERFLIES.

BY THE LATE W. C. HEWITSON, F.L.S.

[I have been asked to publish the following descriptions of new species, which were found among Mr. Hewitson's papers after his death, and the types of which are in his collection.—W. F. KIRBY, Dublin : *September 11th, 1878.*]

EUREMA CHARON.

Upper-side : male, dark brown, paler towards the outer margins. Anterior wing with two white spots beyond the middle of the costal margin, the spot nearest the apex bifid. Posterior wing with one triangular tail, and a sub-marginal series of black spots.

Under-side : red-brown, variegated with paler spots. Both wings crossed at the middle by a band of dark brown. Anterior wing with two yellow spots in the cell, one at the base triangular, marked by a brown spot, the other at the end, marked by an eye-like brown spot; a yellow spot on the costal margin beyond the middle, marked by a rufous spot, the apex rufous-orange, crossed by three brown spots. A sub-marginal series of lilac spots. Posterior wing with six yellow spots from the base to the middle of the costal margin, and a rufous eye-like spot, some rufous spots towards the inner margin, a sub-marginal series of indistinct ocelli, and some lunular blue spots between the tail and anal angle. Exp. 2 inches.

Hab. : Ecuador (Buckley).

LEUCOCHITONEA LATHÆA.

Alis supra rufo-fuscis fasciis duabus transversis, marginibusque exterioribus fuscis. Anticis macula atra discali punctis duobus albis notatis. Posticis infra cæruleis.

Upper-side : rufous-brown. Both wings crossed beyond the middle by two bands of brown, both with the outer margin dark brown, and the fringe broadly brown. Anterior wing with the base dark brown. A large, oval, black discal spot (as in *Mesosemia*), marked by two minute white spots, and bordered with rufous : a brown band below it to the sub-median nervure. Posterior wing with the base and a band below it dark brown.

Under-side : anterior wing as above, but paler, with the base slightly tinted with blue. Posterior wing pale blue to the second transverse band, and marked by some indistinct grey spots in the place of the first band. Exp. $1\frac{1}{2}$ inch.

Hab. : Bolivia (Buckley).

LEUCOCHITONEA LYRCÆA.

Alis supra fuscis, marginem exteriorem versus rufis, fasciis duabus

marginibusque fuscis. Anticis macula discali nigra, punctis binis albis notata. Posticis infra albis, cæruleo-tinctis, margine costali fasciis duabus, ciliaque rufo-fuscis.

Upper-side: brown, rufous towards the outer margin. Both wings with two transverse bands and the outer margin dark brown. Anterior wing with a black cordate spot at the end of the cell, marked by two minute white spots, and bordered by paler colour: an indistinct brown band below this to the sub-median nervure. Posterior wing with an indistinct brown band before the middle.

Under-side: anterior wing as above, except that it is paler at the inner margin. Posterior wing white, tinted with pale blue, crossed from the costal margin, which is clouded with brown, by several bands of brown, two short ones near the base, one near the middle, and one sub-marginal; the outer margins also brown.

Exp. $1\frac{3}{10}$ inch.

LEUCOCHITONEA EARINA.

Alis utrinque fuscis, versus marginem exteriorem rufis: fasciis duabus fuscis. Anticis macula discali nigra, punctis binis albis notata. Posticis infra angulum analem pallidioribus macula fusca notatis.

Upper-side: dark brown, rufous towards the outer margin. Both wings with two transverse bands, and the outer margin dark brown. Anterior wing with an oval black spot at the end of the cell, marked by two minute white spots, and bordered at both ends with paler colour.

Under-side: as above, except that the transverse bands are divided into spots, that the posterior wing is paler near the anal angle, and is there marked by a large black spot.

Exp. $1\frac{3}{20}$ inch.

Hab. : Para (Bates).

LEUCOCHITONEA ELELEA.

Alis supra fuscis, fasciis duabus marginibusque fuscis obscurioribus. Anticis macula discali nigra punctis binis notatis. Posticis infra cæruleis, apice margineque posteriori fuscis.

Upper-side: dark brown, paler towards the outer margin. Both wings with two transverse bands, which are below the middle, and the outer margin dark brown. Anterior wing with an oval black spot at the end of the cell, marked by two minute white spots, and bordered inwardly with paler colour; an indistinct band of brown below it. Posterior wing crossed at the middle by an indistinct band of brown.

Under-side: anterior wing as above, except that it is paler towards the anal angle, and slightly tinted with blue at the base. Posterior wing bright cerulean blue, darker where the bands of the upper-side cross; the apex marked by a black spot, and the fringe dark brown.

Exp. $1\frac{1}{2}$ inch.

Hab. : Cayenne.

LEUCOCHITONEA FALISCA.

Alis supra rufo-fuscis, fasciis duabus fuscis (posticis tribus). Anticis macula discali nigra punctis binis notata punctisque tribus sub-apicalibus albis. Infra anticis macula anali flava; posticis flavis margine costali fasciisque duabus fuscis: macula anali nigra.

Upper-side: dark brown. Both wings crossed beyond the middle by two dark brown bands, the second, which is sub-marginal, divided into spots. Anterior wing with a round black spot at the end of the cell, marked by two minute white spots, and bordered with paler colour: three minute white spots near the apex upon the first transverse band, and below them upon the same band, one very minute spot. Posterior wing crossed before the middle by a brown band.

Under-side: anterior wing as above, except that there is an ochreous spot near the anal angle. Posterior wing yellow, with some spots near the costal margin, an indistinct transverse band below the middle, and the outer margin brown. A sub-marginal series of very indistinct spots, and a black spot near the anal angle.

Exp. $1\frac{3}{10}$ inch.

Hab.: Cayenne.

Allied to *Paulinus*, Cram. The five species which I have described above are very much alike, and all have the discal black spot of the anterior wing dotted with white, as in the genus *Mesosemia*.

[There are three other specimens in the collection, without locality, which only differ from the type in having the hind-wings clay-colour beneath, instead of yellow.—W. F. K.]

[N.B.—*Ithomia Lerida*, Hew. This name is attached in Mr. Hewitson's collection to the insect figured by him in Exotic Butt., v, *Ith.*, pl. 30, fig. 199, as *I. Ilerdina* var. The specimens are labelled Ecuador and Nauta.—W. F. K.]

DESCRIPTION OF A NEW SPECIES OF *HELIOCOPRIS*.

BY D. SHARP, M.B.

I have for some years been acquainted with a male of a species of *Helicoprism* of great size, being myself in possession of portions of an individual found by Mouhot in Laos, and having received from C. M. Wakefield, Esq., an individual obtained from the collection of the late Achille Deyrolle. As I have recently obtained a series of specimens from the collection of the late Andrew Murray, I am now enabled to make known the sexes and extreme developments of the species. Mr. Murray's specimens bore no label of any kind, but were placed in one of his boxes of Indo-Malayan *Copridæ*. The specimen in Deyrolle's collection was labelled "*Maclellandi*, Westw., Cochin China,"

but the species does not appear to have been described, so that I give below a description of it. Its nearest ally is no doubt the Assamese *Helicocoris domina*, Bates, and the two species appear to be of about the same size: the largely developed male of *Helicocoris domina* is, however, described as possessing four horns on the head, to be less black in colour, and to have the intervals on the elytra sub-convex.

In connection with the description of this remarkable insect, I may be permitted to mention what has long been a favourite theory of mine, viz., that as we proceed from the lower to the higher forms in some of the groups of Lamellicorns, we find a better construction of the skeleton, causing the parts of the body to be much more accurately adapted to one another, and that, as the result of this perfection, there is a much greater immunity from the attacks of minute parasites. *Geotrupes* is a form in which the construction is very imperfect, and the result is that the species are dreadfully subject to the attacks of *Acari*, which not only overrun the individuals outwardly, but obtain access to the soft parts of the body, and no doubt destroy a vast number of individuals; to so great an extent is this the case, that I believe the species of *Geotrupes* only continue to exist because the more perfectly constructed Coprophagous Lamellicorns are yet only adapted for existence in warm climates, and *Geotrupes*, therefore, finds in temperate latitudes an abundant and comparatively uncontested pabulum, which enables it at present to hold its place, notwithstanding other disadvantages.

The species of *Helicocoris* offer a beautiful example of the accurate coadaptation of the external parts, by which is obtained a nearly complete exclusion of parasites from those parts of the body which are most accessible in less perfected Coprophagous Lamellicorns; the elytra in *Helicocoris* are so beautifully adapted to the mesothorax, metathorax, and ventral and dorsal segments, that not even a minute parasite can obtain access to any of the soft dorsal surfaces of these parts, although, on making an examination of a *Helicocoris*, we should be justified in concluding that it would be very difficult for an *Acarus* to find sustenance on its juices by getting at the soft parts of the body, yet an examination shows that there are still some parts not sufficiently protected, and on these parts it appears the *Acari* still maintain their attacks. As most accessible, we find the very large mouth. The buccal cavity in *Helicocoris* is greatly developed, and formed of unusually soft pieces, and offers abundant facilities for the entrance of a small invader by its large and unprotected orifice. Thus I was not surprised on cleaning the individual of *Helicocoris Mouhotus* from Cochin China

to find its mouth tenanted by a colony of a large species of *Acarus*, and I also found some individuals of the same (or an allied) species in the mouth of one of the specimens from Mr. Murray's collection.

Another and much smaller *Acarus* has, moreover, found a less easily visited feeding ground, on (or rather in) the body of *Helicocoris Mouhotus*; this spot is the prothoracic stigmata.

On examining an individual of *Helicocoris Mouhotus*, whose thorax had become separated from the body, in Mr. Murray's collection, I was surprised to find fifty or sixty individuals of a small Acarid attached to each of the two prothoracic stigmata, and, on taking to pieces the other specimens of the gigantic Lamellicorn, I found the corresponding stigmata to be tenanted in a similar manner. No doubt this species of *Acarus*, which is small and very depressed, is able to penetrate between the prosternum and mesosternum just at the extreme anterior part of the middle coxal cavities, for this spot is quite near to the prothoracic stigma, and on a movement of extension of the head and thorax being made by the *Helicocoris*, the Acarid could easily find entrance at the spot I have mentioned. I should not be at all surprised if it be found that this Acarid is a species specialized for this mode of life.

HELIOCOPRIS MOUHOTUS, n. sp.

Major; figura H. gigantis (Bates), *multo major, niger, nitidus, subtus rufo-hirsutus; elytris sat crebre punctatis, evidenter striatis, interstitiis haud convexis; prosterno post coxas haud hirsuto; capite magno.*

Mas, major; capite ad oculos haud constricto, lateribus in medio utrinque cornu erecto, lato, apice emarginato, inter cornua simpliciter arcuatim carinato. Prothorace angulis anterioribus leviter prominulis, utrinque anterius lobo prominulo sub-hamato; supra antice longius perpendiculari, medio lamina elongata, sub-horizontali, acuminata; basi utrinque area lavigata. Long. 60—65 mm.; lat. prothoracis, 36 mm.

Mas, minor; capite ad oculos constricto, sed haud angulato, vertice in medio transversim fortiter elevata, elevatione in medio emarginata. Prothorace prope angulos anteriores haud vel vix angulato, anterius breviter perpendiculari, dorso ante medium carina transversa elongata, medio anterius sub-angulatim prominula; undique fortiter rugoso.

Long. 50—54 mm.; lat. prothoracis, 29—31 mm.

Fem.; capite ad oculos constricto, haud angulato, vertice in medio elevata, trituberculata, tuberculis lateralibus minutis; prothorace prope angulos anteriores haud angulato, anterius breviter perpendiculari, dorso ante medium carina transversa elongata, utrinque sinuata, in medio late rotundato.

Long. 54 mm.; lat. prothoracis, 31 mm.

Hab.: Laos, Cochin China.

Thornhill, Dumfries: September 28th, 1878.

CHARACTERS OF NEW GENERA AND DESCRIPTIONS OF NEW SPECIES OF *GEODEPHAGA* FROM THE HAWAIIAN ISLANDS.

BY THE REV. T. BLACKBURN, B.A.

II.

(Concluded from page 123).

C. SCARITOIDES, *sp. nov.*

Convexus, nitidus, nigro-aeneus, antennis, palpis, pedibusque totis rufo-testaceis; capite mediocri; oculis prominulis; antennis corporis dimidio brevioribus; prothorace sat fortiter transverso rotundatoque, breviter subcordato, obsolete canaliculato, antice leviter emarginato, trans basin sparsim nec fortiter punctato, basi utrinque foveolato, angulis posticis acutis subdentiformibus; elytris oblongo-ovatis, striis suturali distinctâ integrâ antice distinete punctatâ, cæteris obsoletis (nonnullis exemplis antice obscure adumbratis); humeris subacute productis.

Long. 6—6½ mm.

Haleakala, Maui. Not rare at an elevation of 4000—5000 feet.

C. CORDATICOLLIS, *sp. nov.*

Convexus, nitidus, nigro-aeneus, plus minusve rufescens, antennarum basi, palpis, pedibusque testaceis; capite mediocri; oculis prominulis; antennis corporis dimidio brevioribus; prothorace sat fortiter transverso, breviter subcordato, leviter canaliculato, antice leviter emarginato, trans basin sparsim punctato, basi utrinque foveolato, angulis posticis acute rectis; elytris ovalibus, striis internis distinctis integris, antice obscure punctatis, externis obsoletis, humeris parum prominulis.

Long. 4½—5 mm.

Haleakala, Maui. At an elevation of 4000—5000 feet. Not common.

C. ANGUSTICOLLIS, *sp. nov.*

Subconvexus, subparallelus, subnitidus, piceus, marginibus rufescens, antennarum basi, palpis, pedibusque testaceis; capite mediocri; oculis prominulis; antennis corporis dimidio sat brevioribus; prothorace leviter transverso, canaliculato, antice leviter emarginato, trans basin confuse et fortiter rugato punctatoque, lateribus minus fortiter rotundatis, angulis posticis minutis subdentiformibus; elytris elongato-ovalibus, fortiter striatis, striis distincte punctatis, interstitiis planiusculis, humeris sub-erectis.

Long. 4 mm.

Haleakala, Maui. One example at an elevation of 4000 feet.

C. NUBICOLA, *sp. nov.*

Subconvexus, subparallelus, nitidus, rufescens, elytrorum disco late infuscato, antennis palpis pedibusque rufo-testaceis; capite mediocri, oculis prominulis; antennis corporis dimidio plus paulo brevioribus; prothorace transverso, obsolete subcordato, leviter canaliculato, antice leviter emarginato, trans basin confuse rugato punctatoque, lateribus minus fortiter rotundatis, angulis posticis acute dentiformibus; elytris elongatis, subparallelis, thorace parum latioribus, subtiliter striatis, striis (marginem apicemque versus obsoletis) distincte punctatis, interstitiis planis, humeris rotundato-rectis; tibiis anticis intus solito profundius emarginatis. Long. 4½ mm.

Haleakala, Maui. One example at summit; 10,000 feet.

C. INEQUALIS, sp. nov.

Converxus, opacus, piceo-cupreus, antennarum basi, palpis, pedibus, et thoracis elytrorumque marginibus (plus minusve) testaceis; capite mediocri; oculis parum convexis; antennis corporis dimidio vix brevioribus; prothorace sat fortiter transverso, breviter subcordato, antice parum emarginato, canaliculato, trans basin obscure rugato punctatoque, postice utrinque profunde foveolato, angulis posticis acute rectis, superficie inæquali (fossâ magnâ juxta angulum anticum utrinque impressâ); elytris ovalibus, confuse striatis, totâ superficie ocellis numerosis confuse conspersâ, humeris rotundatis.

Long. 4½—5 mm.

Haleakala, Maui. Elevation, 4000—5000 feet. Scarce.

BLACKBURNIA.

B. FRIGIDA, sp. nov.

Minus convexa, nitida, nigra, antennis palpis pedibusque rufis; capite minus elongato, pone oculos fortiter angustato; oculis parum convexis; antennis corporis dimidio plane longioribus; prothorace (longitudine latitudini æquali) canaliculato, a lateribus rotundato, ante medium latiori, nec trans basin quam antice angustiori, basi punctato, utrinque late nec profunde impresso, angulis omnibus subrotundatis; elytris elongato-oblongis, antice latioribus, postice attenuatis, profunde punctato-striatis, interstitiis convexis, humeris rotundatis parum distinctis; corpore subtus haud punctato, suturâ inter segmentum secundum et tertium nec in medio quidem obsoleta.

Long. 9½ mm.

Haleakala, Maui. One example at an elevation of 10,000 feet.

B. BLAPTOIDES, sp. nov.

*Subconvexa, picea, nitida, antennis palpis pedibusque rufis; capite fortiter elongato, prothorace angustiori, pone oculos haud distincte angustato, grosse sat confertim punctato; oculis subo-bsoletis (minus etiam distinctis quam in *B. insigni*); antennis corporis dimidio plane longioribus; prothorace elytris angustiori, sat fortiter transverso, canaliculato, antice angustato, grosse punctato, lateribus sinuatis, margine laterali elevato, angulis posticis rectis; elytris amplis, profunde sulcatis, sulcis fortiter sat confertim (punctis magnis) punctatis, interstitiis fortiter elevatis, humeris prominulis; corpore subtus grosse punctato, segmentis ventralibus tribus ultimis fere lœvibus.*

Long. 13 mm.

Konahuanui, Oahu. One example.

B. blaptoides is pretty closely allied to *B. insignis*. It differs in the punctuation of the head, the greater breadth of the thorax, greater convexity of elytra, closer punctuation of the elytral furrows (in which the punctuation is continued to the apex), &c.

BEMBIDIIDÆ.

BEMBIDIUM (LOPHA).

B. PACIFICUM, sp. nov.

Subconvexum, æneum, antennarum basi, palpis, pedibusque testaceis (multis exemplis plus minusve infuscatis); capite mediocri; oculis fortiter convexis; antennis corporis dimidio vix longioribus; prothorace transverso, cordato, obsolete canaliculato,

antice leviter emarginato, trans basin obscure rugato punctatoque, angulis posticis subrectis; elytris ovalibus, antice et postice, plus minusve distincte, flavo-maculatis, profunde punctato-striatis, striis apicem versus evanescentibus, humeris rotundatis.

Long. 4½—5 mm.

Oahu. Rare, but widely distributed, from the sea-level to an elevation of about 3000 feet.

TACHYS.

T. OAHUENSIS, *sp. nov.*

Parum convexus, piceo-niger, antennis palpis pedibusque flavo-testaceis (illis plus minusve infuscatis); capite sat magno; oculis permagnis, convexis, antennis corporis dimidio longioribus; prothorace transverso, postice parum angustato, obsolete canaliculato, angulis posticis subacute productis; elytris subparallelis, obsolete striatis, striis duabus internis distinctioribus, cæteris obsoletis, striâ recurvâ profundâ, antice introrsum flexâ, humeris (fere acute) quadratis.

Long. 2½—2¾ mm.

Oahu. Not uncommon on salt marshes near the sea.

T. ARCANICOLA, *sp. nov.*

Subconvexus, rufo-brunneus, antennis palpis pedibusque testaceis; capite oculisque mediocribus, his parum convexis; antennis submoniliformibus, corporis dimidio viꝫ longioribus prothorace transverso, postice parum angustato, leviter canaliculato, basi utrinque foveolato, angulis posticis acute rectis; elytris ovalibus, striis duabis internis distinctioribus, cæteris subobsoletis, striâ recurvâ antice reflexâ, humeris rotundato-rectis.

Long. 2—2½ mm.

Oahu. Very local, but not rare in some mountain localities.

T. MUCESCENS, *sp. nov.*

Subconvexus, testaceus, elytris plus minusve infuscatis; capite magno; oculis permagnis convexis; antennis submoniliformibus, corporis dimidio brevioribus; prothorace fortiter transverso lato (elytris parum angustioribus), postice parum angustato, canaliculato, transversim basi fortiter depresso, angulis posticis rectis; elytris subparallelis, striis tribus internis profunde impressis, cæteris obsoletis, striâ recurvâ brevi fortiter arcuatâ, humeris rotundatis.

Long. 2¼ mm.

On the plains of Honolulu. One specimen in decaying vegetable matter.

T. ATOMUS, *sp. nov.*

Parum convexus, testaceus, nonnullis exemplis plus minusve infuscatis (præsertim capite); capite magno; oculis parum convexis; antennis moniliformibus, corporis dimidio viꝫ longioribus; prothorace fortiter transverso, postice angustato, angulis posticis rotundato-obtusis; elytris subparallelis, striâ suturali distinctiore, stria recurvâ brevi, parum flexâ, cæteris obsoletis, humeris rotundato-rectis.

Long. 1¼ mm.

Oahu. Not rare, in moss, &c., in mountain localities.

LIST OF THE *HEMIPTERA* OF NEW ZEALAND.

BY F. BUCHANAN WHITE, M.D., F.L.S.

(Continued from page 133).

Tribe ANTHOCORINA.

Only one species of this section has as yet been found in New Zealand. Others may confidently be expected to occur, but, from their (probable) small size, might easily be overlooked.

43. *Cardiastethus Brounianus*, n. sp.

Piceous-brown, clothed with long pale hairs; clypeus, anterior margin of the embolium, and the corium, rather paler; second joint of the antennæ (apex excepted) and legs brownish-yellow; membrane dark fuscous, with the outer three nerves margined with whitish. Head, pronotum and scutellum finely transversely rugose; transverse depression of the pronotum nearly obsolete; central depression of the scutellum rather shallow.

♂. Length, 2—2½ mm.

A few specimens taken by Captain Broun.

Tribe REDUVIINA.

A single species only (which I have not seen) of this group is reported from the Islands, viz. :

44. *Pirates (Brachysandalus) ephippigera*, White.

Tribe EMESINA.

45. *Emesodema Huttoni*, Scott. This I have not yet seen.

Tribe NABINA.

46. *Nabis Saundersi*, n. sp.

Elongate, pale yellowish-testaceous; a central longitudinal band running from the head to the scutellum fuscous-black; the cicatrices of the anterior part of the pronotum fuscous; back of the abdomen (connexivum excepted) fuscous, with a black central longitudinal band somewhat dilated at the base of each segment; a narrow intramarginal band on each side of the body below, the middle of the mesostethium, and a narrow longitudinal band on the centre line of the venter, fuscous; first and second joints of the antennæ, and the legs, concolorous with the body, the apex of the second joint of the former fuscous-black, and the last two joints pale fuscous; spots on the legs and apex of the tarsi fuscous-black; hemelytra longer than the abdomen, pale greyish-testaceous, with the three usual dark spots, the veins margined, and the interstices, especially the first, irrorated with fuscous; membrane pellucid with fuscous veins. Head and neck about as long as two-thirds of the pronotum; the first joint of the antennæ shorter than the head before the eyes; pronotum convex and moderately widened behind, the posterior lobe without oblique streaks, the base sub-equal to the length; the front femora about as long as three-fourths of the head and pronotum taken together.

♂ ♀. Length, 8—9 mm.; breadth, 2 mm.

Messrs. Broun, Hutton, and Wakefield. *N. Saundersi* is rather

like *N. ferus*, but is longer, and the apex of the membrane seems to be less rounded, the pronotum is longer, and less and more gradually widened, &c.

47. *N. maoricus*, Wlkr.

Only known to me by the description, from which it appears to be a species distinct from No. 46, though said to be also allied to *N. ferus*. It is described as having an entirely pale scutellum and four black spots on the hemielytra.

Tribe SALDINA.

In addition to *Salda australis*, Buch. White (E. M. M., xiii, 106), three other New Zealand species are before me, but not in sufficient numbers or condition to admit of anything like complete descriptions. They may, however, be thus indicated—

48. *Salda australis*, Buch. White.

Belongs to the same section, in Stål's "Enumeratio," as *S. saltatoria*.

Captain Broun (one specimen).

49. *S. Butleri*, n. sp.

Long-oval, black, with short unicolorous hairs and scattered golden hairs; the dilated margin of the pronotum, a small spot beyond the disc of the clavus, three spots on the front margin of the corium, a streak exterior to and near base of the first nerve, two confluent spots interior to the nerve, and five or six spots on the apical half of the corium, brownish-yellow; membrane brownish-fuscous, spotted with paler in the cells, the nerves darker, especially at the base, and the outer side of the first cell strongly margined with black; sides of abdomen below, and last segment, broadly pale. Pronotum broadly semilunar, with dilated and subreflexed side margins; scutellum-large; membrane well defined, large, with four cells.

Length, 5 mm.

Professor Hutton (one example). Belongs to the section of *S. coxalis*.

50. *Salda* sp.—.

Too immature to determine, but evidently allied to the last.

Professor Hutton (several specimens).

51. *S. lælaps*, n. sp.

Shortly obovate, black, with black and golden hairs; the clypeus, sometimes the hinder part of the hind margins of the pronotum, and a variable number of small spots on the hemielytra, brownish- or whitish-yellow; legs yellowish, a broad band at the middle of the femora, and the apex of the tibiae and of the tarsi, blackish; sides of pronotum somewhat dilated and narrowly reflexed; membrane small, rather coriaceous, and hence not well defined, with four cells, of which the inmost one is very short.

♂ ♀. Length, 4—4½ mm.; breadth beyond middle, 2½—3 mm.

Mr. Wakefield (two specimens).

Tribe NOTONECTINA.

52. *Anisops Wakefieldi*, n. sp.

Pale yellowish-white, shining ; scutellum black, margined with yellowish-white ; abdomen blackish, spotted above with yellow ; legs margined with fuscous ; hemielytra sub-vitreous. Frons slightly furrowed, scarcely produced ; anterior part of the pronotum slightly and very obtusely keeled ; breadth equal to the length of the pronotum and scutellum taken together ; front tibiæ of the male broader *at the apex* ; front tarsi monomerous, *twice* the length of the claws.

δ ♀. Length, 9 mm. ; breadth, $2\frac{3}{4}$ mm.

Messrs. Hutton and Wakefield. Sometimes (but rarely) the scutellum is entirely pale.

53. *A. assimilis*, n. sp.

Very like *A. Wakefieldi*, but smaller ; scutellum not or only slightly marked with black ; back of the abdomen yellow, marked with black ; front tibiæ of the male broader *at the base*, front tarsi *four times* as long as the claws.

δ . Length, 6— $7\frac{1}{2}$ mm. ; breadth, $1\frac{3}{4}$ —2 mm.

♀. Length, $7\frac{1}{2}$ —8 mm. ; breadth, 2 mm.

Professor Hutton. Female specimens apparently belonging to this species are scarcely separable from *A. Wakefieldi*, except by their smaller size and paler scutellum. The labrum, however, seems to be longer in *assimilis*, reaching nearly to the middle of the third joint of the rostrum, while in *Wakefieldi* it scarcely extends beyond the base.

Tribe CORIXINA.

54. *Corixa (Corixa) arguta*, n. sp.

Fuscous-black, shining ; pronotum obsoletely keeled, sub-rastrate, with about ten yellow lines, which are here and there split and anastomose ; hemielytra scarcely rastrate, sparingly clothed with pale adpressed hairs, and marked with irregular, undulated, broken and angular yellow lines, those at the base of the clavus sub-transverse and sub-entire, those of the corium crossed by four indistinct longitudinal streaks of the ground colour ; lines at the margins of the hemielytra longitudinally sub-confluent ; lines of the membrane transverse and sub-entire at the inner basal angle, the others hieroglyphic-like ; membrane-suture narrowly marked with yellow in the middle ; the pale embolium suddenly dilated about the middle ; back of the abdomen fuscous ; vertex, clypeus, sternum and venter pale, the sternum sometimes spotted with black ; legs pale, the joints somewhat fuscous-brown, hind tarsi with fuscous hairs.

δ . Palæ cultrate, rounded on the back, a little produced at the base below ; frontal fovea oval, passing a little beyond the lower angle of the eyes ; venter fuscous in the middle ; strigil circular, furnished with eight more or less shortened rows of teeth.

♀. Palæ narrowly cultrate.

Messrs. Hutton and Wakefield (many specimens). Rather variable in size, but constant in the markings.

(To be continued).

Apion Schœnherri in abundance in Sheppy.—While Mr. G. C. Champion and I were prospecting for beetles on the Sheppy marshes one bitterly cold morning at the end of October, it occurred to us to pull up a few tufts of withered grass at the roots of some willows growing on the bank of a fresh water ditch. These tufts we found to swarm with yellow-legged *Apions*, among which *A. Schœnherri* (hitherto taken very rarely by me in stack refuse some years ago) was by no means uncommon.

Yesterday, we again visited the same spot; it was too cold and damp for outdoor work, but we gathered a quantity of "shakings," and, on examining these at home, we obtained *A. Schœnherri* in large numbers. *A. difforme* was by far the commonest species, occurring literally in thousands; *lævicolle* was by no means rare, and there were a few *pubescens*; such plebeians as *A. fagi*, *assimile*, *trifolii*, *nigritarse*, *vorax*, *aethiops*, *virens*, being well represented in point of numbers. The only other beetles at all worth mentioning were about a dozen of *Throscus obtusus*, and plenty of *Sunius intermedius*.

In other parts of the Isle of Sheppy, we found a few beetles, of which *Engis humeralis* and *Coryphium angusticolle*, under decayed elm bark, and *Limnichus pygmæus* and *Telmatophilus brevicollis*, in pond refuse, perhaps deserve a passing notice.

I was not a little surprised, on casually examining a dead ash tree, to find under its decaying bark, riddled with ancient burrows of *Hylesinus crenatus*, a goodly number of *Diphyllus lunatus*—a beetle I certainly did not expect to see in Sheppy.
—JAMES J. WALKER, R.N., 7, West Street, Blue Town, Sheerness: Nov. 12th, 1878.

[Mr. Walker's interesting experience of this rare *Apion* is curiously corroborative of my own some years ago at Seaford, with the exception that I found the beetle in smaller numbers. *Apion lævicolle* in thousands was with it, and *diforme* in great abundance, besides commoners. All were in and about old furze bushes.—E. C. R.]

Description of the larva, &c., of Myelois pinguis.—In Stainton's Manual, the undescribed larva of this species is said to feed in decayed ash trunks; and Hofmann, in his work of 1875, gives no description of it, but merely says, "In spring, under the bark of ash": neither is any description of it afforded in the interesting records of capture of the perfect insects, to be met with in the Entomologist's Weekly Intelligencer (*vide* vol. vi, p. 164, and vol. viii, pp. 131—133—179), although the finding the larva is mentioned, together with good hints for collectors; I therefore hope now to throw some light on the larva, and a little on its habits, so far as they have been ascertained with much perseverance by Dr. Wood (of Tarrington), who kindly provided me with examples of the larva and pupa *in situ* to figure.

This larva inhabits the living bark of ash, frequently pollard trees, never affecting any dead or decayed portions of a tree nor penetrating to the wood, nor does it eat far into the bark, however thick, but generally less than an inch, and mines more of a chamber than a gallery; as it grows it enlarges its original small round hole of entrance, which eventually becomes of a size sufficient for the escape of the moth; but there are always a few long black grains of frass blocking the entrance; this frass is characteristic, and should be looked for, when searching a tree, on any projecting bosses as well as on the spreading foot, upon which it sometimes falls and lodges; for stray grains of frass detected below afford a good clue to the situation of the mine above.

Of three larvae I received on the 13th of July, 1877, two were quite small and feeding slowly, while one was full-fed, and this, when safely extracted from the piece of bark for the purpose of depicting, was soon afterwards induced to enter a goose-quill, where it chose to remain and spin its cocoon, enabling me to watch its progress through the transparent medium during a day and a half, when it became quite opaque.

On the 22nd July, other pieces of ash bark, containing a pupa and a larva not quite half-grown, arrived from the same kind friend, and this larva lived on as long as I could keep the bark fresh and edible, but it died during the autumn, having made scarcely any additional growth while in my keeping, although after the first inspection I did not again disturb it, for at that time, after clearing away the frass to ascertain the exact direction of the mine, I noticed that in a few minutes afterwards the entrance was again blocked up with more frass by the larva within.

In 1876, Dr. Wood found a full-fed larva at the end of May and bred the moth on the 8th July following; and in 1877, on the 19th July, he found a pupa and three young larvae not half-grown. Of the two moths I bred myself, the first was a female from the pupa within the before-mentioned quill on the 2nd of August, and, on the 15th, a male from the pupa within the bark.

It appears that some of the larvae are feeding the whole summer through, but whether they are more than one year in feeding up is at present a doubtful point, the evidence being rather conflicting, although it justifies Dr. Wood's opinion that some portion of a brood passes two seasons in the larval state.

The larva when young is very pale, of a dirty whitish or greyish colour, having a blackish-brown head and plate at each end of the body, and showing partially an internal dorsal vessel of dark greyish; but when full-grown it measures about three-quarters of an inch in length and is tolerably stout in proportion, tapering a little from the third segment to the head which is flattened and less than the second in width, it tapers also a little from the eleventh to the anal tip; beyond the thoracic the other segments on the back have each one sub-dividing deepish wrinkle, followed by one or two more or less distinct though they are deeper on the sides, and the region beneath the spiracles is puckered, the anal legs are close together and well beneath the end of the body: the colour of the head is chestnut-brown marked with blackish-brown, the plate on the second segment is much paler in front but broadly blotched at its hind margin with the darker brown where it is dorsally divided, the anal plate is chestnut-brown; the ground colour of the back and sides is a deepish flesh tint, gradually becoming paler and rather ochreous on the belly; an interrupted dorsal line of much darker flesh colour shows plainly on the front of each segment just as far only as the transverse wrinkle, the tubercular dots and the brown hair emitted by each are so minute as to be visible only through a lens, the characteristic ocellated spot on each side of the third and twelfth segments is ringed with chestnut-brown, having a flesh-coloured centre with a longish hair, the small round spiracles are of the ground colour ringed with brown, the anterior legs chestnut-brown, these, and the head, the plates, and ocellated spots, are highly lustrous, while all the rest of the body appears soft and smooth, but without gloss.

The pupa, while occupying the mine in the bark, is closely enveloped with a coating of whitish silk as a cocoon so thin and clear that its form, and even a little of its colour, can be rather plainly seen through the silk, the head lying very near the entrance of the mine, which is lightly blocked with frass, of which a great quantity

lies around and behind the cocoon ; the pupa itself, according to sex, measures nearly or quite half an inch in length, and one-eighth in diameter at the end of the wing-covers ; the general appearance is rather slender and of usual form, but with the abdomen tapering off gradually to a rounded tip without any projections ; its colour is light brownish-ochreous or light reddish-brown on the wing-covers, rather darker on the thorax and abdomen, and the surface glossy.—WILLIAM BUCKLER, Emsworth : 23rd August, 1878.

Heliothis peltigera near Tenbury.—I should like to report my capture of a fair specimen of this species, which I saw flying in the sun in a lane in this town, and secured with a pill box on June 24th. It may also be of interest to state that in June, 1873, I saw a magnificent specimen of *Drepana sicula* at rest in Leigh Wood, Bristol, which I also took with a pill box. It was seen, while still alive, by the Rev. J. Greene. I have not been able to look for this species since.—W. CLAXTON, Tenbury, Worcestershire : November, 1878.

On the preservation of Aphides, and other soft-bodied insects, for collections.—The difficulty of preserving soft-bodied insects in a scientifically serviceable condition is well known, and although it has been evaded, rather than overcome, by putting some into tubes filled with alcohol or other antiseptic fluid, yet the delicate and fragile character of others has rendered this mode impracticable ; while their softness causes them, if dried in the ordinary way, to shrink so that no parts can be recognized. Thus with *Aphides*, for example, the bodies become so shrivelled and shapeless that the collector had at best, as Dr. Horváth says (Ent. Nachr., iv, p. 103), to congratulate himself if he possessed the wings.

Herr D. H. R. von Schlechtendal has, however, recently communicated to the "Entomologische Nachrichten," iv, p. 155, a mode of preserving soft insects by means of the sudden application of great heat, the statements of which I here condense for the benefit of those who are desirous to have a collection, say of *Aphides* in all stages of their existence, preserved in form and colour ; these advantages being claimed for the method, and vouched for by Herr Kaltenbach, and Drs. Giebel, Taschenberg, Mayr, and Rudow. Such a collection is now rendered more requisite by the researches of M. Lichtenstein, and, in addition for us in Britain, by the work on our indigenous species by Mr. Buckton, now in course of publication.

The heat is derived from the flame of a spirit or petroleum lamp ; above this is placed a piece of sheet-tin, and over this the roasting proceeds. A bulging lamp-cylinder, laid horizontally, serves as a roasting oven ; in this the insect to be dried, when prepared as directed, and stuck on a piece of pith, is to be held over the flame ; or the cylinder may be closed at the lower end with a cork, which should extend far inwards, and on this the insect should be fastened ; the latter mode being preferable because the heat is more concentrated and one hand is left free. The mode of procedure varies according to the nature of the objects to be treated.

For the class of larger objects, such as *Hemiptera*, *Cicadina* and *Orthoptera*, in their young stages of existence, the heat must not be slight, but a little practice shows the proper temperature required. If the heat be insufficient, a drying up instead of a natural distention ensues. The insect to be roasted is to be pierced by a piece of silver wire on the under side of the thorax, but it is not to be inserted so far as to damage the upper side, and the wire should then be carried through a disc of pith,

placed beneath the insect, on which the legs should be set out in the desired position. But with some objects, such for instance as a young *Strachia*, the drying proceeds very quickly, so that if distention be not observed then the heat is too great, for the expansion of the air inside will force off the head with a loud report; also with softer, thicker *Pentatomidae* care must be taken to begin with a heat only so strong that the internal juices do not boil, for in such case the preparation would be spoilt. It is of advantage to remove the cylinder from time to time and test, by means of a lens, if a contraction of the skin has taken place on any part, if so the roasting is to be continued. The desired hardness may be tested with a bristle or wire.

For *Aphides*. The living *Aphis* is to be put on a piece of white paper, and at the moment when it is in the desired position it is to be held over the flame, and in an instant it will be dead and will retain the attitude. Then put it, still on the paper, into the oven; or, still better, hold it over the heated tin, carefully watching the drying and moving the paper about in order to prevent it getting singed. The roasting is quickly accomplished in either way, but somewhat slower out of the oven, especially in the larger kinds, such as *Lachnus*. If the paper turn brown it is a sure sign that caution is requisite. To pierce these brittle preparations for preservation is hazardous, and it is a better way to mount them with gum on card, placing some examples on their back.

For *Cecidomyiae*, *Agromyzæ*, *Cynipidæ*, and other small insects liable to shrink, yet containing but little moisture, such as *Poduræ*, *Pediculi*, *Psyllidæ*, &c., another method is adopted. Over the insect, mounted on a wire, &c., as above directed, a thin chemical re-agent glass, or glass rod, heated strongly at one end, is held, and the heat evolved is generally sufficient to bring about the immediate drying and distension, but if the heat be too little the process must be repeated; and although by this method the danger of burning is not obviated, yet the position of the legs is maintained much better than by the aforesaid roasting.

Larvæ of all kinds, up to the size of that of *Astynomus adilis*, even when they have long been kept in spirits, may be treated successfully by the roasting method; but with these objects care must be taken that the heat is not too strong or else the form will be distorted. For small larvæ it is preferable to use a short glass, in order better to effect their removal without touching the upper part, which becomes covered with steam, and contact with which would cause the destruction of the preparation. Larvæ of *Coleoptera*, which contain much moisture or have a mucous surface, must lie on a bed of paper or pith in order to prevent adhesion and burning, and these may be further avoided if the cylinder be slightly shaken during the process, and the position of the object be thereby changed.

I have not had an opportunity of trying the roasting process, but it does not seem to be difficult in any of its modifications, and with practice and care would become easy. It is admitted that with slender-limbed insects the joints are rendered very brittle, but practically this condition can hardly be worse than that which results from ordinary drying. I would suggest the trial of pieces of talc—an incombustible transparent material—cut into appropriate sizes, and that on these the insects should be fixed in proper position by means of gum tragacanth (thus dispensing with the wire). I think that the drying would be facilitated, and the talc might remain as a permanent support and be fixed in the cabinet in the manner suggested by Mr. Edwards, vol. xiii, p. 282.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham : November 13th, 1878.

Migrations of Plant-lice.—My suppositions about the change of habitat of the *Aphides*, belonging to the group of the *Pemphigians* (mostly gall-makers on trees), have become a reality.

I can affirm to-day that the gall-louse of the *Lentiscus*, *Aplooneura lentisci*, Passerini, passes, when it becomes winged, to gramineous plants (*Bromus sterilis*, *Hordeum vulgare*), and there deposits apterous young ones, which feed on the grass roots during the winter, and in spring become winged and return to the *Lentiscus*, where they deposit the sexuated pupæ. From these pupæ emerge both males and females “*without rostrum*;” they copulate, and the female lays “*a single egg*,” from which proceeds the gall-maker. This is a new confirmation of my theory about the cycle of life of a *Pemphigian*, viz.:—

- (1.) The egg: generally only one in each female; out of it comes:

The *Fundator* (first larval state) forming the gall, becoming, after four moults, a *viviparous Pseudogynæ*, and filling up the gall with its *proles*. That *proles* becomes, after four moults,

- (2.) the *Emigrant* (second larval state), winged *Pseudogynæs*, also *viviparous*, leaving the galls and flying on to gramineous plants, on which they deposit small lice, which are
- (3.) the *Gemmantia* (third larval state). This is the curious stage of unlimited apterous reproduction under ground, very much in the same way as the *Phylloxera vastatrix*; out of these numerous colonies in spring, emerge some nymphs, giving a winged form, which is
- (4.) the *Pupifera* (fourth larval state), winged *Pseudogynæ*, which carries back to the *Lentiscus* the pupæ, from which the little apterous *male and female* lice, *destitute of rostrum*, issue, and, after copulation, the female lays the fecundated egg, which closes the circle.

J. LICHTENSTEIN, La Lironde, près Montpellier: 16th November, 1878.

The Doubleday Collection.—Since the publication of Mr. A. B. Farn's letter in the “*Entomologist*,” for October, on the above subject, I have inspected the “*Doubleday Collection*,” at Bethnal Green.

I attended at the Museum fully expecting to see the collection in a most appalling and disgusting condition, but my fears were totally unfounded. Drawer after drawer was duly inspected, and returned to its place, but, strange to say, no signs of mites, grease, or any other kind of neglect appeared. The whole collection was in the most exquisite and unparalleled condition, and, to say the least of it, is the best I have ever had the pleasure to inspect. I cannot conceive why Mr. Farn should accept questionable information and publish it in such a manner, and as an unbiased individual I am decidedly of opinion that some satisfactory explanation is due;—surely some mistake has been made. With regard to the question of adding fresh insects to the collection—perhaps Mr. Farn will kindly mention some other method of replacing old and faded specimens (of which, however, I failed to find any); I candidly admit that I am totally unable to do so.

I am informed that three parcels only have been received in answer to the notice—a fact, I believe, almost entirely due to Mr. Farn's letter; although I am equally sorry to see outside specimens added to the collection, in the absence of any other suggestion I would submit that a small round-punched label, coloured red, should be affixed, by transfixing with the pin, under the bodies of the fresh specimens in such a manner that a portion of this mark of their origin may be seen; this

will not in any way affect the appearance of the fresh insects, but it will effectually separate them from the others.—W.M. J. VANDENBERGH, Junr., Hornsey, Middlesex: November 13th, 1878.

[The proper place for the foregoing communication is in the journ where the statement originally appeared. Our correspondent doubts (we hope needlessly) its acceptance for publication there. The action of the Doubleday trustees rendered the collection public property, and we shall be glad to hear from other sources that its condition is such as here stated; we shall consider it our duty to make a personal inspection. Although the collection cannot be considered a "type-collection," it is greatly to be regretted that it should be tampered with, either by additions or substitutions. If this be done we doubt not that proper means will be taken to indicate these.—EDS.]

Obituary.

Victor Ghiliani. We regret to learn that this well known Italian entomologist died on the 27th of May last: he had long, we think, been in delicate health. For many years he had been attached to the Royal Zoological Museum at Turin; was one of the founders of the Italian Entomological Society; and one of the oldest and best known of the now numerous school of Italian entomologists. His writings (which are numerous) almost entirely concern the insects of his native land, in which he did good work. All who have had the pleasure of meeting him at Turin, or who have had occasion to correspond with him, will bear testimony to his courtesy and extensive entomological knowledge.

Thomas W. Wonfor. This gentleman died at his residence, 38, Buckingham Place, Brighton, on Sunday, the 20th October last, after a few weeks' illness, in the 51st year of his age.

Shortly after the formation of the Brighton and Sussex Natural History Society in 1853, Mr. Wonfor was appointed an honorary secretary, a post he continued to fill up to the date of his death, and in the performance of the duties of which he displayed an extraordinary amount of ability, energy, and tact. The prosperity and advancement of this Society, and by means of it the diffusion of scientific knowledge in Brighton and Sussex, was the object for which he laboured for nearly a quarter of a century with the devotion of an enthusiastic naturalist.

The papers on entomology, and nearly every other branch of zoology, communicated by Mr. Wonfor to the Proceedings of the Brighton and Sussex Natural History Society are very numerous, and the excellence of many of them has obtained for their author a more than local reputation. It was, however, as a microscopist that Mr. Wonfor chiefly distinguished himself, and one of his papers "On certain Butterfly Scales, characteristic of Sex," read at Brighton in November, 1867, was subsequently published in the 8th volume of the Microscopical Journal. In addition to his very numerous papers in the Proceedings of the Brighton and Sussex and other Natural History Societies, Mr. Wonfor frequently contributed to "Scientific Opinion," "Scientific Gossip," and other periodicals. On the occasion of the visit of the British Association to Brighton in 1872, Mr. Wonfor took a very active part in their proceedings, and acted as Secretary to one of the Committees.

Without claiming for the deceased the position of a distinguished scientific specialist, it may be safely affirmed that few men ever possessed a larger amount of general information on almost all branches of Science, or have been more willing to impart it for the benefit of others, than the amiable and accomplished gentleman

whose death must be a source of sorrow to his numerous friends, and an irreparable loss, not only to Members of the Natural History Society of Brighton, but to his fellow townsmen generally.

Mr. Wonfor was appointed Curator of the Brighton Free Library and Museum in 1875; he was elected a Fellow of the Linnean Society in June, 1877, and a Member of the Entomological Society in February last.—H. Goss.

ENTOMOLOGICAL SOCIETY OF LONDON: 6th Nov., 1878.—H. W. BATES, Esq., F.L.S., &c., President, in the Chair.

Mr. F. Smith explained, that when (at the Meeting on September 4th) he stated that the Linnean collection had been allowed to fall into a state of complete neglect, he did not wish to infer that it was infested by *Acari*, *Psoci*, or *Anthreni*. He only examined two drawers of the collection.

Mr. C. O. Waterhouse exhibited *Chauliognathus excellens*, a new species, from Columbia.

Mr. Stainton exhibited *Tinea orientalis*, bred from buffalo horn (*vide ante*, p. 133).

The Rev. H. S. Gorham exhibited *Platypus cylindrus*, *Lathrobium pallidum*, *Achenium humile*, and *Cryphalus abietis*, from the neighbourhood of Horsham.

Mr. Goss exhibited *Cordulia (Oxygastra) Curtisi* from Hampshire (*vide ante*, p. 92).

Mr. Meldola exhibited a male of *Erebus odorus*, L., from Jamaica, a species remarkable for the large scent-tufts on the posterior legs.

Prof. Wood-Mason exhibited examples of *Gongylus gongyloides*, L., and *G. trachelophyllus*, Burm., which he was convinced were specifically distinct, notwithstanding Saussure's opinion that the latter was only a variety of the former. He remarked on the geographical distribution of both forms, and on the differing mimetic analogies they presented.

In connection with this latter subject, Mr. Distant reminded the Meeting of Waterton's statement that the "rattle" of the rattle snake suggested such a similitude to an Orthopterous insect, that might be of service to the former by deceiving or attracting birds.

Mrs. Randolph Clay (present as a visitor) exhibited the species of *Zopherus* (still living) worn as an ornament by the ladies of Central America, as recorded at p. 116, *ante*.

Sir S. S. Saunders sent for exhibition examples of *Blastophaga Phenes*, L., sent to him by M. Lichtenstein, and employed for purposes of what is termed "caprification." Also *Sycophaga crassipes*, Westwood, used for the same purpose, on the sycamore fig of Egypt; notes on these insects (and on some others connected therewith) were read.

The Secretary read a report from H. M. Consul at Taganrog (forwarded by the Board of Trade) relative to the enormous destruction of grain in Southern Russia by *Anisoplia austriaca* (one of the *Rutelidae*). A Committee was appointed to report thereon.

Miss E. A. Ormerod read a paper on the destruction to carrots caused by the too-well-known *Psila rosae* (with figures). She had tried the effect of phenol in arresting the ravages, and an analysis of the roots appeared to show that its use was beneficial, without detracting from the edible qualities.

Mr. C. O. Waterhouse read descriptions of new *Telephoridae* from Central and South America.

Mr. Distant read descriptions of new species of *Hemiptera-Homoptera*.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 4.

Palæozoic Time.

[*On the Insecta of the Carboniferous Period, and the animals and plants with which they were correlated.*]

In the Carboniferous rocks, remains of insects have been found occasionally, but they are far from common, and up to the present time only about ninety-four* species have been described. Of these, five or six were obtained from the United Kingdom,† about sixty-six from the continent of Europe,‡ and some twenty-two from North America.§

In my last paper,|| I briefly described the few fossil insects which have been discovered in the Devonian rocks of North America. These fossils, it will be remembered, all belonged to the Order *Neuroptera*, or, rather, *Pseudo-Neuroptera*.

In the Carboniferous rocks, remains of the *Neuroptera* are much more numerous, and in addition to some twelve species which, from their possessing characters common both to that Order and the *Orthoptera*, have been placed by Dr. Goldenberg in an extinct Order,¶ about twenty-five species have been determined.

The *Orthoptera* of this period are represented by more than fifty species, and this Order and the *Neuroptera*—if we include in the last named, the species referred by Goldenberg to his *Palæodictyoptera*—comprise all the insects yet discovered from rocks of this age, except five, two of which have been referred to the *Coleoptera*,** and three to the *Hemiptera*.††

Had the two last-named Orders been thoroughly established, and widely distributed, geographically, at this period, their remains would, in all probability, have been discovered at least as frequently as those of the *Neuroptera* and *Orthoptera*.

It appears, therefore, that at this period the *Neuroptera* (including

* At page 53, *ante*, I spoke of the insects obtained from the carboniferous rocks as including nearly ninety species. Since the date at which I wrote, several others have been described in the Proc. Bost. Soc. Nat. Hist., vol. xix, 1877–78, and elsewhere.

+ Coalbrook Dale, Shropshire; near Sunderland; near Glasgow, &c.

† Wettin and Loebejn, in Westphalia; Gersweiller and Saarbrück, near Trèves; Mannebach, in Thuringia; Erbignion, Valais, Switzerland; Sars-Longchamps, Mons, and elsewhere in the Belgian coal fields, &c.

§ Frog Bayou, Arkansas; Cape Breton; Talmadge, Ohio; Morris, Illinois; Pittston, Pennsylvania, &c.

|| *Ante*, pp. 124–127.

¶ *i. e.*, *Palæodictyoptera*. See "Fauna Sarapontana Fossilis," 1877, p. 50.

** *Curculioides Anstictii* and *Troxites Germari*.

†† *Fulgorina Ebersi*, *F. Kliveri*, and *F. lebachensis*.

therein the *Palæodictyoptera*) and the *Orthoptera* were the dominant Orders, and that, towards its close, the *Coleoptera* and *Hemiptera* began to make their appearance.*

Great Britain.

Of the five fossil insects obtained from the British coal measures, four have been referred to the *Orthoptera*, and one to the *Coleoptera*. The representative of the last named Order is the oldest *British* fossil insect known. It was discovered in the Ironstone of Coalbrook Dale, Shropshire, and was described by Dr. Buckland† as *Curculiooides Ansticci*.‡

The first-discovered species of *Orthoptera* from the British Carboniferous rocks was also obtained from the Ironstone of Coalbrook Dale, and was described by Dr. Mantell§ as belonging to the genus *Corydalis* of the *Neuroptera*, and named by him *Corydalis Brongniarti*. It has since been decided that it belonged to the *Orthoptera*,|| and it has been referred to the genus *Gryllaeris*.

In addition to these fossils, three fragments of *Orthoptera* were discovered, some years ago, in the Durham coal fields.¶ One of the fragments is described by Mr. Kirkby as being a very fine, distinct example of the anterior portion of the fore-wing of an insect, in form and neuration agreeing with the recent genus *Blatta*, but approaching the *Mantidæ*.** The third specimen†† is believed from its shape and neuration, to be the abortive anterior wing of some species belonging to the *Phasmidæ*, but it is impossible to pronounce with any certainty as to its probable affinities. The most recently-discovered fossil insect from British strata of this period, was obtained from the Scottish coal fields, and has been referred‡‡ by Dr. Henry Woodward to the *Mantidæ*, and named by him *Lithomantis carbonarius*.

This specimen concludes the scanty list of fossil-insects discovered in the British Carboniferous rocks: and I will now call attention to some of the most interesting of those which have been obtained from the coal fields of continental Europe.

* See *antea*, p. 56.

† Bridgwater Treatise, vol. ii, p. 89. See also the Geol. Trans. (2nd series), vol. v, pt. 3, p. 446, and "The Silurian System," pp. 104, 195.

‡ Dr. Buckland described two insects from Coalbrook Dale as *Curculationis*, i. e., *C. Ansticci* (above mentioned), and *C. Prestvici*; but Dr. H. Woodward, F.R.S., has decided that the last named fossil should have been referred to the *Arachnida*, and not to the *Insecta*. See Geol. Mag., September, 1871, vol. viii, p. 385.

§ "Medals of Creation," vol. ii, p. 554.

¶ See a paper by Mr. A. H. Swinton, in Geol. Mag., xi, 1874, p. 237, pl. xiv.

†† The locality was the North Bank of the Wear, opposite to Claxheugh, about two miles West of Sunderland. See Mr. Kirkby's paper in the Geol. Mag., 1867, vol. iv, p. 388.

** Dr. Goldenberg has included this insect in his list of fossil *Blattidæ*, under the name of *Blattidium mantidioides*. (See Fauna Sar. Fossilis, 1877, p. 20.)

†† The second specimen appears to be a part of the same insect as No. 1.

‡‡ Quar. Journal Geol. Soc., Feb., 1876, p. 60. In deciding as to the family to which this fossil belonged, Dr. Woodward states that he had the advantage of the opinions of Mr. McLachlan, Prof. Westwood, and Mr. C. O. Waterhouse.

Continental Europe.

Of the Neuropterous insects,* ten have recently been placed by Dr. Goldenberg in the extinct Order *Paleodictyoptera*, before mentioned. The *Neuroptera* from these coal measures include several species belonging to the *Termitidæ*, and one to the *Ephemeridæ*. The last named specimen was discovered by M. Persinaire,† in the neighbourhood of Mons, in the Belgian coal fields. It was originally described by M. Preudhomme de Borre, as belonging to the *Orthoptera*, and was named by him *Pachytylopsis Borinensis*; but, after Dr. Breyer had examined it and expressed an opinion that it belonged to the *Lepidoptera*, its name was changed to *Breyeria Borinensis*. This fossil was subsequently submitted to Mr. McLachlan,‡ when in Brussels, in July, 1877, and he decided, after a careful examination of the wing, in which he detected abundant traces of transversal reticulation, that it could not possibly have belonged to the *Lepidoptera*, and that it was the wing of a Neuropterous insect of the family *Ephemeridæ*.

The fossil *Orthoptera* from these coal measures belong, with few exceptions, to the *Blattidæ*, of which family upwards of thirty§ species have been identified, including *Blattina helvetica*,|| from Erbignon, Valais, which, according to Professor Heer, is the most ancient Swiss fossil animal known.

With one exception—*Polyzosterites granosus*—all the *Blattidæ* from these coal measures are referred to the extinct genus *Blattina*.

The other *Orthoptera* from the European coal measures, include a few species of *Gryllidæ* and *Aceridiidæ*, and a supposed species of *Phasmidæ*?—*Protophasma Dumasi*.¶

The first insect belonging to the *Hemiptera* which was discovered in the coal measures, was obtained from the neighbourhood of Cassel, and has been described by Dr. Dohrn** as *Fulgora (Fulgorina) Ebersi*. Two other species, belonging to this order, were subsequently discovered in the coal measures of Saarbrück, viz., *Fulgorina Kliveritt* and *F. lebachensis*. The only specimen of *Coleoptera* from European

* *Dictyoneura libelluloides*, *D. anthracophila*, *D. formosa*, *D. Decheni*, *D. elegans*, *D. elongata*, *D. Schmitzi*, *D. obsoleta*, *D. Humboldtiana*, and *Omalia macroptera*. For descriptions of these, see Fauna Sar. Fossils, 1877, *antea cit.*, and Bull. Acad. Belg., 2nd series, vol. xxviii, pp. 384—410.

† "Notes sur des empreintes d'insectes fossiles," &c., by A. Preudhomme de Borre, in the Ann. Soc., Ent. Belge, vol. xviii, 1875.

‡ See Compte-Rendu of the Meeting of the Soc. Ent. Belge, in August, 1877.

§ Die Versteinerungen des Steinkohlengebirges, &c., Halle, 1844. Palæontographica, vol. iv, 1854. Viertelj. der naturf. Gesellsch. in Zurich, vol. ix, 1864. Neue Jahrb., 1869 and 1870. Fauna Sar. fossili, 1873 and 1877, *antea cit.*, &c.

¶ Vierteljahrsschr. naturf. Gesellsch., *antea cit.*, p. 273, &c.

** Compte-Rendu Soc. Ent. Belge, January, 1878, pp. 9—12; and Ann. des Sciences Nat., 6 series, Tome 7, Art No. 4.

** Palæontographica, vol. xvi, 1869.

† Neuc Jahrb. für Min., &c., 1869; and Fauna Sar. Foss., 2nd part, 1877, *antea cit.*

strata of this age was discovered in the coal measures of Saarbrück ; it has been described by Dr. Goldenberg under the name of *Troxites Germari*.

America.

The fossil insects obtained from the American Carboniferous rocks all belong to the *Orthoptera** and *Neuroptera*.† The first named Order includes *Mylacris anthracophilum*, six species of cockroaches, i.e., five *Blattidæ* (*Blattina venusta*, *B. Heeri*, *B. bretonensis*, *B. sepulta*, and *B. fascigera*), and one species referred to a new genus —*Archimylacris*; a cricket—*Archegogryllus priscus*; and a supposed species of *Mantis*.

The *Neuroptera*‡ comprise thirteen species belonging to the genera—*Miamia*,§ *Hemeristia*, *Termes*, *Crestotes*, *Megathentomum*, *Euephemerites*,|| *Libellula* ?, *Haplophlebius*, and *Paolia*. From the neuration of the wings of the species belonging respectively to the genera *Miamia*¶ and *Hemeristia*, Mr. Scudder is of opinion that they each represented a new family of *Neuroptera*, containing peculiarities both of *Neuroptera* proper and *Pseudo-Neuroptera*. The species belonging to the genus *Termes* (*T. contusus***) is especially interesting as being, I believe, the only fossil specimen of a white ant discovered in America. Amongst the remains, referred by Scudder to his genus *Euephemerites*, is “the well-defined†† wing of an insect of marked ‘simplicity.’” It has been named *E. primordialis* by Scudder, who states that, in this ancient wing, scarcely the slightest differentiation has begun. In this respect, therefore, this wing differs from all others yet discovered ; for even in those obtained from the Devonian rocks, the differentiation of the wings is scarcely less perfect than in living insects.

The fossil referred to the genus *Libellula*, is supposed to be the abdomen of a larval dragon-fly ; but it appears to be so imperfect and fragmentary, that it is impossible to say to what insect it belonged. It is extremely improbable that this fossil should have belonged to the *Odonata*, which, although abundantly represented in the Jurassic rocks of Solenhofen, and also—though less commonly—in the English Lias, are unknown in rocks of greater antiquity.

* Owen's 2nd rep. Geol., Arkansas, p. 314 ; Geol. Mag., vol. v, 1868 ; Canadian Nat., vol. vii (n. s.) ; Proc. Amer. Assoc., &c., vol. xxiv ; Acadian Geol., *antea cit.*, p. 388 ; Proc. Bost. Soc. Nat. Hist., vols. xi and xix ; and Geol. Ill., vol. iii, p. 567.

† One of these—*Haplophlebius Barnesi*—is placed by Goldenberg in the extinct order *Palaeodictyoptera*.

‡ See Geol. Mag., vol. iii (new series), November, 1876, p. 519.

§ Silliman's Jour. (2), vol. xxxvii, p. 34 ; Geol. Illinois, vol. iii ; Proc. Amer. Assoc., &c.

|| *Euephemerites simplex*, *E. gigas*, *E. affinis*, and *E. primordialis*.

¶ Two species, viz., *Miamia Bronsoni* and *M. Danae*.

** Proc. Bost. Soc. Nat. Hist., vol. xix, 1878, p. 54.

†† Proc. last quoted, p. 37.

The fossil named *Haplophebius Barnesi* appears to have belonged to the *Ephemeridæ*, and consists of a long* narrow wing, about three and a half inches in length, so that the insect, when expanded, must have measured over seven inches, and so have been much larger than any living species of that family. Mr. Scudder says of it, "The extreme simplicity of the neuration probably places this insect among "Ephemerina, although the form of the wing, and the reticulation, "recall the *Odonata*. Other features of the wing resemble the *Odonata*, "and it is not impossible that *Haplophlebius* forms a synthetic type, "combining essential characters of *Odonata*† and *Ephemerina*."

Having now called attention to the *Insecta* of this period, I will briefly refer to the other animals, and to the plants, which existed contemporaneously.

The *Protozoa* of the period are represented, as in the Devonian age, by *Foraminifera*, remains of which, in some of the limestones, occur in great abundance.

The corals and sponges are the principal representatives of the *Cœlenterata*, and the *Echinodermata* consist almost exclusively of *Crinoidea*.

Of the *Arthropoda*, the *Crustacea* include the *Trilobita* and *Eurypterida*, which here make their last appearance, and also *Ostracoda* and *Phyllopoda*. In addition to the *Crustacea* and the *Insecta*, the *Arthropoda* of this period are represented by *Arachnida* (both scorpions and true spiders) and *Myriopoda*, no traces of which have been met with in older rocks.

The *Mollusca* are most abundant in the coal measures, and include *Polyzoa*, *Brachiopoda*, *Gasteropoda*, Tetrabranchiate *Cephalopoda*, *Heteropoda*, &c. Of the *Vertebrata*, in addition to Fishes, which are still principally Ganoids, we find the first traces of *Amphibia*‡ and *Reptilia*.§

The vegetation of this period was most luxuriant, and in its general character was similar to the Devonian, although but few species are common to the floras of both periods. Amongst the Aerogens, the ferns, the *Lepidodendra*, and the *Calamites*, were the predominant groups; and amongst the lower Orders of Cryptogams, some traces of fungi or mushrooms have been discovered.

Of the Gymnosperms, the *Conifera*|| were well represented, and in rocks of this age we have the first recorded occurrence of Cycads.

The Avenue, Surbiton Hill :
30th November, 1878.

* See plate xvii, fig. 1, p. 391, Geol. Mag., Sept., 1867. See also "A Manual of Palæontology," by Prof. Alleyne Nicholson, M.D., p. 1-6, fig. 129: and Dawson's "Acadian Geology," p. 357.

† Dr. Dawson is of the same opinion; see Geol. Mag., vol. iv, 1-67, p. 86. Dr. Goldenberg has placed this insect in the extinct order, *Palaeodictyoptera*; Fauna Sär. Fossilis, ii, p. 50, 1877.

‡ The *Amphibia* of this period belonged exclusively to the extinct Order, *Labyrinthodontia*.

§ True reptiles were represented by *Enaliosaurs* or Sea-saurians. See Dana's "Manual," ante cit., p. 341.

|| Some of their trunks exceeded 44 feet in height: Lyell's "Elements," 6th edit., p. 473.

ON *ELACHISTA KILMUNELLA* AND SOME CLOSELY ALLIED SPECIES.

BY H. T. STANTON, F.R.S.

I first indicated an *Elachista* under the name of *Kilmunella* in 1849 in my "Catalogue of British Tineidæ and Pterophoridæ." I purposely use the word *indicated*, for the few lines there printed cannot be called a description. I quote them *verbatim*:

"Exp. 4½ lines. Anterior wings grey, the first fascia angulated towards the hinder margin: head grey.

"This is the *subbistrigella* of many cabinets.

"I took this in a boggy place on the top of the hill at Kilmun in June."

In 1854 appeared my volume of the "Insecta Britannica: Lepidoptera Tineina," and this contains (p. 253) the first actual description of the insect indicated above.

For convenience of reference, I again quote the diagnosis and description :

"*Kilmunella*, Sta. Cat., p. 25 (1849). Alis antieis saturate obscure griseis, "fascia recta alla ante medium, maculis ante apicem dualus in fasciam sœpe con- "nexis albis (♀ basi tota alba, sub costa tantum cinerea); capite, cum palpis, "saturate griseo. Exp. al. 4½—5 lin.

"Head, face, and palpi dark grey. Antennæ dark grey. Anterior wings dingy "dark grey, with a *nearly straight white fascia* in the middle, and two nearly oppo- "site *white spots before the apex, frequently united into a fascia*; cilia grey, at the "apex whitish. (In the female the entire base of the wing is white, with the ex- "ception of a grey streak along the costa.) Posterior wings grey, with paler cilia.

"Common on bogs and mosses in June and July; on the summit of the hill "above Kilmun it is extremely plentiful, flying freely in the afternoon, threading its "way between the stems of grass or rushes, and occasionally settling for an instant."

The above description was written after studying the long series of specimens which I collected at Kilmun when stopping there for ten days in July, 1850, as is duly recorded in the second edition of the "Entomologist's Companion." At that time the insect had not been bred, and it will be observed, that the first fascia is spoken of as *nearly straight*, and not a word said about *its being obsolete towards the costa*, and the two spots beyond the middle are said to be *frequently united into a fascia*.

These characters, to which I am now calling attention, are the very points which serve to distinguish *Kilmunella* from some of the species most closely allied.

After that portion of the "Insecta Britannica" volume was printed, I bred, at the end of July, 1854, several specimens of an *Elachista* from larvae found by Mr. John Scott at Fochabers mining the leaves

of a species of *Carex*. I find in my Diary, that as the males emerged I did not seem to recognise them, as they are only entered *Elachista* (without any specific name); but when the female made its appearance, I seem to have jumped to the conclusion that I recognised it, as I entered it at once as *Elachista Kilmunella*, and thenceforth it would appear that I had too hastily assumed that the males were also *Kilmunella*, though differing somewhat from my caught specimens, as perhaps was to be expected in bred specimens.

But much mischief arose from this mistake, for the very next description I wrote of *Kilmunella*, I modified it in accordance with my bred specimens.

In 1858 appeared in the "Transactions of the Entomological Society of London," vol. iv, new series, my "Synopsis of the genus *Elachista*," and there, at p. 301, is the following description of *Elachista Kilmunella*:

" Most nearly allied to the preceding [*E. atricomella*], but distinguished by the "duller, blunter anterior wings, the fascia being often obsolete towards the costa, "and the opposite spots duller and more nearly opposite. *Airæ* is a blacker insect, "and the fascia is altogether more indistinct.

" Expansion of the wings, 4½—5 lines. Head dark grey : anterior wings dingy "dark grey, with a nearly straight whitish fascia before the middle, frequently obso- "lete towards the costa, and two opposite whitish spots towards the hind margin, "that on the costa being rather posterior.

" In the female, frequently the basal portion of the wing is suffused with "whitish, especially along the inner margin.

" The larva, which is yellowish-grey, mines the leaves of a *Carex* in April and "July.

" The perfect insect appears in June and August, and occurs in various parts of "Scotland, and in Lancashire."

It is evident in the above description, that the tendency of the first fascia to be *obsolete towards the costa* is something quite novel, which we seek in vain in the earlier description; moreover, more stress is laid upon the *posterior position of the costal spot* than had hitherto been done.

It may seem a self-condemnatory opinion, but the description reads to me as if that of *Kilmunella* had been carefully adjusted to fit the newly bred specimens, which perhaps, after all, may turn out to have been a totally distinct species.

Unfortunately, when I supplied von Heinemann with specimens as *Kilmunella*, it is very probable I sent him some of my *bred* specimens, and if these were not the veritable *Kilmunella*, it would tend to increase the confusion.

Mr. John Sang, of Darlington, who has been working very diligently at this subject for some time, has lately sent me such an accumulation of evidence, that I have no alternative but to surrender at discretion. Mr. Sang forwarded me six specimens bred from *Carex* (5 ♂, 1 ♀), along with twelve captured specimens of the same species, and, by the side of the latter, twelve of what he considers the ordinary *Kilmunella*, taken on the moors at the end of June and in July, and he pointed out that "the *Carex* feeder is brown, not grey, and the "fascia in the ♂ is distinct on the dorsal margin, but becomes almost "obsolete towards the costa. The position of the spots is curious, the "dorsal spot pointing inwards and the costal spot outwards; whereas, "in *Kilmunella*, the two spots either form a slightly angulated or a "slightly sinuous fascia, and the first fascia is distinct to the costa, so "that the insect appears to have two fasciae. The cilia in *Kilmunella* "seem to me much whiter. The wing of *Kilmunella* is decidedly more "truncate looking. The bred insect can only have one brood: I bred "the ♀ as late as the 23rd August."

Mr. Sang describes the habit of the larva as follows:

"The larvæ mine the long (old) leaves of *Carex riparia*, no doubt beginning in "the autumn and feeding most of the winter, making a narrow, indistinct, pale mine, "with no sign of 'frass' in it; very like that of *E. luticomella* in *Dactylis*. When "it comes to the lower end of the leaf, it enters the stem, goes down to the top of "the root (not into it), and then up and down till full fed, by that time having "hollowed out a gallery of considerable width with much soft brown 'frass' in it; "very like the work of an internal-feeding *Noctua* larva."

The next question that will arise is this: if the *Carex* feeder be distinct from the original *Kilmunella*, has it ever been named and described?

Long ago, I described an insect in the possession of the late Mr. Edleston, of Manchester, under the name of *Elachista alpinella*; but in the Entomologist's Annual for 1855, p. 56 (2nd edition, p. 78), I said (after noticing that *Kilmunella* had been "bred from larvæ found "by Mr. Scott in a species of *Carex*, near Fochabers, Banffshire") "I am inclined to think that *E. alpinella*, L. B., p. 254, is only a form "of this species;" and, subsequently, I sunk this *alpinella* altogether as a synonym of *Kilmunella*, which I well remember now was not at all satisfactory to Mr. Edleston.

The description given in the "Insecta Britannica: Lepidoptera Tineina," p. 254, is as follows:

"*Alpinella*, Edleston *in lit.* Alis anticis fuscis, maculis tribus indistinctis albidis, "una dorsali ante medium, secunda ad angulum analem, tertia costali ante apicem; "capite fuso.

Exp. al. 4½ lin.

" Head, face, and palpi fuscous. Antennæ fuscous. Anterior wings fuscous, " with three indistinct whitish spots, one on the inner margin before the middle, " one at the anal angle, and one rather beyond it on the costa; cilia pale fuscous. " Posterior wings grey, with paler cilia.

" Taken by Mr. Edleston, on moors near Manchester, in August."

The *fuscous* colour, the fact of the first fascia being so abbreviated to be spoken of as a *spot*, and the position of the two spots (so far as it is given, for nothing is said of the direction in which they point), all rather seem to indicate here the species which has been bred by Mr. Sang from *Carex*, but to me the description made from caught and worn specimens is too unsatisfactory to make it desirable to retain the name of *alpinella*, and, fortunately, in Woeke's continuation of von Heinemann's work on "Die Schmetterlinge Deutschlands und der Schweiz," at p. 495, we have an *Elachista monticola*, Woeke, described, which to me seems quite applicable to Mr. Sang's insect, except that the ground colour is given as black. I translate the description, as follows :

" *Monticola*, Woeke. Anterior wings broader posteriorly, black (with the basal portion paler in the ♀), with slightly curved or angulated white fascia (much broader in the ♀), and two opposite hinder spots obliquely placed, cilia grey, with a line of black scales before the middle; head of the ♂ black-grey, of the ♀ whitish. Length of wing, 2—2½ lines (4½ times as long as broad).

" Near to *Kilmunella*,* the anterior wings narrower at the base, with the hind margin more oblique, darker, less glossy, the fascia in the ♂ likewise narrow, obtusely angulated in the middle, above the fold more or less obsolete, in the ♀ broad, but with the edges ill-defined, not so much angulated as very faintly curved. In the ♀ the colour of the basal portion of the wing varies considerably, sometimes owing to scattered whitish scales it is only a little paler than the rest of the wing, or it is only whitish or brownish-white along the inner margin, and sometimes, as in *Kilmunella*, it is entirely whitish, only with a greyish tinge along the costa and in the fold, and then, as in that species, the pale portion runs into the fascia. The opposite spots are more or less triangular, smaller and narrower in the ♂, broader in the ♀, the dorsal spot points to two-thirds of the costa. Cilia paler grey, scarcely paler towards the apex, thickly sealed with black at the base, the dividing line thick, likewise far from the ends of the cilia.

" Posterior wings half the breadth of the anterior wings, dark grey, the cilia more than three times the length of those of the anterior wings.

" The head of the ♂ almost black, with the face scarcely paler, in the ♀ dirty white, only on the neck rather grey. The palpi internally of the colour of the face, externally grey, darker in the ♂, the abdomen and the legs as in *Kilmunella*.

" On the Upper Harz, from the middle of July, the larva in June in the stems of *Carex fulva*, mining into the root."

* It must be borne in mind as being very doubtful which species I actually sent to v. Heinemann as *Kilmunella*.

Wocke quotes as a doubtful synonym to this, the *helvetica* of Frey, of which he says "it seems to belong here; worn specimens of "*monticola* are just as pale."

Immediately before *monticola*, Wocke describes Frey's *stagnalis*, which occurs on mountain moors in Bohemia and in the Harz at the end of June and the beginning of July, and if not already in our collections, is extremely likely to occur with us. I therefore translate the description:

"*Stagnalis*, Frey, L.E., 13, 316. *Kilmunella*, Nolcken, 705. *Turfosella*, "Heinemann in lit.

"Anterior wings black-grey, with a white fascia and two hinder spots placed "almost exactly opposite; cilia dark grey, at the apex white-grey, with a black "dividing line beyond the middle, before which they are dusted with black; the "head dark grey. Length of wing, 1½—2 lines (4 times as long as broad).

"Smaller and shorter winged than the allied species, recognised by the whitish "colour of the cilia beyond the dividing line and below the apex of the wing.

"Anterior wings pale grey, the ♀ with the basal portion sometimes rather paler, "but only slightly so, the fascia beyond one-third of the length of the wing entire, "whitish, narrow, in other respects rather variable, sometimes quite perpendicular, "sometimes from the fold to the costa inclining towards the base, or with a blunt "angle in the middle pointing posteriorly; the opposite spots as far from the fascia "as the latter is from the base, exactly opposite and pointing towards each other, "almost forming a second straight fascia nearly parallel to the first, though with a "slender interruption in the middle, where, however, there is frequently a more or "less distinct fine angulated marking as a connecting link, as in *poe*. Cilia dark "grey, the dividing line not far from the tips, previous to this line they are rather "thickly dusted with dark scales.

"Posterior wings half the length of the anterior wings, black-grey, with paler "cilia, which are yellowish at the base.

"Head dark grey, the face in certain directions paler, palpi moderately long, "grey, internally yellowish-white, abdomen and legs grey, the former in the ♂ with "a long pale ochreous-yellow-grey anal tuft, the hinder tibiae from the base to the "middle spurs yellowish-white.

"On the high moors of the Sudetic Mountains, and the Upper Harz, at the "end of June and beginning of July.

"Nolcken mixes this species (*turfosella*) with *monticola* (formerly *montana*, "Hein. in lit.), his notices suit especially to the former, and I also possess two males "from him which leave no doubt. The distinctness of the two species is proved with "certainty, from the different mode of life of the larva and the food-plant (I once "bred *stagnalis* from the leaf of a *Carex*), also, though both fly on the Harz in "neighbouring localities, they do not fly together and are out at different times."

I may be dull of comprehension, but I confess I do not quite follow Wocke as to "the different mode of life of the larva and the "food plant;" both feed on *Carex*—only *monticola* is said to mine the stem, *stagnalis* the leaf. Is that the great distinction? Mr. Sang's larva first mines the leaf and then the stem.

Between the descriptions above quoted of *stagnalis* and *monticola* a description is introduced of *Kilmunella*, which must have been made from some specimens with which I had supplied von Heinemann, as Wocke says "it has not hitherto been detected on the continent."

He describes this *Kilmunella* as follows :

" Anterior wings of uniform breadth from the base, rounded posteriorly, dark grey, with a faint violet-red gloss. The fascia in the ♂ narrower and indistinct, " rather variable, perpendicular and straight or slightly angulated, often broken in the " middle, in the ♀ the entire basal portion is whitish, only tinged with grey on the " costa and in the fold, and passes without any defined separation into the fascia, " which is posteriorly quite straight and perpendicular. The opposite spots are " rather large, somewhat variable in form, usually triangular, the costal spot points " towards the anal angle, the dorsal spot towards the middle of the costa. Cilia at " the base dusted with dark grey, from the apex to the middle of the hind margin " whitish, below this rather dark grey, the dividing line is far away from the tips of " the cilia.

" Posterior wings half the breadth of the anterior wings, the cilia more than " three times the length of those of the anterior wings.

" Head and the rather long palpi in the ♂ dark grey, in the ♀ pale grey ; legs " and abdomen dark grey, the latter in the ♂ with the anal tuft of the same colour, " in the ♀ with narrow pale margins to the segments ; the hinder tibiae spotted with " whitish before the middle.

" From Scotland."

To put the whole matter in few words, thus :

Kilmunella is grey, and has an entire fascia before the middle, and then an angulated fascia formed of two opposite spots.

Monticola is brown, and has the first fascia obsolete towards the costa, forming only a dorsal spot, and the hinder spots look in contrary directions and do not form a fascia.

Stagnalis, which we have not yet distinguished amongst our British species, should be smaller and shorter winged, with the first fascia entire and the opposite spots almost forming a straight second fascia, the apical portion of the cilia whitish.

Mountsfield, Lewisham :

October 20th, 1878.

Heliothis peltigera at Hereford.—The notice of *Heliothis peltigera* occurring at Tenbury reminds me that I captured a specimen in my garden here last summer. I believe its occurrence in Herefordshire has not previously been recorded.—T. A. CHAPMAN, Binghill, Hereford : December 3rd, 1878.

NOTES ON LARVÆ OF SOME *PHYCIDÆ* (KNOT-HORNS).

BY C. G. BARRETT.

The larva of *Homæosoma sinuella*, Fab.—For two or three years I have been on the look out for the larva of *Homæosoma sinuella* in its favourite localities on the coast, and once, finding unmistakeable *Homæosoma* larvæ in flower-heads of *Carduus lanceolatus* in one of these localities, was much surprised at rearing *H. binævella*, which I had never seen there. In the summer of 1877, I casually noticed that some very tall plants of ribwort-plantain (*Plantago lanceolata*) were much frequented by *H. sinuella*; specimens were running up the long flower-stalks to take flight (a position in which the long strong legs and compact longicorn-like form of the moth were strikingly exhibited), but as this only led me to examine the *seed-heads* of the plantain, no results followed. However, in February last, when searching for *Dicrorampha* larvæ along the undercliffs, I came upon these large plants of ribwort-plantain, and determined to give them a thorough examination, and, in the solid root-stocks (from which proceed the fibrous roots), I found larvæ, which, from their appearance, I was disposed at the time to refer to some *Tortrix*, but which soon began to spin themselves tough, soft, silken cocoons, which became in time of a sooty-black, within the cavities in which the larvæ had lived, and they remained unchanged for at least four months. Other larvæ continued, apparently, to feed much longer, but, at the end of March, most of them were in cocoon, and, early in June, they began to assume the pupa-state. The first moth emerged from these on June 17th, and they continued to come out all through July; but, in their favourite haunts on the warm slopes of the cliffs, specimens were flying at the beginning of June. When examining the plants in March and April, I was surprised to find how small and stunted a root-stock would serve to contain a larva, and in the larger roots to find two or three cocoons in one cavity. At the same time, although portions of the plants were killed, fresh vigorous shoots were growing from the sides, and these became after a while so luxuriant that it was difficult to find the pieces of old root-stock in which the larvæ had fed, and were then in pupa.

On the 4th September, I again examined the plantains and found young larvæ at work, some of them indeed being well grown and actually *larger* than those I had found in the winter, and that they now bore much more the appearance of *Homæosoma* larvæ. At this time, in what may be called its *active* state of existence, the larva is, when at

rest, short and very thick, but it nearly doubles its length when crawling, though the hinder part is still thick, and sometimes very "baggy." Segments rather deeply divided, and having transverse folds on the skin, the third and fourth segments having each *two* of these folds, which nearly meet at the back and look like cross diagonal lines, while the remaining body-segments have each one fold in the middle. Colour dull porcelain-white, with a faint bluish tinge when full grown, darker between the segments; the sub-dorsal lines and spiracles indicated by depressed dots. Head deeply lobed, light chestnut, jaws brown, dorsal plate pale brown, dotted along its posterior margin with black, anal plate pale brown, anterior feet black. Eating the inner substance of the root-stock of *Plantago lanceolata*, living entirely in the cavity thus formed, its presence only slightly indicated by the drooping heart leaves. By the winter, however, although it seems still to eat a little from the walls of its cavity, it has shrunk considerably, the obesity of the posterior portion having quite disappeared. It is now short, thick, and very sluggish, dull white, the third to fifth segments rather more transparent, dorsal vessel visible, head and dorsal plate light brown, darker at the edges, anal plate and legs as before, and while in cocoon it only becomes slightly yellowish. It varies excessively in the time of spinning this cocoon—from September to March apparently—and the cocoon is not black at first, but from whitish becomes brown, and finally sooty. Pupa light chestnut, dorsal region paler.

Dr. Hofmann, in his "Kleinschmetterlingsraupen," describes the larva of *sinuella* (from Treitschke and Hübner) thus:—"Light bark-brown, with white longitudinal stripes, head brown spotted with black, dorsal plate black. In September, on *Chenopodium*."

Clearly this description does not refer to our insect.

The larva of *Homæosoma binævella*, Steph.—This is to be found in the middle of August in the flower- and seed-heads of *Carduus lanceolatus*, eating the young seeds and excavating a large cavity in the solid substance at the base of the flower-head, in which cavity it lives. When full-fed, it leaves the head and spins a tough brown cocoon among rubbish, in which (like the allied species) it remains unchanged through the winter and spring. Several of the moths emerged in the third week in July.

This larva is stout, more particularly at the posterior extremity, very pretty, pale green, paler beneath, with pink dorsal and sub-dorsal stripes, spiracular stripe also pink but interrupted, each segment

deeply wrinkled below the spiracles. Head bright chestnut, dorsal plate greenish in front, pale brown behind, anal plate blackish.

But here again is a discrepancy.

Hofmann quotes Von Hornig's description of the larva of *binævella*, II.-S.:—"Dirty reddish-grey, with dark brown dorsal stripe, two "small black dots on each segment, and interrupted dark brown longitudinal stripes. Head dark brown, the dorsal plate somewhat darker, "divided by a paler line. In *May and June*, in the heads of *Carduus acanthoides*."

Clearly we have more to learn about these species!

The larva of Rhodophæa advenella, Zincken.—On June 6th, I beat an exceedingly pretty larva from hawthorn: cylindrical, moderately stout, light pea-green, with bright purplish-pink sub-dorsal stripes, head pale brown, eyes darker, plates green, the purple-pink stripes being continued upon the dorsal plate. It spun a tough silken cocoon attached to a dead leaf, in which it became a chestnut-brown pupa, and, after lying in pupa about a month, the moth emerged on July 15th.

The description of this larva, quoted by Dr. Hofmann from Zincken and Treitschke, is:—"Naked, spindle-shaped, of a beautiful "green, with red-brown lateral lines, head red-brown. In May and "June, in the flowers of Hawthorn. Pupating in the earth in a "slight web."

The larva of Rhodophæa consociella, Hübner.—In the middle of June last, Mr. Hodgkinson sent me a few larvae of this species, found by him at Arnside. They were not active; cylindrical, with rather long delicate bristles, very pale greenish-grey with dark green-grey dorsal, and two sub-dorsal, stripes. Head and dorsal plate large, pale yellowish-brown with grey dots, the plate being semi-circular in form, anal plate hardly distinguishable. Drawing together leaves of oak, gnawing away the under surface and making a dense web among them. Pupa light brown, in a silken coeooon, covered with frass, and fixed to the surface of a leaf or to the web.

I remember similar larvae in the south of England, and, as they have been before described and are well known, am only induced to note these particulars because Prof. Zeller has described the larva, in the "Isis," as:—"sulphur-yellow, with fine brown longitudinal lines and "small black raised dots." The other particulars agree so well that I think the larva of this species must vary considerably in colour.

The larva of Ephestia cinerosella, Z. (*artemisiella*, St., Man.).—I found larvae of this species in the stems and root-stocks of *Artemisia*

absinthium in the winter and spring, and reared a fine series from June 29th to July 27th. This larva and its habits have been so well described by Mr. Buckler (E. M. M., vol. ix, p. 143), that I need only remark the satisfactory fact that the destructive Ichneumon, mentioned by him, seems here to be either very scarce or totally absent.

Pembroke: October 8th, 1878.

ON *EUDROMUS*, FAMILY *CARABIDÆ*.

BY H. W. BATES, F.L.S.

The genus *Eudromus* of Klug, the most remarkable development of the *Pterostichus* or *Feronia* type of *Carabidæ* known at present, has been treated by recent systematists with unmerited depreciation. To cite the two chief instances: Lacordaire, in his "Genera," sinks it in the general crowd of synonyms, under the genus *Feronia*, without a word of comment; and Harold and Gemminger make it a synonym of the Australian group *Homalosoma*, increasing the indignity by giving "Nov. Holland," as the locality of its two described species. In this way, has been buried out of sight the important biological fact that Madagascar has developed, in addition to its many other remarkable animal forms, a special group of the world-wide *Feroniæ*, carrying the type to the highest degree of perfection as regards size, and grace of form and sculpture.

The chief authority on this family, Baron Chaudoir, has, as far as I can gather, only once had occasion to allude to the genus. This is in his description of the allied Australian group *Homalosoma*, in the Bull. Moscou, 1865, iii, p. 64, where he points out the remarkable character of the short, broad, and rounded scutellum, as distinguishing *Eudromus* from *Homalosoma*. Klug, in founding the genus (Wiegmann's Archiv, 1835, i, p. 384), gives a detailed generic diagnosis. But neither of these authors makes mention of the length and slenderness of the legs and antennæ, which amply distinguish the Madagascar group, not only from *Homalosoma*, but from all other genera of *Pterostichinæ*, and even from the *Sphodrinæ*, with which Baron Chaudoir is inclined to perceive some near affinity, when speaking of *Homalosoma*. Taking then the characters derived from the scutellum (latissimum, breve, postice rotundatum), the antennæ (graciles, thoracis basin longe superantes), and the legs (elongati, præcipue tarsis gracilibus, posticis articulo primo valde elongato), added to the length and slenderness of the palpi, the last joint of which is compressed, and more or less dilated towards the apex, and the striated mandibles,—*Eudromus* may be taken as a per-

feetly well-defined generic group in this sub-family. The short and broad scutellum, it shares in common with *Eucamptognathus* and *Oodinus*, two other fine Madagascar genera of the same group. In the degree of slenderness and character of clothing of the under-surface of the tarsi, there is considerable difference amongst the species, as there is also in size and sculpture; but in all, the elytra are ribbed and more or less obliquely truncate and toothed at the apex.

I have had the opportunity of examining four distinct species of this fine genus. They appear to inhabit the central plateaux and mountains of Madagascar, but nothing has yet been recorded regarding their habits. Judging from the length of the legs, they must have great powers of running, and it is probable that many more species remain to be discovered.

1. EUDROMUS STRIATOCOLLIS.

Feronia (Omalosoma) striatocollis, Brullé, Hist. Nat. des Ins., iv, p. 364 (1834).

Eudromus alternans, Klug, Wieg. Arch., 1835, i, p. 384, t. 6, f. 2, c. d.

My specimen (♀) measures $1\frac{1}{2}$ in. (18 lines) in length. Brullé's appear to have been a little larger (20 lin.). Klug gives 17—20 lin. The species is distinguished by the opaque, minutely sculptured surface of the thorax and elytra; the thorax being covered with fine transverse striae.

2. EUDROMUS LÆVICOLLIS.

Feronia (Omalosoma) lævicollis, Brullé, l. c., p. 365.

Measures 1 in. $10\frac{1}{2}$ lin. Brullé's example, taken by M. Bernier, and deposited in the Muséum d'Histoire Naturelle, is nearly of the same size as mine. Distinguished by its nearly quadrate and smooth polished thorax. The elytra are less opaque than in *E. striatocollis*, although covered with a similar minute sculpture, consisting of excessively fine striae, on ribs and interstices alike. The ribs are six on each elytron, the alternate (2nd and 4th) rather higher, and the 6th or submarginal one much elevated, extending to the sutural apex, and receiving the 2nd and 4th at their termination.

3. EUDROMUS TRISULCATUS, n. sp.

Latior, elytris utroque sexu gradatim dilatatis. Niger, sericeo-nitens: thorace quadrato, lateribus anticis rotundatis, posticis sinuatis; dorso sulcis tribus lævibus, latis, profundis, marginem anticum haud attingentibus: elytris utrinque tri-costatis, intersticiis lævibus, apice oblique truncato, apice suturali ♂ obtuso, ♀ triangulariter emarginato.

Long. 1 in., $10\frac{1}{2}$ lin. ♂ ♀.

The elytra have scarcely any traces of the minute striæ which distinguish the two preceding species, and have only three costæ on each ; the interstices being broad and quite free from punctures or elevated lines. The upper edge of the truncature of the elytra is subdentate.

4. EUDROMUS EMARGINATUS, Putzeys.

I have received from Dr. Baden a pair of a small and very distinct species under the above name, but I have not been able to find a published description of it. It measures 13 lin. The thorax has traces of transverse striæ, especially behind, but is otherwise smooth and polished ; it is more quadrate in outline than the other species, and the hind angles are more obtuse. The elytra are minutely strigose only in the interstices ; the costæ, six in number, besides a slender 7th or submarginal one, are narrow, the 1st, 3rd, and 5th, however, become obsolete before reaching the apex, and the latter, in the ♀, is strongly tridentate. The soles of the tarsi are clothed with long, reddish, stiff hairs.

Bartholomew Road, Kentish Town, N.W. :
December, 1878.

DESCRIPTION OF A NEW SPECIES OF *SIDERODACTYLUS*, INJURIOUS TO GRAPE VINES (IMPORTED FROM THE CAPE OF GOOD HOPE) IN THE ISLAND OF ASCENSION.

BY F. P. PASCOE, F.L.S.

SIDERODACTYLUS ORNATUS, n. sp.

Head and rostrum rather broad and depressed, speckled with small golden-green scales ; antennæ long and very slender, the second joint of the funicle more than twice as long as the first ; prothorax round, convex above, black, the anterior margin and sides densely covered with yellowish metallic scales, two large oblong spots composed of similar scales behind ; elytra copper-brown, depressed, widest behind the middle, the apex rounded, longitudinally punctured, and, when viewed sideways, transversely wrinkled, the outer margin posteriorly with golden-green scales ; anterior femora glossy black, tibia and tarsus passing gradually into pale brown, the former curved and having six or seven well-marked denticles on its inner border ; intermediate and posterior legs testaceous ; all the tarsi pubescent ; body beneath black, the sides speckled with golden-green scales.

Length, 4½ lines.

Siderodactylus is amongst English genera most allied to *Tanymec-*

cus; its long anterior legs, however, and their tumid femora, together with the oval shoulderless elytra, give it a different aspect. The species described above is about the size of *S. puberulus*, Boh., but, among many other points, its diversely coloured legs will distinguish it from its rather limited number of congeners (16), two or three of which are still undescribed. As in many other genera differentiated by well-marked characters, the relative length of the joints of the antennæ is, in *Siderodactylus*, only of specific importance.

1, Burlington Road, Westbourne Park :

December, 1878.

[This beetle formed the subject of a communication from the Lords of the Admiralty to Kew. It is stated to be doing much damage to grape vines by eating the leaves, and also to attack the plants of kohlrabi.—R. McL.]

DESCRIPTION OF A NEW GEODEPHAGOUS BEETLE, OF THE FAMILY *SCARITIDÆ*.

BY GEORGE LEWIS.

MOUNOTIA BATESI, *n. sp.*

Nigra, prothoracis margine laterali basalique et elytrorum margine laterali late cupreis : elytris striato-punctatis, integris, interstitiis crenatis. Long. 1½ lin.

This species is much smaller than *M. gloriosa*, Cast., being only one inch and seven-eighths in length, inclusive of the mandibles, and is conspicuously different in the elytral striae, which are much deeper and extend throughout the whole of the wing-case; while in the older species the region of the scutellum is comparatively smooth.

Two specimens of this insect have been received from Burma, and it will probably form the most northern type of the genus. I have dedicated this species to my friend Mr. H. W. Bates, whose careful descriptions of, and interesting geographical remarks on, the *Geodephaga* and *Longicornia* of Japan, first attracted the attention of the public to the fauna of these eastern islands.

3, Green Street, Grosvenor Square :

17th December, 1878.

Variety of the larva of Abraxas grossulariata.—At a meeting of the Huddersfield Scientific Club, held on the 14th June last, Mr. S. L. Mosley showed examples of a remarkably dark form of this larva. He had received them from Mr. J. E. Robson, of Hartlepool, who wrote him that a colony of the form usually occurred there. Mr. Mosley kindly gave me one of them, which I preserved. It differs from the strikingly marked usual form in being almost uniformly sooty-black: there is no trace of the reddish lateral stripe below the spiracles; and the yellow, or cream colour, only shows a little on the second segment, and on the ventral area as a narrow central stripe, interrupted, except between the legs and pro-legs, at the segmental divisions. The only other markings are two small pale spots on the front of segments 5, 6, 7, 8 and 9, and laterally on segments 10 and 11. The appearance altogether is so different from the usual form, that at first sight I had no idea what the larvæ were; and on placing my preserved specimen in the cabinet along with the broad black bordered variety of the imago, it seemed to correspond with it exactly. Unfortunately for that theory, however, these black larvæ at Hartlepool only produce the most ordinary form of the imago.—GEO. T. PORRITT, Highroyd House, Huddersfield: December 5th, 1878.

Description of the larva of Tinea orientalis.—Since the description of the imago in the November number (see ante, p. 134), I have succeeded in discovering the larva, which was exhibited at the East-London Entomological Society, on 27th November. I have described it as follows:—Length about 8 lines. Colour dirty whitish, shining, no perceptible hairs; head reddish-brown; 2nd and 3rd segments yellowish on the back, sides whitish, overlapping and swollen, giving the larva the appearance of having a hood; dorsal vessel blackish; legs reddish. The larva feeds in a very tough silken case, in buffalo horn, making galleries quite through the horn. On a future occasion I hope to be able to give a description of the pupa.—C. W. SIMMONS, 8, Gough Street, Stainsby Road, Poplar, E.: November 28th, 1878.

New British species of Phycidæ.—I have much pleasure in recording the capture of a species of knot-horn new to Britain, which I identified, by examination of the foreign collection in the British Museum, as *Euzophera oblitella* of Zeller. The following is a description of the one specimen I captured:—Front wings greyish, dusted with darker; both lines black, the first preceded, the second followed, by a pale band; nearly midway between the two is a conspicuous black spot; near the base, and almost touching the costa, is another black spot; hind wings pearly-grey, gradually darkening to the hind margin. Expanse of wings, 8 lines.

The specimen is in beautiful condition, and was taken on the south-west coast of the Isle of Wight in the autumn of 1876. I have not identified it until lately.

There is only one specimen in the British Museum Collection. In Staudinger's Catalogue, Hungary, Sarepta (South-East Russia), South France, Andalusia, and Sicily are recorded as localities.—J. B. BLACKBURN, care of Rev. J. BUCKMASTER, The Vicarage, Wandsworth: 27th November, 1878.

[The insect above mentioned was first described by Zeller in the Isis of 1848; he then placed it in the genus *Ephestia*, near *interpunctella*; now it is referred to the genus *Euzophera*, and its nearest allies, known to us as British species, are *E. pinguis*, Haw., and *E. cinerosella*, Z. (*artemisiella*, Stn.).

The generic name *Euzophera* appears in the Stettin. ent. Zeitung, 1867, p. 377,

as a substitute for Heinemann's name *Stenoptycha*, which he himself threw down (Schmett. Deutschlands u. der Schweiz., Zweite Abtheil. Band i, Heft ii, Zünsler, p. 209) as having been already employed for a genus of *Pterophoridæ*. One peculiarity of the species on which stress is laid both by Zeller and Heinemann, though Herrich-Schäffer makes no mention of it, is a yellowish-brown dorsal spot on the inner edge of the first fascia. On reading Mr. Blackburn's description I felt doubtful whether his insect was truly Zeller's *oblitella*, and having expressed a wish to him to see the insect, he kindly brought me the specimen, and I have to-day had an opportunity of leisurely examining it. This dark dorsal blotch is decidedly visible, though not very evident, but readily to be found if looked for. The two pale fasciæ have both a dentate or jagged appearance (Herrich-Schäffer says "fein gezackt"). The central spot, described above as a "conspicuous black spot," also puzzled me, for Herrich-Schäffer says "der Mittelfleck unbestimmt," but Heinemann evidently implies that the insect varies in the distinctness of this marking—it consists of two spots, the lower one being the more distinct and being that noticed by Mr. Blackburn. Heinemann says of this central spot "bisweilen fehlt es oder doch der obere Punkt," and hence, if one or both spots are liable to disappear, there is room for considerable variation.

It will be seen from the above that I have abundantly confirmed the correctness of Mr. Blackburn's determination of the species, and I need only further add that his specimen is quite as fine as if it had been bred.—H. T. STANTON, Mountsfield, Lewisham : December 11th, 1878.]

On a new Depressaria hitherto confounded with the atomella of our cabinets.—In September last I received from Mr. Barrett a fine series of a *Depressaria* bred from *Genista tinctoria*, which at once attracted my attention; I had previously a single specimen of unknown origin of the same insect amongst my *atomella*.

On referring to what has been written latterly about these insects, I find that Dr. Rössler of Wiesbaden, in his "Schmetterlinge des Herzogthums Nassau," published in 1866, had, at p. 230, differentiated this *Depressaria* from that which stands as *atomella*, and had reserved to this *Genista tinctoria*-feeding species the name of *atomella*, giving to what we used to consider *atomella*, bred from broom, the name of *pulverella*.

Von Heinemann, in his "Schmetterlinge Deutschlands und der Schweiz," Zweite Abtheilung, Band ii, Heft. i, pp. 148, 149, confirms this separation of the two species, but uses the name *scopariella* for the broom-feeding species, and these are the names retained in Staudinger and Woeke's Catalogue, where *atomella* is not given as a British species, though now it has fairly established its claim to rank as such.

Under these two names I shall proceed to speak of them. *Atomella*, as far as we at present know, feeds only on *Genista tinctoria*; *scopariella* feeds on broom (*Spartium scoparium*), and, according to Rössler, also on *Genista pilosa*; I may mention, that the species which I bred from larvæ collected on *Calycotome spinosa* in the south of France, was *scopariella*. *Atomella* is a more gaily-coloured insect than *scopariella*—the anterior wings have the base and costal portion more yellowish, the other portions (especially towards the inner margin) more or less suffused with rosy. *Atomella* is a trifle shorter in the wing than *scopariella*, and the anal angle is more rounded, and thus the hind margin does not present so truncate an appearance

as in *scopariella*. The difference in the larvæ is, I believe, not yet sufficiently made out. Rössler describes the larvæ of *atomella* as very pale grey-green, with shining black head and thoracic plate, the latter with a fine central line, but he makes no mention of the larva of the other species: von Heinemann describes the larva of *scopariella* as green, with three dark stripes and a reddish-green head.

Writing to Mr. Barrett on the subject, I called his attention to the fact that if we knew that both these descriptions were made from full fed larvæ, there was plenty of distinction, but that it was quite possible the larva of *scopariella* before the last moult might have a black head and thoracic plate, and if the larva of *atomella* described by Rössler was immature, it might assume a different appearance afterwards. Mr. Barrett, in reply, sent me his memorandum of the larva of *atomella* on *Genista tinctoria* as follows: "Cylindrical, exceedingly active and gymnastic. "Delicate pale pea-green, with narrow dorsal and broader sub-dorsal stripes all grey-green. Spots small, black, hairs minute. Head and plates pale yellow."

Probably next season an opportunity will be taken to compare the two larvæ in their various stages of growth.—H. T. STANTON, Mountsfield, Lewisham: 12th December, 1878.

The Doubleday Collection.—I think I should not leave unnoticed the remarks of Mr. W. J. Vandenbergh, Jun., which appear in the E. M. M. for the present month, on my letter to the "Entomologist," for October, in reference to the request of the Trustees of the Doubleday Collection for fresh specimens of 238 species of *Lepidoptera*.

The remarks may be conveniently divided into two sections: 1st, that I should not have written on "questionable information"—which Mr. Vandenbergh considers I have done; and 2nd, that my letter has deterred entomologists from sending specimens to the Doubleday Collection.

As regards the 1st, I would point out that Mr. Vandenbergh could have seen from a catalogue of the Collection (if he had obtained one), and from my letter to the "Entomologist" (if he had read it carefully), that it was on no "questionable information" that my letter was based—but on actual knowledge, obtained while collating the catalogue with the Collection. The catalogue (which was undertaken at my suggestion) was, I understood, but a preliminary to placing all mite-infested specimens under proper treatment. I spent many hours on each of several days at the Bethnal Green Museum in supervising the catalogue, and, for this purpose, I had the whole of the collection under my immediate notice, and I then predicted that very serious results would accrue unless energetic steps were taken to eradicate the mites by which so many specimens were attacked.

But if anything were wanting to show how foolishly Mr. Vandenbergh has accused me, and how well-founded my prediction was, the advertisement of the Trustees for 238 species furnishes it.

As regards the 2nd point—that I have deterred entomologists from responding to the request of the Trustees—I am obliged to Mr. Vandenbergh for the compliment he conveys, that I can influence entomologists so much, but must decline it. But Mr. Vandenbergh can scarcely be aware that nothing can be more deterrent than his own communication. He tells us there are "no signs of mites, grease, or any other kind of neglect," not even old or faded specimens, and that "the whole collection

is in the most exquisite and unparalleled condition." Surely all this points to the fact that the specimens asked for by the Trustees are not needed. "Save us from our friends," may well exclaim the Trustees. But did not Mr. Vandenberg know that, in August last, Mr. James English was appointed to go through the collection, "and put it in proper order?" (*vide* Trustees' advertisement).—A. B. FARN, Dartford: *4th December, 1878.*

Caprification of the sycamore fig—Correction of an error.—In the report of the Proceedings of the Entomological Society of November 6th (*vide ante*, p. 168), it was erroneously stated that the *Sycophaga crassipes*, Westw., was employed for the purpose of "caprification" on the sycamore fig of Egypt, in the same way that the *Blastophagæ* are applied to the domestic fig. No such process is adopted in the former case; but the Arabs, in lieu thereof, make an incision in each fig, either to promote maturity, or to prevent the figs from falling off (as is said to be the effect of caprification); and possibly also to get rid of the *Sycophagæ*, which crowd the interior of these figs, and which avail themselves of such aperture to escape; or otherwise they gnaw a series of small holes round the crown of the fig, which eventually falls in, thus affording a large space for egress. M. Lichtenstein's specimens of *Blastophaga* from Montpellier correspond with the *B. grossorum*, Gr., of Tyrol, the females of which are *jet-black*, with a very short oviduct; whereas, those of the *Cynips Psenes*, L., from Smyrna, are *rufous*, and their oviduct twice the length of the body.—S. S. SAUNDERS, Norwood: *December 17th, 1878.*

The genus Vespa at Worcester.—Of our seven British species, five occur here within the parliamentary borough: *Vespa vulgaris* is, usually, plentiful; *V. germanica* is common; *V. crabro* occurs occasionally; *V. rufa* has occurred to me twice; *V. sylvestris*, several specimens visited a blooming *Scrophularia* in the garden this year. No more species of *Vespa* have been found by me in other parts of the county.—J. E. FLETCHER, Happy Land, Worcester: *November 30th, 1878.*

Pyrus terminalis as a food-plant for insects.—The service-tree is disappointing from an entomological point of view, and seems to nourish only one species peculiar to it. The following list omits species not found by me. It will be seen that both the *Hymenoptera* and most of the *Lepidoptera* are hawthorn-feeders also, and that but few of the species occur in considerable numbers.

Hymenoptera :—*Eriocampa adumbrata* and *Dineura stylata*, of regular occurrence, but uncommon.

Lepidoptera :—*Rumia crataegata*, scarce; *Chimatobia brumata*, rather common; *Swammerdamia pyrella*, two or three found in a season; *Ornix anglicella*, not common; *Lithocollotis corylifoliella*, rather common; *L. torminella*, common; *Nepticula* —— one larva found, mining a nearly straight gallery; *N. ——*, two larvae found, mining a much contorted narrow gallery, crowded together near the foot-stalk.

? *Diptera* :—A few larvae found, minute, mining indifferently either side of the leaf, making a small blotch, very faintly perceptible, of the filmy appearance presented by the mine of *Phylloconistis suffusella*.—ID.

Migration of Aphides.—Dr. Kessler, of Cassel, writes to me, that after reading my "Enquiries about Plant-Lice," he sought for and found, in August, the winged

pupifera of "*Tetraneura ulmi*" carrying back to the elms the "*Sexuata erostrata*." This is a very interesting and long looked for discovery.—J. LICHTENSTEIN, Montpellier: 4th December, 1878.

On the preservation of Aphides.—I had great pleasure in reading the note on Herr Schlechtendal's system of preservation of *Aphides* (p. 164 *ante*), and I think it may also be of interest to make known the method I use. Many years ago, seeing how well some fossil insects had been kept enclosed in amber or resin, I thought it might be possible to imitate this mode of preservation of soft-bodied insects, and I tried to do so by placing an insect on a drop of balsam on a piece of thin covering-glass of appropriate size, covering it closely with another piece of glass, and fixing the whole in a frame made with two pieces of card, but the experiment was not satisfactory.

Two years since I tried talc instead of glass: it is easy to cut with scissors, is nearly as transparent as glass, thinner, and not brittle. Then, by dissolving a bit of resin in spirit of turpentine, I make an artificial amber, a little brown in colour but sufficiently transparent for my purpose, and proceed as follows:—I put a drop on a square piece of talc, place my plant-louse thereon, and move it gently until it is completely immersed, by which time the legs and wings are generally extended in a proper position, then I put another square piece of talc on the top, and press on it a little until the liquid is well expanded and the insect is entirely surrounded. Then I take a frame of card and a similar piece of gummed paper, lay the prepared object on the former, and cover it with the latter, previously moistened, in order to hold all together, and, finally, I write the name, number, and page of my diary on the card, and pin the preparation in my cabinet. The whole proceeding takes only five minutes. The specimens answer perfectly for my biological studies; they have kept well for two years, and I believe will last at least as long as I shall. More care ought of course to be taken with specimens intended for embryological researches, but for a collection this method is quite sufficient. The number, say $\frac{2}{3}$, refers to the 23rd page of my diary, line 5, where I read—"Pemphigus cornicularius, Pass., winged "emigrant pseudogynæ coming out of galls on *Pistacia terebinthus*, 8th Sept., 1878 (sent to J. W. Douglas)." —ID.

[The specimen M. Lichtenstein had the goodness to send is very effective as regards transparency, security, and doubtless also its durability. The compression that results from the nearness of the pieces of talc to each other, would, however, often be detrimental to the structure of the body of an insect, but this might be obviated if the insect were surrounded by a ring of thick card on which, instead of on the body of the insect, the covering piece of talc should rest.—J. W. D.].

The works of the late Professor Stål.—In the Ann. de la Soc. Ent. de France, p. 177 (1878), is an article by Dr. V. Signoret, entitled, "Notice sur la vie et les travaux entomologiques de Carl Stål," and I am indebted to the courtesy of Dr. Signoret for a copy of the paper, which, by giving an enumeration of all the late Professor Stål's entomological writings, will prove most valuable to Hemipterologists and other workers. The work of Stål, as thus catalogued, consists of 87 memoirs, the result of the labours of twenty-five years. His first paper, "Nya Svenska Hemiptera," appeared in 1853; his last publication "Systema Acridiodeorum," bears the date

of the present year. In glancing over this list I have noticed one omission. 63,—“‘Analecta Hemipterologica,’ Berliner entom. Zeitschr. 1866 (not 1867), p. 387 à 393,” is followed by a continuation in the same volume, p. 381 to 394, in which four new genera and ten new species are described. This Dr. Signoret appears to have missed in his labour of love in recording the works of his late friend, whose death is the greatest loss that systematic entomology has sustained for many years.—W. L. DISTANT, 1, Selston Villas, Derwent Grove, East Dulwich : 12th December, 1878.

Review.

HEMIPTERA-HETEROPTERA NEERLANDICA. De inlandsche ware Hemipteren (land—en waterwantzen) beschreven en meerendeels ook afgebeeld door S. C. SNELLEN VON VOLLENHOVEN, J. U. et Ph. nat. Doct. Met 22 Platen, pp. i—xii and 1—368. 8vo. ’sGravenhage, 1878.

This work, of which only 100 copies are printed, is wholly in the Dutch language, and consists of descriptions of all the species of *Hemiptera-Heteroptera* hitherto known to inhabit Holland, arranged in systematic order and illustrated by the author. The genera employed are for the most part of old date, none being adopted since those of Fieber, and not many of them ; which fact will be welcomed by entomologists of conservative and synthetical views, but in even a greater degree be displeasing and very surprising to the school of analytical subdividers. The names will often not be tenable,—some from being improperly applied, e. g., *Cimex*, Linn., *Hydrometra*, Fab. ; some from having been previously used, e. g., *Pachymerus*, Lep. ; some from the heterogeneous character of the species associated under them ; and some for other reasons ; but the student will soon rectify such matters. With regard to species, the descriptions are full and sufficient, but the record of the synonymy is marred by citing (with some exceptions) only authors and their works, giving the page, &c., where the species is described, but not the name under which it is described, although either in generic or specific appellation it often differs from that adopted by our author, which, recent emendations not being noticed, are frequently incorrect. There are no new species. The plates are in excellent style, the figures (comprising 239 species) being, with few exceptions, very characteristic ; and the most of the slight deviations from strict accuracy are pointed out in the text. The work will be of great value to Dutch entomologists, and should incite them to greater efforts in collecting and studying *Hemiptera*, which appear to have been hitherto as much neglected in Holland as in most other parts of Europe. In Britain also the work should be appreciated, on account of the figures of many of our native species, which are not otherwise to be easily met with ; and it should also have a special interest for us as showing the general community so far of the Hemipterous fauna of the two countries, notwithstanding the occurrence in Holland of some species rarely or never found in Britain. The curious thing is that a great many species indigenous to Britain are not found in Holland—the British being about 450 in number, whilst those here denoted are only 280 ; rather an unexpected result, considering the geographical position of Holland on the continent (in the same latitude as our midland counties), and the narrow, insular separation of Britain therefrom. This proportion may, however, be varied when Holland has been better worked by Hemipterists, unless it should prove that its Hemipterous fauna is more limited than that of Britain by geological causes or surface conditions of vegetation and cultivation.

NOTES ON THE BUTTERFLIES OF PORT BAKLAR, TURKEY.

BY JAMES J. WALKER, R.N.

From the 24th February to the 15th August, 1878, H. M. S. "Swiftsure," was stationed in the Gulf of Xeros, at an anchorage near its eastern end, marked on the Admiralty chart as Port Baklar. This port is distant by land about twelve miles from Gallipoli, the road to that town passing through the famous "Lines of Boulair :" and about four miles, across the narrow isthmus of Gallipoli, from the Sea of Marmora. While here, in the "Swiftsure," besides collecting all the *Coleoptera* and *Hemiptera* I could find (which, although abundant enough in early spring, became very scarce after May), I paid a little attention to the *Lepidoptera*. A few hasty notes on the butterflies I observed within five miles of the port—seventy-four species in all—may be not devoid of interest ; and these notes I preface with a brief description of the locality.

The landing-place at Port Baklar is on a sandy beach, backed by a strip of salt marsh, which gradually rises into low clay hills ; on one of these, about two miles inland, stands the large and excessively dirty village of Boulair. Turning to the left on landing, and proceeding towards the head of the Gulf, ten minutes' walking brings one on to a range of low sandstone cliffs, about two miles in length ; much of the land on the top of these cliffs is under cultivation as vineyards, &c., but there is a good and varied growth of flowers and herbage on their face, and in some sheltered chines are a few good-sized elms, poplars, and aspens, with clumps of thorny bushes and great festoons of honeysuckle, bramble, and *Smilax*; trees, though, are generally scarce throughout the district. Inland, the country becomes more hilly and broken, intersected by deep, narrow watercourses, the sides of which bear a good growth of bushes of various kinds : the most conspicuous feature in the scenery being the fine conical tumulus of Lysimachus, locally known as "Mal Tepé," from the summit of which, 790 feet above the sea-level, and more than 100 above the surrounding heights, a superb view of the Sea of Marmora and the Gulf of Xeros can be obtained on a clear day. This tumulus is about five miles from the landing-place, and I rarely went more than half-a-mile beyond it. It is, perhaps, worth noting that all except two (*Argynnис Daphne* and *Pyrgus malvarum*) of the butterflies hereafter mentioned, occurred on the two miles of cliffs.

My entomological solitude was, in July, enlivened by the company of Mr. G. F. Mathew, whose ship (H. M. S. "Cygnet") was then stationed at the Marmora end of the Boulair lines, and with whom I had more than one very pleasant excursion.

In the following notes, the names are those employed in Kirby's "Manual of European Butterflies;" the dates, when not otherwise specified, being those on which I first observed the insect.

Papilio Podalirius, L., April 21st (second brood, June 27th). Very common, flying gracefully round the tops of fruit trees, but easily caught. The green slug-like larva not uncommon on sloe-bushes; it emits a very strong but pleasant scent like ripe pears. *P. Machaon*, L., April 21st (second brood in July); common, in dry places and fallow-fields; varying much in size.

Thaïs cerisyi, G., May 12th; one seen by me on the cliffs, but (having no net with me) I did not catch it. *T. Polyxena*, W. V., May 2nd; one on the cliffs. Mr. G. F. Mathew found the larva commonly, at the end of June, on the Marmora side of the isthmus.

Aporia crataegi, L., May 12th; excessively abundant, both in the larva and perfect states; at the end of May, the butterflies could be seen, towards sunset, settled in companies of 40 to 50 on small twigs, from which, when disturbed, they rose in a perfect cloud, some of the ♀ singularly transparent, and almost scaleless.

Pieris brassicæ, L., June 2nd; rare. *P. rapæ*, L., May 2nd; common. *P. napi*, L., June 26th; rare. *P. Daplidice*, L., April 28th; abundant on the cliffs, and in waste places; fresh broods out in June and August.

Anthocharis Belia, Es., April 16th (second brood, June 6th); common on the cliffs and elsewhere. *A. cardamines*, L., April 12th; abundant in bushy places: smaller than average English specimens.

Leucophasia sinapis, L., April 12th; common throughout the summer, on the cliffs as well as in the ravines. *L. lathyri*, Hübn., April 16th. A "wood-white" butterfly, more slender and delicate-looking than even *sinapis*, and not rare in open places on the cliffs; seems to fit the description of *L. lathyri* in Kirby's "Manual" very well.

Colias Edusa, Fab., April, 14th: abundant, the ab. *Helice* occasional.

Gonepteryx rhamni, L., June 20th; scarce.

Melitaea Cinxia, L., May 2nd; very abundant on the cliffs in the larval and perfect states: some of the ♀ very dark; it was quite over by the end of May. *M. Phœbe*, Fab., May 18th (second brood of smaller specimens on July 23rd); common on the cliffs. *M. didyma*, Es., May 26th (second brood on July 23rd); common on the cliffs: the ♂ a very beautiful and conspicuous insect, from its rich, deep, fulvous-red colour; the ♀ very variable, many specimens being deep

greenish-olive, with the black spots hardly visible. *M. trivia*, W. V., May 26th (second brood on July 4th); common on the cliffs; the larva not rare on species of *Verbascum*.

Argynnис Daphne, W. V., June 26th; not very scarce in a deep ravine beyond Mal Tepé, but very difficult to obtain, as it always kept well out of reach, among the brambles; only about four were caught. *A. Ino*, Es., June 29th; one worn specimen on the cliffs. *A. Lathonia*, L., June 27th; very scarce, on the cliffs. *A. Pandora*, W. V., May 30th; a few examples of this grand fritillary (which is common at Besika Bay) on the cliffs and elsewhere: it is exceedingly shy, and strong on the wing.

Grapta Egea, Er., July 20th; not rare, sunning itself on bare rock-faces on the cliffs. *G. c-album*, L., June 14th; not unfrequent in lanes and bushy places.

Vanessa polychloros, L., June 2nd; common about elms for about three weeks. *V. urticæ*, L., July 19th; very rare. *V. Io*, L., June 23rd; only a few specimens observed. *V. Antiopa*, L., June 20th; not uncommon on the cliffs and elsewhere, for about a fortnight.

Pyrameis Atalanta, L., June 23rd; not very common. *P. cardui*, L., June 14th; excessively abundant everywhere.

Limenitis Camilla, W. V., May 26th; very plentiful along the cliffs, and in the ravines, wherever the honeysuckle grew; a most exquisite insect when in fine condition. Three broods during the summer.

Melanagria Galathea, L., June 6th; abundant: the specimens small and very dark, nearly all the marginal white spots being obliterated. *M. Larissa*, H., June 1st; abundant: varying much in size and colour.

Lasiommata Roxelana, Er., June 2nd; abundant in shady places: a very weak flier, but provokingly fond of ensconcing itself in the most brambly corners, to the great detriment of the net: worn ♀ stragglers occurred as late as August 15th. *L. Megæra*, L., April 14th; abundant.

Hipparchia Proserpina, W. V., July 6th; one specimen only (a ♀) of this fine insect, on a bramble-blossom on the cliffs. *H. Hermione*, L., July 11th; rare on the cliffs. *H. Briseis*, L., June 25th; very common in dry, open, flowery spots, and fond of the blossoms of the wild thyme: active and wary. *H. Semele*, L., June 6th; rare, on the cliffs. *H. statilinus*, Hf., July 16th; very abundant on the cliffs. *H. Janira*, L., May 25th; generally abundant. The var. ? *Eudora*, Esp., frequent in vineyards, &c., on the cliffs: first seen July 17th. *H. Tithonus*, L., July 14th; very rare.

Cœnonympha Pamphilus, L., April 30th; generally abundant.

Thecla ilicis, Es., May 28th; very common about sloe-bushes, and settling on umbelliferous flowers. *T. rubi*, L., April 16th; common in bushy places on the cliffs and elsewhere.

Chrysophanus Thersamon, Es., June 26th; very common in waste places, and partial to umbels. *C. Gordius*, Es., May 28th; not unfrequent on the cliffs: a very shy insect, and difficult to obtain in fine condition. *C. Phleas*, L., April 14th; abundant throughout the summer: most of the specimens very dark and suffused.

Polyommatus bœticus, L., June 9th; common in flowery places, and especially in a field of kidney-beans on the cliffs: a very sharp flier. *P. Telicanus*, Ht., June 27th; abundant, frequenting the flowers of *Lythrum salicaria*. *P. balcanica*, Fr., June 6th; common in dry, flowery places, and by the sides of paths, near Mal Tepé and elsewhere. *P. Tiresias*, Rg., July 5th; scarce and local, confined apparently to one little weedy spot on the cliffs, and invariably in bad condition. *P. Hylas*, W. V., April 18th (second brood, June 6th); common on the cliffs, in dry flowery spots. *P. Medon*, Hf., May 2nd; abundant throughout the summer. *P. Icarus*, Rg., May 2^{ed}; extremely abundant everywhere. *P. Agestor*, G., May 30th; on the cliffs, scarce. *P. Admetus*, Es., June 26th; very common near Mal Tepé and on the cliffs, in grassy places among bushes. *P. Argiolus*, L., April 25th; common in bushy places all the summer. *P. semiargus*, Rg., May 2nd; a few specimens (all ♀) on the cliffs. *P. Cyllarus*, Rg., April 25th; common, and generally distributed, preferring rather damp places.

Pyrgus malvarum, L., June 6th; rare, on Mal Tepé. *P. marrubi*, R., April 16th; common throughout the summer by road-sides and in dry places. *P. lavateræ*, Es., May 16th; not rare in dry, flowery places. *P. sidæ*, Es., May 12th; this pretty skipper was not rare on the cliffs and near Mal Tepé, frequenting flowery, bushy places. *P. malvæ*, L., May 2nd; common in damp spots. *P. phlomidis*, H.-S., May 30th; rare, on the cliffs and in the ravine beyond Mal Tepé. *P. orbifer*, H., May 18th (second brood, July 7th); common, in dry flowery spots on the cliffs.

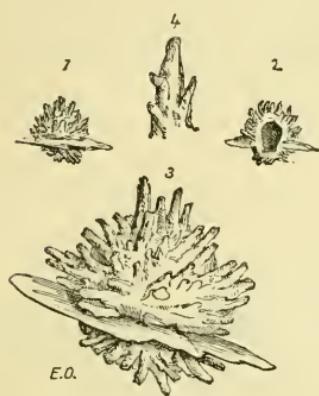
Nisoniades Tages, L., July 31st; rare. *N. Marloyi*, Bd., May 18th second brood, July 18th); not uncommon on the cliffs, and near Mal Tepé, in dry, stony places: conspicuous on the wing by its sooty blackness.

Pamphila Thaumas, Hg., May 26th; generally abundant. *P. Actæon*, Es., June 16th; very common in damp places on the cliffs. *P. sylvanus*, Es., July 14th; rare. *P. nostradamus*, Fab., June 27th; not rare in dry, hot places near the sea, but hard to catch, and almost always in poor condition: varying much in size, some of the ♀ being one and a half inch in extent of wings.

ON AN UNDETERMINED OAK-GALL.

BY ELEANOR A. ORMEROD.

The accompanying figure (1, natural size, 2, section, 3, magnified) is of a small gall, which I found last summer on a fragment of a leaf amongst a number of oak-sprays gathered in the neighbourhood of Isleworth.



The gall is about a quarter of an inch in diameter, irregularly spherical, about two-thirds of it above the upper surface of the leaf thickly beset with spines, for the most part simple, but in some cases branched (as at 4), the colour yellowish-green, with a mixture of rose,

especially on the spines. Internally, the gall is single-chambered, with a hard, woody wall, about a quarter of the diameter of the gall in thickness.

On examination (when the time had passed for probable development of the gall-insect), the only tenant proved to be a whitish larva, dead, and too much distorted for complete identification, but from the presence of strong jaws, legs, and pro-legs, certainly not either dipterous or cynipideous. This larva, whether parasitic or otherwise (being the only fragment of a clue to the nature of the gall-maker), I have placed with the coloured drawing of the gall in the collection of British galls in Museum 2, at the Royal Gardens, Kew, and one portion of the bisected gall is in the hands of Dr. Friedrich Thomas, of Ohrdruf, Gotha (the well-known gall-observer) for reference. The gall was unknown both to him and the English gall-observers who have seen it.

Dr. G. Mayr, in his "Mitteleuropäischen Eichengallen," p. 33, and plate iv, fig. 44, gives a sketch of the gall of "*Cynips gemmea*," Gir., which, except in the spines of the *C. gemmea* being shorter than in the specimen figured above, bears much resemblance to it, but of these he merely says, "I refer, with regard to this doubtful kind, to the description in Dr. Giraud's 'Signalements,' and give only a drawing from a typical specimen in the Imperial Zoological Collection."

My great difficulty in any identification of this very well marked species arises from not noticing it at the time of gathering. I was making a collection of oak-galls, and put the sprays together in a box,

and shortly after, in the course of repeated examinations, saw the torn leaf with this gall, which, consequently, I conjectured was not fully developed when gathered, and grew afterwards to maturity (as occurs with other of our leaf-galls, under favourable circumstances).

Should any of our gall-observers have noticed this species, it would be very interesting to have any information on the subject, which, I trust, will be my excuse for offering a note of what at present seems an imperfect observation.

Spring Grove, Isleworth :

December, 1878.

DESCRIPTION OF A NEW SPECIES OF *PLÆSIORRHINA* (*CETONIIDÆ*), AND A NOTE ON AN APPARENTLY NEW SPECIES OF *CERATORRHINA*, BOTH FROM WEST AFRICA.

BY GEORGE LEWIS.

PLÆSIORRHINA WATKINSIANA, n. s.

Oblonga, nitida, ærea; thoracis marginibus, elytrorum fasciâ rectâ, corpore subitus, femoribusque obscuro-flavis. ♂ et ♀.

Hab. : Isubu.

Long. 13 lin.

I have examined a series of this species, which is allied to *P. cincta*, but is rather longer, of more bronze-green (like *P. plana* in this respect), and differs especially in having the clypeus less clearly punctured, the thorax smoother, with its sides thickly punctured (punctures elongate), not densely strigose ; the scutellum is longer and smoother, the elytra also have smoother striæ, and are less strongly punctured about the shoulders. The fascia is very much narrower than in *P. cincta*.

I have named this species after Mr. W. Watkins, the well-known dealer, from whom my specimens were obtained.

I may also note that I have, from the same source, a series of a *Ceratorrhina*, closely allied to *C. aurata*, but more parallel, with more slender legs and tarsi, and the hind tarsi testaceous. I propose the name of *C. gemina* for it provisionally, feeling sure it will prove a distinct species, but at present I have not been able to examine any number of *C. aurata*.

Hab. : Mongo-ma-Lobah.

I have deposited types of both species in the British Museum.

3, Green Street, Grosvenor Square, W. :

10th January, 1879.

DESCRIPTIONS OF NEW SPECIES OF BRITISH ACULEATE
HYMENOPTERA.

BY EDWARD SAUNDERS, F.L.S.

POMPILUS CONSOBRINUS, Dbm., Hym. Eur., i, p. 79.

Closely allied to *gibbus* in size and general appearance, but easily distinguished from it by the long hairs on the metathorax; the head of this species is also much more densely covered with black hairs, and the 3rd submarginal cell is sub-quadrata, almost as in *P. spinus*.

♂ & ♀ taken by myself at Hayling Island in July; ♀ by J. B. Bridgman, Esq.

P. CHALYBEATUS, Schdte., Kröyer's Nat. Tidskr., i, p. 338, No. 7.

Very closely allied to *gibbus*, but I think clearly distinct. The ♂ may be known at once by the 5th and 6th segments of the body, beneath, being longitudinally depressed, the 5th emarginate and the 6th deeply and somewhat squarely notched; the ♀ differs in having the clypeus very smooth and shining in front, its margin not raised at the sides, and with only two stiff setæ projecting from above the glabrous margin, whereas, in *gibbus*, the apical margin of the clypeus has somewhat large and irregularly scattered punctures, the sides are slightly raised and margined, and there is a series of several long setæ above the bright apical margin. The apical segment of the body is also much more densely covered with black hairs than in *gibbus*, and the 3rd sub-marginal cell is more triangular.

♂ & ♀, Chobham and Southwold. ♂, Worthing.

MIMESA EQUESTRIS, Fab., *apud* Wesmael, *nec* Shuckard.

I have several specimens of a *Mimesa* with a red base to the body, which clearly belong to the species that Wesmael calls *equestris*, Fab. If his views of the synonymy be correct, and he seems to have considered them very carefully, our species that we have hitherto called *equestris* will have to be called in future *Shuckardi*. It may be separated at once by its narrow petiole, which has a carina down its middle (in *Shuckardi* the petiole is wide, flat and rugose); from *bicolor*, which it very closely resembles, it may be known by its shorter petiole, its more strongly punctured thorax, and strongly punctured mesopleuræ; in *bicolor* the puncturing of the mesopleuræ is almost unobservable.

I have taken this species at Southwold and Chobham.

OXYBELUS MANDIBULARIS, Dbm., Hym. Eur., i, p. 514.

Closely allied to *uniglumis*, but with the mandibles flavous at the base and rufescent at the apex, the spots of the body of a more distinct yellow, and the puncturing of the 2nd and following segments much stronger and more scattered; thorax with the tubercles, and a spot on each side of the collar, flavous; the femora are black, with their apices pale, and the front pair is broadly flavous beneath; the tibiae are flavous, more or less reddish at their extremities, the 1st and 2nd pairs with a streak behind, and the 3rd with a broad band near the apex, black; tarsi rufescent.

Mr. J. B. Bridgman first called my attention to this species, and sent me a specimen to examine; I found a similar one amongst my specimens of *uniglumis* taken at Littlehampton in July, 1873, and I have little doubt that they were referable to the above species.

HALICTUS PAUXILLUS, Schenck.

♀ in general appearance and size resembling *minutus*, but differing in the less closely punctured and shorter mesothorax, and the more definitely truncate metathorax, also in having the 1st segment of the body very shining and almost impunctate, such punctures as there are being so fine and scattered as to be scarcely observable; besides these characters there is a faint indication of a small white pubescent spot at the base of the 2nd segment, and all the segments are widely pale at the apex, the body is also of a slightly more regularly oval shape.

I have taken ♀s of this species at Chobham, and have others from Charlwood, Surrey. Dr. Capron has also taken it at Shere, near Guildford, and had himself separated it as a species new to him. I do not know the ♂.

H. LONGICEPS, n. sp.

Allied to *minutus*, but at once distinguishable by its long narrow face, which is considerably longer than wide, the mesothorax is also much more coarsely punctured, and the puncturing of the body is also coarser. The ♂ which I refer to this species has exactly the same shaped face as the ♀, and the puncturing of the thorax and body also corresponds; the head is thickly covered with grey hairs, and the clypeus is whitish at the apex; the antennæ, when the head is laid back, extend beyond the scutellum, and are fulvous beneath; the body is very closely punctured, the tarsi pale, more or less brownish towards the apex.

♀ not uncommon at the blossoms of the heath at Chobham, in June. I have specimens also from Wandsworth, Reigate, and Hastings. ♂ from Reigate and Southwold.

H. BREVICEPS, n. sp.

♀. Another of the *minutus* group, but very distinct from that species or *longiceps*. It has a shorter, rounder head than *minutus*, with a shorter, wider clypeus, the puncturing of the thorax is much coarser, the body and wings are shorter, and the nervures of the latter paler; the basal segment of the body is very smooth and shining at the base, punctured at the apex; the whole insect has a peculiarly thick compact form.

I have taken this species at Chobham and Hayling Island, but have not met with the ♂.

H. PUNCTICOLLIS, n. sp.

Allied to *villosulus*, and with the same shining surface to the thorax, but with

the punctures very much larger, deeper and closer together, giving the thorax a somewhat rugose appearance; the whole insect is also somewhat larger. The ♂ differs from [the ♂ of *vilosulus* in having the puncturing of the thorax close and deep like the ♀, and the antennæ entirely black (not fulvous) beneath, as in that species.

In a lane near Guestling, Hastings, in October. I found the ♀ pretty commonly, but I only found one ♂. I have, however, another ♂, taken somewhere in the vicinity of Hastings.

Holmesdale, Upper Tooting:

January, 1879.

BRITISH HEMIPTERA—ADDITIONAL SPECIES.

BY J. W. DOUGLAS.

HETEROPTERA.

PERITRECHUS GRACILICORNIS.

Peritrechus gracilicornis, Puton, Pet. Nouv. Ent., ii, 117 (1877); Synops. Hém. Hét. de France, 85, 2 (1878).

Very like *P. geniculatus*, Hahn, in form, size, and colour. Differs in the antennæ being very slender throughout, the 2nd and 3rd joints cylindrical, not thickened upwards, and in all the tibiæ and tarsi being testaceous.

It resembles *P. nubilus*, Fall. (*cf.* E. M. M., xi, 267), in the slender antennæ, but they are finer than in that species, more especially with reference to the 3rd joint.

I have an example from Hastings, which I long since put aside as distinct, but forgot it entirely, until reminded of it by Dr. Puton's description of his new species, with which it agrees. Dr. Puton writes that it does not occur in the Departments of Vosges or Nord of France, but is found at Rouen, and that it is not unlikely to inhabit the South of England.

Lygaeus puncticeps, Thoms. (*cf.* E. M. M., xi, 267), is now recognised as *Pachymerus geniculatus*, Hahn (Wanz., i, 68, t. x, fig. 41 [1831]), and this having priority, the specific name will have to be adopted, *vice puncticeps*. Herrich-Schäffer led the way into error in the index to the "Wanzenartigen Insecten," by putting *geniculatus*, Hahn, = *nubilus*, Fall., and so it passed, until Thomson, finding there were two allied species, referred one to *nubilus*, Fall., and named the other *puncticeps*, not knowing or not recognising that it was Hahn's *geniculatus*. *Peritrechus nubilus*, Vollenhoven (Hem.-Hét. Neerlandica, p. 46, pl. 6, fig. 6 [1878]), must be referred to *P. geniculatus*.

Of *P. nubilus*, Fall. (*vide l. c. supra*), Dr. Puton says (*in litt.*), the distinct maculation of the membrane of the elytra, in comparison with the obscure marking in *P. geniculatus* and *P. gracilicornis*, is one of the characters of the species always particularly noticeable.

HOMOPTERA.

DICRANONEURA AUREOLA.

Cicada aureola, Fall., Act. Holm., 25 (1806), Hem. Suec., ii, 39, 22 (1829).

Iassus aureolus, Germ., F. Ins. Eur., 17, 20.

Typhlocyba aureola, H.-Sehf., F. G., 164, 16; Flor, Rhyn. Livl., ii, 391, 6 (1861); Kirschb., Cicad., 182, 11 (1868).

Erythria aureola, J. Sahlb., Not. Fenn., xii, 202, i, pl. ii, fig. 24 (1871).

Notus aureolus, Leth., Hém. Nord., 78, 7 (1874).

Typhlocyba chlorophana, H.-Schf., F. G., 124, 9.

Broad, upper surface pale greenish-yellow.

Head transverse, longest in the middle, rounded in front, scarcely angulate, including the long, not projecting, eyes lunate, wider than the pronotum. *Eyes* concolorous with the head, but partly with a darker shade. *Pronotum* convex, in front following the contour of the concave posterior margin of the head, posteriorly deeply emarginate; posterior angles obliquely truncate, disc in the middle slightly infuscated. *Scutellum* large, posteriorly distinctly acuminate. *Elytra* broad, posteriorly broadly rounded; membrane sub-hyaline, slightly infuscated; nerves straight, parallel, yellow, the second cell shorter than the others. *Wings* slightly infuscated, sub-hyaline; nerves strong, blackish, except at the base of the apical furcation of the third, which is pale, as also is the transverse nervule connecting the fork with the second nerve; the said furcation at its commencement acutely angulate, and then divergent to the intramarginal nerve. *Legs* yellow; posterior tibie outwardly with small black dots at the base of the dark spines; claws of the tarsi blackish. *Abdomen* above, black, the posterior margin of the segments, including the genitalia, broadly yellow, under-side yellow. Length, 1½ line.

Found among heather (*Calluna vulgaris*), in August and September. The species, new to our fauna, was taken last autumn at Forres, by Mr. G. Norman.

In the Verh. z.-b. Ges. Wien, xvi, 507, Fieber founded on this species his genus *Erythria*, but the slight differences in the form of the head and the neuration of the wings from his genus *Notus* (= *Dicranoneura*, Hardy), doubtless induced him subsequently (Kat. Cicad., p. 14) to merge it in the latter.

Dyschirius angustatus in Yorkshire.—Last summer, at Bridlington, Yorkshire, I took four specimens of a *Dyschirius* which I did not know, but which Mr. Champion has determined to be *angustatus* (*jejunus*, Dawson). In company with it I took two or three specimens of *Bledius erraticus*. It is perhaps worthy of remark, that these two beetles were originally found together in the same place (Lanercost, near Newcastle), almost the only locality hitherto recorded in Britain for either.—W. W. FOWLER, Repton, Burton-on-Trent : January, 1879.

Occurrence in Britain of Harpalus (Scybalicus) oblongiusculus, Dej.—I have recently detected a ♀ example of this well-marked species amongst a large number of *Harpalidae* (including *H. sabulicola*, *rotundicollis*, *rupicola*, *puncticollis*, *neglectus*, *rubripes*, *serripes*, *vernalis*, &c.) captured by my friend Mr. J. T. Harris on the Chesil Bank, Weymouth, in May last. *H. oblongiusculus* (apart from its larger size and the somewhat different structure of its male anterior tarsi) may be at once known from *rupicola*, *cordatus*, *puncticollis*, and others of the *Ophonus* section, superficially resembling it, by the shape of the thorax, which is much constricted behind, with the posterior angles very obtuse and almost rounded and the base nearly straight, the very pubescent elytra, &c. This example agrees very well with Dejean's description (Dej. Spec., iv, 198), and also with continental examples of *H. oblongiusculus* in the British Museum and my own collection, except that it is rather smaller in size; the species is tolerably common in the neighbourhood of Paris, Lyons, and other parts of France, and there appears no reason why it should not extend to this country, the locality already producing one or two peculiar species, as *Omophlus armeriae*, *Harpalus vernalis*, &c.—G. C. CHAMPION, 274, Walworth Road, London : January 8th, 1879.

Notes on the Coleoptera of Chobham.—Mr. Edward Saunders (*vide* vol. xiii, p. 113 *ante*) gives a list of *Coleoptera* occurring at Chobham, and remarks that there are few localities better worth visiting to those interested in the *Hymenoptera* and *Hemiptera*. During the past three years, I have occasionally visited the locality—thanks to the kindness of Mr. Saunders, who originally guided me to the spot—and I think the above remark will certainly apply equally well to the *Coleoptera*, the neighbourhood of Chobham having produced to me some of our rarest sand-loving *Geodephaga*. I have visited the locality at various times of the year, but more especially during early spring and late autumn, the latter I find by far the best for the *Geodephaga*. Avoiding, as much as possible, the species recorded by Mr. Saunders, I note the following :—*Anchomenus gracilis*, common in wet *Sphagnum*; *Anisodactylus binotatus*, var. *atricornis*, sparingly in damp places on the heath, but never in company with the type; *Harpalus discoideus* (both sexes), rarely, under stones and at roots of heath, late autumn; *Amara infima*, not uncommon under stones, &c., on bare places on the heath—a species long sought after by me; *A. patricia*, rarely, sand-pits; *Bembidium nigricorne*, rare, sandy places, certainly distinct from *B. lampros* or its var. *velox*, and easily separated from that common species by its shorter and more convex form, entirely black legs and antennæ, &c.; *Acupalpus brunnipes*, rather common in wet places on the heath, apparently always on peat as at Esher; *Parnus striatellus*, Fairm., one or two in wet places; *Myllæna Kraatzii*, *Gymnusa brevicollis*, and *Philonthus signaticornis*, and *nigrita* (common), in wet *Sphagnum*;

Stenus Kiesenwetteri, several, in wet *Sphagnum*, early spring, in a very similar locality to that at Wimbledon, and most of the usual Wimbledon species occurring with it; *S. opticus* and *cinerascens*, wet places; *Aphodius tessulatus* and *testudinarius*, in stercore; *Smicronyx cicur*, on the heath.—ID.: December 2nd, 1878.

On the habits of Apion Hookeri and Thyamis dorsalis.—*Apion Hookeri*: there is a small field at Knowle, Warwickshire, in which I have occasionally found single specimens of this species by sweeping, and in which, this year, I took a goodly number by an accidental discovery of its favourite plant. In looking for larvae of *Cucullia chamomillæ* on the wild chamomile (*Matricaria chamomilla*), I noticed a small black speck upon each of several unopened buds, which, upon closer examination, turned out to be our little friend *A. Hookeri*. Every specimen was deeply absorbed in the business of feeding, having its tiny head buried in the centre of the unopened bud. I did not find a single one on an open flower. As I have never seen this fact previously recorded, I thought it might be worth communicating.

Thyamis dorsalis: during a spring visit to Ventnor this year, I searched for *T. dorsalis* in every conceivable spot, without finding more than two specimens. I determined to procure more if possible, and so set about my task systematically. I shook individual plants into my net, without result, until I became tired. At last, seeing a tuft of common groundsel (*Senecio vulgaris*), I made a stroke at it as a sort of final effort. To my great joy, *T. dorsalis* was discovered at last! Seven individuals fell from that small tuft of groundsel. I tried again in another place, and more *dorsalis*. Seeing a field in which *Senecio* was growing in abundance, I went and swept it, meeting with the most complete success. I afterwards took a friend with me to the same spot, and he bagged *dorsalis* to his heart's content.—W. G. BLATCH, Green Lane, Smallheath, near Birmingham: December 18th, 1878.

[The attachment of these two beetles to the plants respectively specified is familiar to all southern collectors.—EDS.]

On the habitat of Enæcyla pusilla.—This autumn, when sweeping the moist herbage under the trees in Monk's Wood and Crown East Wood, I obtained males of this caddice-fly,—thus bringing its habitat in this country and on the continent into harmony. The situations where I had previously taken the species—near the margins of rivulets—are not really out of agreement with its woodland habitat. The whole district where it occurs was once wooded; and, no doubt, when the country was brought into cultivation, some remnants of the trees and undergrowth would be left by these tiny watercourses, affording the needful conditions (moist moss to feed on, and a situation to hide in, after the feeding time is past, alike free from wet and drought) for the insect's life-course. By two of these rivulets there still exist evident relics of the ancient forest—for instance, at Mudwall, where the rivulet runs by the high road, there is a rather steep bank, of a few yards in extent, clothed with our regular woodland flora, including one or two scrubby oaks; and at this place, which does duty for a field hedge, I recently took a specimen of *Leucophasia sinapis*.—J. E. FLETCHER, Happy Land, Worcester: November 30th, 1878.

On the preservation of Aphides, &c.—Perhaps it may be of interest for you to hear that the method of preserving *Aphides* communicated by M. J. Lichtenstein in Ent. Mo. Mag., xv, 191, has been detailed previously by Mr. F. Petzold, of Vienna, in No. 8 of my Entomologische Nachrichten (1878). Mr. Petzold's method has the

advantage of using a ring of thick card, which you mention in your note. The specimens I saw are very well preserved, though several years old.—F. KATTER, Putbus : *January 10th, 1879.*

Lepidoptera of Yorkshire.—At a meeting of the Entomological section of the Yorkshire Naturalists' Union, held at Leeds, on January 11th, it was decided to publish a list with localities of the *Lepidoptera* of the county of Yorkshire. Its compilation was placed in the hands of Mr. W. Prest, of York, and myself. May I ask, therefore, that every Lepidopterist who has collected in any part of Yorkshire will kindly send list with localities (and, in the case of rare species, *dates*) of all the species noticed, with any notes that may be of use, to me, as early as convenient. I need scarcely say that all such assistance shall be fully acknowledged.—GEO. T. PORRITT, Highroyd House, Huddersfield : *January, 1879.*

On the power of resisting intense cold possessed by Cheimatobia brumata.—At the meeting of the Entomological Society of London, held on the 4th January, 1875 (*vide Ent. Mo. Mag.*, xi, p. 213), I called attention to the appearance of quantities of this moth immediately after the breaking up of a severe frost, and asked if they were recently emerged or not, a point upon which there appeared to be difference of opinion. The question has again occurred to me. Last night witnessed a sudden thaw after three weeks of nearly continuous frost, latterly of great severity, inasmuch as the thermometer registered only 5° Fahrt. (= —15° Centigrade) on the night of the 24th inst. To-night, *C. brumata* is flying to the light as lively as if nothing had occurred. The earth is still frozen, excepting on the surface, so I think it impossible that the moths can have only just emerged from the pupæ, and it follows that they must have existed in the perfect state through the frost ; it would hardly be proper to say "lived," for they could not have been otherwise than frozen. It would be an interesting experiment to test the greatest amount of cold this little moth can bear without losing its power of re-vivifying.—R. McLACHLAN, Lewisham : *26th December, 1878.*

The autumnal pupation of Abraxas grossulariata.—In connection with the note of Mr. Silcock on this subject (p. 150 *ante*), I may record, that in October last, seeing some currant and gooseberry bushes were being defoliated, I beat out of them a great many larvæ of *A. grossulariata*, and was surprised at the great size to which many of these had attained, the others being of the small dimensions usual at that season. To-day, I disturbed one of the larvæ which had escaped my raid, from its retreat under a loose piece of the bark of an apple tree overhanging a currant bush ; it was more than half-an-inch in length, and, although there is hard frost, it was lively, and swung itself down by a silken thread. Close by, under the shelter of a horizontal branch, there are several pupæ alive, suspended in their ordinary slight hammocks.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham : *5th January, 1879.*

Variety of the larvæ of Abraxas grossulariata.—Mr. Porritt, making his statement respecting these larvæ at second hand, has fallen into one or two slight errors that are better corrected at once. First, the larvæ do not occur here, but in

Northumberland, a few miles north of Newcastle-on-Tyne. Second, they are not all sooty-black, but vary in every degree, from the ordinary colour of the larva to uniformly black, even more so than the specimen Mr. Porritt describes. I was rather late in getting them last year, and most of them got into pupa before I could get them sent off. I will endeavour to get a good supply this year, and will be happy to supply any entomologist desiring either to preserve or rear them. I have bred a great many of them, but never got a variety, and the dark specimens are so different from the type, that it scarcely seems as if they came out right, when they produce only the ordinary form of the imago. I do not wonder that Mr. Porritt had no idea what the larvæ were.—JOHN E. ROBSON, Bellerby Terrace, West Hartlepool : January, 1879.

Natural History of Crambus geniculeus.—On September 4th, 1877, my friend, Mr. Wm. R. Jeffrey, kindly sent me a female moth of this species alive in a pill-box, wherein she had laid a few eggs loose, and continued to lay a few more until the 9th, when she died.

The eggs began to hatch on the 28th of the month, one or two at a time, until the end of October, and, as the young larvæ hatched, they were in succession placed on a potted turf of short grass cut from a dry pasture, and I had no further trouble with them through the winter beyond occasionally watering the grass, which continued to look very well up to the commencement of March, 1878, when it began to look sickly and to die off: meanwhile a fresh turf was potted just in time to receive the remaining larvæ, for many had already left their winter quarters in quest of fresh pasture, and I picked up a few while making their escape from the withered turf; amongst which, however, quite enough still remained, crawling actively amongst the threads spun in connection with their silken galleries, now for the most part abandoned; these galleries were close to the earth, and some few partly beneath the surface, crowded with frass at the bottom and made of dirty-brown silk, they were not conspicuous.

By April 13th, the fresh turf had become greatly ravaged and the larvæ were rapidly maturing, two at this early period having already spun up; and a further examination at the end of the month proved them to be full-fed and all spun up, after converting their galleries into cocoons, wherein they remained (while the grass flourished) for the three following months. The moths appeared at intervals, two or three at a time, from the 2nd to 25th of August.

The egg of *geniculeus* is roundish-ovate in shape, the shell rather strongly ribbed and reticulated, and slightly glistening; its colour, when first laid, is yellowish-white, but changes in a few days to salmon colour, afterwards to pinkish-red, and a few hours before hatching again changes to a dark pinkish-grey.

The newly-hatched larva is of a rose-pink colour, with a blackish head and a brown plate on the second segment; and when about the age of five months it is half an inch long, of a very dingy reddish-brown or greyish-brown colour, with blackish head, black plates and spots, altogether darker than it afterwards becomes.

The full grown larva measures five-eighths of an inch in length and is moderately stout in proportion, cylindrical, though tapering a little at the hind segments, the head, full and rounded, is a trifle less than the second segment, which is rather long, each segment after the fourth has a deepish wrinkle across the back. The colour of

the head is shining black with reddish-grey margins to the lobes on the face, a transverse streak of grey just above the mouth, and the papillæ paler grey; the ground colour of the body is reddish-grey or light brownish-grey, darkest on the thoracic segments, paler behind where it is slightly tinged with ochreous, and palest on the belly; on the second segment is a broad semi-lunar black shining plate dorsally divided by a line of grey, a dark dorsal line is visible through the dull skin, which is greatly relieved by the glossy tubercular spots of dark brown, these on the hinder segments are of warmer brown and also the anal plate; of the trapezoidal spots on the back the front pairs are the largest, of a rounded-off squarish shape, the hind pairs smaller and transversely oblong, and in front of the anal plate the two spots are united together; along the side is a longitudinal row of spots, two on a segment, the front one roundish and less dark, the hind one transversely oblong and much paler; the spiracles are very small, round and black, situated on the pale tracheal thread which shows faintly through the skin, beneath these occur other tubercular longitudinally-ovate shining spots, every spot furnished with a fine hair.

On opening a cocoon—which is of an earthy-brown colour, nearly half an inch long, and roundish-oval form—the pupa was found quite lively within it on the 26th August; it was of moderate slenderness, a trifle over three-eighths of an inch in length, the head obtusely pointed downward in front, the thorax convex, the eye, leg, and wing-covers very distinct, and also the antennæ, which take a sweeping curve round the eye to the end of the wing; the abdomen tapering to its rather blunt extremity, the free abdominal segments deeply cut; in colour, light brownish-ochreous, much freckled with darkish brown on head, thorax, and wings, these last being rayed and margined with still darker brown, the eyes and anal segment equally dark brown, the whole surface shining.—WILLIAM BUCKLER, Emsworth: *December 2nd, 1878.*

Note on Gelechia nanella, Hübn.—In Stainton's Manual (ii, p. 342), we read,—“Larva in the flowers of pears.” This statement, I know, was founded on actual observation, but it is only a little bit of the natural history of the species, and not the beginning of it, for the egg could not have been laid in the flowers nor could the larva have continued to feed there, seeing how short a time the flowers last, and where it went afterwards we are not told. I am not in a position to say either; but I can add a little to the ultimate stage of the history. I sought in vain on the trunks of the pear trees for the imago, but last July, on an apple tree, five feet from the ground, I saw a dozen or more sitting close to empty pupa-skins sticking out of crevices in the bark, from which, doubtless, they had but just emerged. I infer that, after the manner of those of their race with the pear-flowers, the larvae of these had fed on the apple-blooms, and that, after feeding up in the young fruit or leaves; they had secreted themselves in the crevices of the bark of the tree, and there changed to pupæ. Perhaps some one has watched the manners of the species throughout its life and can give us the history.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: *December 10th, 1878.*

On a new Swammerdamia, hitherto confounded with cæsiella.—Mr. Barrett sent me, last September, a series of what he reputed two distinct species of *Swammerdamia*, hitherto confused by us as *cæsiella*. I was able, in reply, to inform him that Pro-

fessor Zeller had written a little treatise on this group in the Stettin. ent. Zeitung for 1871, and had differentiated the two species exactly as Mr. Barrett had done. The name *cæsiella* should now be dropped and not retained for either species—one, feeding on hawthorn, being the *oxyacanthella* of Duponchel and Zeller; the other, feeding on sloe, being the *spiniella* of Hübner and Zeller.

Of *Swammerdamia oxyacanthella*, Mr. Barrett writes: "The larva is dark red-brown, with a broad spiracular stripe, which is yellow from the head to near the middle and thence reddish to the extremity, no dorsal line, lives in a white web singly, in an angle of the twigs of hawthorn. Beginning of June. Imago first emerged June 26th, all others being then in the pupa state."

Of *Swammerdamia spiniella* he writes: "The larva reddish-brown, with a broad ill-defined pale dorsal line, and a broad yellowish-white spiracular stripe. The dorsal line in full grown larvæ is not always continued to the anal extremity, but is always very distinct towards the head and anterior segments. On black-thorn, in a similar loose web to the other, but often two or three larvæ in one web. Middle of June to end. Imago emerged July 7th."

Mr. Barrett adds "these distinctions were perfectly constant. I had a fair number of the hawthorn larvæ, and found those of the other species in great abundance on blackthorn. These latter were still feeding when the hawthorn species was in pupa and emerging." He says also, that he "took the hawthorn species in great abundance at Llanberis—only among hawthorn." *Spiniella* "was afterwards plentiful everywhere amongst blackthorn."

In the eleventh volume of the Natural History of the Tineina, I have confused these two species as the *sexes* of my *S. cæsiella*—see p. 70—"Thorax white in the male, grey in the female." *Spiniella* has the thorax white, *oxyacanthella* has it grey.

Zeller, in the Stettin. Ent. Zeitung, 1871, p. 75, points out the differences of the two larvæ, laying stress on the identical characters mentioned by Mr. Barrett.

Everything would therefore seem perfectly clear and distinct, only, unfortunately, I have on several occasions bred what appears to me to be *spiniella* from a hawthorn hedge, in which there is not an atom of sloe. The problem now will be to try and find the two larvæ on this same hedge and to separate them and breed the two distinct species.—H. T. STANTON, Mountsfield, Lewisham : 12th December, 1878.

Occurrence of Swammerdamia nanivora in Russia.—During a recent visit of Baron von Nolcken to this country I was much pleased to see in one of his boxes three specimens of *S. nanivora*, of which I had previously only seen the single specimen, which I bred, in 1870, from a larva found, in Strathglass, by Dr. Buchanan White, on *Betula nana*, and which was briefly noticed in the Entomologists' Annual, 1871, p. 96. Baron von Nolcken captured his specimens, on June 8th, 1878, in Estonia, in a mossy bog, among *Betula nana*. The size and distinctness of the sub-apical costal spot was well seen in the Baron's specimens, and Mr. Ragonot, who had an opportunity of seeing them during von Nolcken's stay in Paris, also noticed this character. It will be remembered, however, that the species was established mainly on the brown larva being so different from the green larva of the ordinary birch feeder, our *griseo-capitella*, the *Heroldella* of German authors.—ID. : January, 1879.

Depressaria atomella, a new species to Britain.—This species now appears on

the scene as if it was only bred last year : whereas, I actually sent specimens to Mr. Stainton in 1861, as it puzzled me. He returned it as *atomella* (the broom-feeder *scopariella* had not then been separated specifically, and both were then mixed under the one name *atomella*), with the remark, that probably the food-plant, *Genista tinctoria*, was the cause of some variation from the usual appearance of the insect. I bred several dozens, and all my correspondents will have it in their cabinets : it may readily be distinguished from the others by the pinkish tinge on the anterior wings, as also by their being much longer than in *D. scopariella*.

Three years ago, I sent specimens to Mr. Barrett, he said, "Are you sure it is *atomella*?" I replied that it was so named by Mr. Stainton. I heard no more about it until September 30th, 1878, when I received a letter from Mr. Barrett, saying, "I am doing my utmost to prove that your *D. atomella* from *Genista tinctoria* is distinct from the species taken in the south of England and hitherto called *atomella*, but do not be too sanguine ; the *Genista-atomella* is much more local than the other. I may add, that I have bred a lot here."

The readers of the January number of the Magazine would imagine that my valued friend Mr. Barrett was the discoverer of the species, whereas, I have been breeding it for the last seventeen years, and I have no doubt that Mr. Stainton's "single specimen of unknown origin" was from me.—J. B. HODGKINSON, 15, Spring Bank, Preston : Jan. 4th, 1879.

Elachista monticolella.—In August, 1872, I took several of this insect at Wether-slack. I thought at the time I could see a difference from *kilmunella*. I sent all my fine series of the latter and several of the former to Mr. Stainton to examine. He replied, "Get more and try and breed it, you may get a new species." I placed them in my cabinet as *E. festucella*, n. sp. Last July I called Mr. Sang's attention to them, he did not know the insect, and remarked that he had some *Elachista* larvæ then feeding, which he did not know. Oddly enough, they came out *E. monticolella*. I sent the same specimens again to Mr. Stainton to overhaul, and this time he returned them as *monticolella*, with a note saying they are probably Edleston's *alpinella*.—ID.

Note on the synonymy of Cicada montana, Scop.—In the "Ann. Soc. Ent. France," 2^e Ser., v, 154—156 (1847), Amyot, in pursuance of his "Système mononymique," changed the names, among others, of four species of *Cicadina* into *Tibicina* (derived from the genus *Tibicen*, Latr.), *Melampsalta*, *Tettigetta* and *Cicadetta*, the latter being in place of *haematoles*, Fab., = *montana*, Scop., our English species. The conversion of specific into generic names, although common with zoologists and botanists, has often been reprehended and would have been specially denounced by Amyot in his case. In his "Meletemata Entomologica," vii, 414—425 (1857), Kolenati restored the specific names which Amyot had set aside, and adopted Amyot's names as sub-generic under the genus *Cicada*, Auct. In his "Hemiptera Africana," iv, 25 (1866), Stål preserved *Tibicen*, Latr., as a distinct genus, but made the other three sub-genera into a genus (p. 42), enlarging the characters thereof accordingly, as he had a perfect right to do ; yet it was not correct to call the genus, as he did, *Melampsalta*, Kol., for it is not only not Kolenati's sub-genus, but is composed of elements which had been by him purposely separated from it under other names. J. Sahlberg, in the "Notiser Fl. et Faun. Fenn.," xiii, 77 (1874), does not

allude to Stål, yet places *montana*, Scop., in a genus which he calls *Melampsalta*, Kol., although Kolenati made the species, as above stated, the type of his sub-genus *Cicadetta*. It has, I know, been held to be obligatory that when genera are amalgamated the name of one of them should be attached to the new combination, but, without admitting this, then at least the genus should have the author's name appended. The true way would be to give a new generic appellation, for the addition to the nomenclature thus created would be a less evil than is the appropriation of a name to things for which it was not intended. Fieber, in his posthumous work, edited by Dr. Puton, "Les Cicadines d'Europe" (1875), gives *Tibicina*, Amyot, Kol., as a distinct genus, but does not advert to *Tibicen*, Latr. and Stål, except in the synonymy of some of the species, ignores Stål and Sahlberg as to the adoption of the genus *Melampsalta*, and uses *Cicadetta* as the name for a genus of 26 species, giving it as equivalent to *Cicadetta*, Kol., and *Melampsalta*, Kol. in part, yet attributing it, as a *genus*, to Amyot. The question for us now is—what generic name is to be adopted for our one British species, viz.: *Cicadetta*, Kol. (= *Cicadetta*, a species, Amyot), *nec* Fieb.; or *Melampsalta*, Stål and J. Sahlb., *nec* Kol.; or *Cicadetta*, Fieb., *nec* Kol.; or a new name. I should vote for Stål's comprehensive genus if it were not for the objection to the false application of the name of Kolenati as its author, and to the wrong principle of using the generic name otherwise than for such species as would be covered by the characters given for the sub-genus by the original author.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: December 1st, 1878.

Review.

A CATALOGUE OF THE BRITISH TENTHREDINIDÆ, by P. CAMERON. Published by the Natural History Society of Glasgow. 8vo, 1878.

Although this does not pretend to be much more than a label list, it is a valuable contribution to the literature of British Insects, there having been no attempt made to give a complete view of the British saw-fly Fauna since the time of Stephens' "Illustrations." The principal synonyms are added. Mr. Cameron admits 324 British species, and of these 76, or nearly one-fourth, belong to the unmanageable and difficult genus *Nematus*. The arrangement is very different to that followed by most of the former writers on the group, and no doubt Mr. Cameron will duly explain the reasons for his system in the Monograph he has in preparation.

Obituary.

Adam White died at Glasgow on the 4th January, aged 62. He was born in Edinburgh on the 29th April, 1817, and was educated at the High School of that city. When quite a lad he came to London with (we believe) no other credentials than a letter of introduction to Dr. Gray of the British Museum, and a strong determination to establish himself in the metropolis in a position suitable to his tastes. He became an official in the Zoological Department of the British Museum in December, 1835, and continued a faithful servant of that institution up to 1863, when mental indisposition necessitated his retirement, on a pension. During this time he published many and varied papers on almost all branches of Entomology, and also a few on Botanical subjects (with some separate works, chiefly of a semi-popular nature). His last scientific communication, before his illness had become established, was to the meeting of the Entomological Society on November 4th, 1861. Tested

in time's crueible, his work has proved to be of far more than ordinary value, and the opinion of those best able to judge on special points, tends to show that, excepting in a few instances in which he worked "to order," he displayed an amount of ability rarely excelled by writers of his time. After a period of confinement, he so far recovered as to be able to add to his pension by literary work, and we find also that two short papers by him appeared in the Proceedings of the Royal Physical Society of Edinburgh, written in 1865 and 1866. But he suffered several relapses; yet even when an inmate of one of the Scottish Asylums, he edited, and largely contributed to, a Jouranal, the contents of which were supplied by patients. By many entomologists of the present generation he was no doubt thought to have long passed from among us. Now that he *is* dead, it is only just that a small tribute be paid to his memory. Those who, during his time of office, had occasion to consult the entomological collection of the British Museum, will bear testimony to the assertion that no one was more willing to go out of his way to oblige, and the writer of this notice cannot express how much he profited, as a *débutant*, by his invariably wise counsel and ready assistance. Mr. White was a Member of the Entomological Society of London from 1839 to 1863, and a Fellow of the Linnean Society from 1846 to 1855.—R. McL.

ENTOMOLOGICAL SOCIETY OF LONDON.—*4th December, 1878.* H. W. BATES, Esq., F.L.S., &c., President, in the Chair.

Mr. T. P. Newman, of 7, York Grove, Peckham, was elected a Member, and Mr. J. J. Walker, of Sheerness, a Subscriber.

Mr. Stainton exhibited a series of *Glyphipteryx schœnicolella*, of which many examples had been taken last summer, near Witherslack, by Mr. Threlfall.

Mr. Wood-Mason remarked on the method of stridulation used by one of the *Rutelidae*.

Professor Westwood exhibited varieties of *Epinephile Tithonus* and *Jurtina (Janira)*, the latter being especially interesting, owing to the left hind-wing having, on the under-side, a streak of the paler colour usual in the ♀, the insect being otherwise ♂. He also exhibited various enlarged coloured diagrams of varieties or monstrosities, including a ♂ *Perrhybris Pyrrha* (in the late Mr. Hewitson's collection) having the under-side of the right hind-wing coloured as in the ♀, which sex mimics a species of *Heliconia*; also diagrams of two already recorded instances of perfect insects with larval heads, viz., *Nymphalis populi* and *Dytiscus marginalis*.

Mr. McLachlan exhibited a series of cases of Brazilian caddis-flies forwarded to him by Dr. Fritz Müller; they included those of several forms of *Hydroptilidae*, a *Setodes* (or ally), and others of uncertain position (in the absence of the perfect insect). One of these latter was composed of pieces of leaves, and was found in the water that collects between the leaves of *Bromeliæ*, in which situation Dr. Müller had also found tadpoles, and also larvae of dragon-flies and other aquatic insects. Mr. Bates had informed him that rain water collects at the bases of the leaves of these plants, and remains there for nine months in the year. Dr. Müller also sent a photograph of some peculiar cases referred by him to the *Hydropsychidæ*, having a funnel-shaped network entrance. Dr. Müller likewise sent drawings of the neurulation of various genera of *Lepidoptera*, in order to show the homology that existed,

in this respect, between these insects and the *Trichoptera*. Mr. McLaehlan called especial attention to the homology between the neuration of *Castnia Ardalus* as delineated by Dr. Müller and that of *Hydropsyche*, which possessed the most complete arrangement of nervures amongst the *Trichoptera*; and Mr. Stainton alluded to the Trichopterous nature of the neuration, and other points of structure, in *Micropteryx*. Professor Westwood was not yet convinced of the existence of these homologies, and suggested that coloured diagrams of the supposed homologising arrangement should be supplied.

The Rev. A. E. Eaton exhibited a piece of "Kungu Cake," used as food by the natives of the district of Lake Nyassa, as recorded by African travellers. It is made of the accumulations of vast quantities of small insects that collect on the shores of the Lake, and which had been supposed to be *Ephemeridae*. The substance is black, amorphous, and tasteless; and, in the piece placed in his hands, he had been unable to detect remains of *Ephemeridae*, but had discovered the wings of minute *Culicidae*.

The Secretary read the Report of the sub-Committee appointed to examine into the question of the destruction of grain at Taganrog by *Anisoplia austriaca*, in which special allusion was made to the enormous swarms of the insect that occurred in the province of Banate in 1867, as recorded by Pastor Orth and Herr von Pelikan in the Verhand. zool.-bot. Gesellschaft in Wien for that year. It was estimated that 6,720,000 of the beetles were destroyed at the time, 100 men having been employed for that purpose. In the report it was suggested that rotation of crops and the preservation of insectivorous birds should be attended to; and that the only occasional appearance of the insect in extraordinary numbers may be due to the simultaneous development of perfect beetles that might have remained, and accumulated, in the pupal stage, for a series of years.

With regard to the subject of insects used as food, Mr. Distant said he had been informed that *Euthesia fullo*, a common eastern Hemipterous insect, was largely eaten by the natives of the Naga Hills. Mr. Meldola called attention to the chemical composition of the bodies of insects, and showed that analysis proved them to contain nitrogen, and Mr. W. Cole had also detected phosphoric acid.

Mr. C. O. Waterhouse sent for exhibition a living specimen of an undetermined species of *Calandridae*, found in an orchid house at Windsor.

Mr. A. G. Butler communicated a paper on a collection of *Lepidoptera* from Cahar, N. E. India.

15th January, 1879. H. W. BATES, Esq., F.L.S., &c., in the Chair. Anniversary Meeting.

The following were elected Members of the Council for 1879, viz.: H. W. Bates, F.L.S., W. L. Distant, J. W. Dunning, M.A., F.L.S., Rev. A. E. Eaton, M.A., E. A. Fitch, F. Grut, F.L.S., Sir J. Lubbock, Bart., M.P., V.P.R.S., &c., R. Meldola, F.C.S., E. Saunders, F.L.S., F. Smith, S. Stevens, F.L.S., J. J. Weir, F.L.S., and Professor J. Wood-Mason, F.G.S.

Subsequently the following Officers were elected, viz.: Sir J. Lubbock, President; J. J. Weir, Treasurer; F. Grut, Librarian; R. Meldola and W. L. Distant, Secretaries.

The retiring President read an Address, which was ordered to be printed; and the Meeting terminated with the usual votes of thanks to him, and to the other Officers of the Society.

LIST OF THE HEMIPTERA OF NEW ZEALAND.

BY F. BUCHANAN WHITE, M.D., F.L.S.

(Concluded from page 161).

HOMOPTERA.

Div. CICADARIA.

In his list of New Zealand insects, Prof. Hutton enumerates 21 species of *Homoptera*, viz., 12 species of *Cicada*, 7 of *Cixius*, and 2 of *Ptyelus*. To these fall to be added 2 species recorded elsewhere, making in all 23 supposed species. Four of the names, however, are merely synonyms, which reduces the list to 19. In the following list I am able to add 8, making a total of 27 New Zealand *Cicadaria*. This is just half the number of *Heteroptera*, which is, curiously enough, the same proportion that the British *Cicadaria* bear to the British *Heteroptera*. In New Zealand, however, there must be many additional species of both sub-orders yet to be discovered.

Fam. CICADIDÆ.

Twelve *Cicadæ* have been recorded, but Stål has shown that 4 of these are identical with others. All belong to the genus *Melampsalta*, Kol., Stål, and 5 of them were described by the late Mr. Walker. I have before me 8 or 9 New Zealand species of *Melampsalta*, but, with one or two exceptions, I cannot identify any of them from Walker's descriptions, though I have no doubt they include many of his species. Though of opinion that species which are so described that they cannot be identified without an examination of the types, ought not to stand, I am unwilling to add to the synonymy by giving new names to the species before me, and will, therefore, in the meantime, merely quote the Walkerian (and other) species with their synonyms as pointed out by Stål.

55. *Melampsalta cingulata* (= *Tettigonia cingulata*, F., *Cicada flexicosta*, Stål, *C. zealandica*, Boisd., *C. indivulsa*, Wlk.).

Mr. Wakefield. Found also in Australia.

56. *M. scutellaris* (= *Cicada scutellaris*, Wlk., *C. sericea*, Wlk.).

57. *M. muta* (= *Tettigonia muta*, F., *Cicada Cutora*, Wlk., *C. ochrina*, Wlk.).

A series of specimens from Messrs. Hutton and Wakefield seem to belong to this species.

58. *M. Telxiope* (= *Cicada Telxiope*, Wlk., *C. duplex*, Wlk., *C. arche*, Wlk.).

Found also in Australia.

59. *M. cincta* (= *Cicada cincta*, Wlk.).

Four specimens from Mr. Wakefield may belong to this.

60. *M. ? nervosa* (= *Cicada nervosa*, Wlk.).

I do not know whether this is a *Melampsalta*, but the probability is that it, like all the species of the family I have seen, belongs to that genus.

61. *M. angusta* (= *Cicada angusta*, Wlk., *C. rosea*, Wlk., *C. bilineata*, Wlk.).

62. *M. cruentata* (= *Tettigonia cruentata*, F.).

63. *M. Mangu*, n. sp.

Blaek, with long black and grey hairs, and finer pale pubescence. Markings red, but many of them often obsolete; when present, they are—the sides of the frons, the sides of the vertex above the antennæ, and a spot at the base of the vertex, a broken line on all the margins of the pronotum and a short central line on its disc, a short line on each side of the disc of the scutellum and a cross-shaped mark at the apex of the same part, the hind margins of the abdominal segments above very narrowly, and some more distinct spots on the sides of the last (δ) or last two (φ) segments. These markings are often more or less absent or are (in some specimens) yellow instead of red (faded colour?). Under-side pale, with a rosy tinge. Legs pale rosy, coxae with large black spots; trochanters and femora with black streaks; tibiae with black streaks and rings; tarsi piceous towards the apex; front femora with three black spines below. Tegmina and wings vitreous; costa and veins testaceous, more or less tinged with red, black beyond the middle.

δ . Opercula small, whitish, transverse, broadly rounded at the apex.

δ φ . Length, 17—20; exp. tegm. 32—40 mm.

Four specimens from Mr. Wakefield, labelled "On rocks at Porter's Pass, Canterbury, about 3500 feet."

I have another species much resembling *M. Mangu*, but larger and almost altogether black.

Fam. CERCOPINA.

Sub-Fam. APHROPHORIDÆ.

64. *Aphrophora jactator*, n. sp.

Ovate-oblong, fuscous-brown, with a faint greyish-green tinge, shining, almost glabrous, coarsely and thickly punctate; tegmina rather obscurely variegated with darker brown, and with two pale blotches on the front margin, the first of which is somewhat oblong, and the second, and larger, triangular; between the pale blotches is an irregular brown triangle, whose apex separates them. Legs with obscure fuscous markings. Vertex rounded in front, breadth nearly double the length;

pronotum with an obtusely angular front margin, much broader than the head with the eyes, disc more remotely punctured.

Length, ♂, 10, ♀, 11—12; breadth, ♂, 4 $\frac{1}{2}$, ♀, 5 mm.

Captain Broun (many specimens). Not unlike, in some respects, *A. alni* in colour and markings. The structure, however (especially the ♂ genitalia), is quite different.

65. *Philænus fingens* (= *Ptyelus fingens*, Wlk.).

Several specimens from Captain Broun. Markings often faint.

66. *P. subvirescens* (= *Ptyelus subvirescens*, Butler, *Aphrophora subvirescens*, A. White, MS.).

Captain Broun (one specimen). Mr. Butler suggests that *P. fingens* is possibly a variety of this. Having but a single example I can scarcely judge (nor can I dissect it), but my impression is that they are distinct. Should they prove to be the same, *fingens* has the priority.

67. *P. trimaculatus* (= *Ptyelus trimaculatus*, Butler, *Aphrophora trimaculatus*, A. White, MS.).

Messrs. Broun, Hutton, and Wakefield. Common and variable.

Fam. JASSINA.

Sub-Fam. JASSIDÆ.

68. *Dorydium Westwoodi*, n. sp.

Pale yellowish-ochreous; head with a very slight tinge of brown; tarsi claws pale brown. Head and thorax finely punctate; tegmina coarsely reticulate-punctate or cibose between the veins. One example has a brown intramarginal streak from the base to the apex of the tegmina.

Length, 14; breadth at base of tegmina, 2; length of head, 4 mm.

Three specimens from Mr. Wakefield, with the ticket "Found by Mr. Fereday near Christchurch." This curious species strongly resembles the seed of one of the larger grasses.

69. *Athysanus negatus*, n. sp.

I have not enough material to describe this species at length. It is pale rufous-brown, with no distinct markings; some indistinct spots on the pronotum, spines of the hind tibiae, and apex of the tarsi, rather darker, as well as the veins (♀) or some minute specks near the veins (♂) of the tegmina. ♂, back of abdomen black, apical segments testaceous; ♀, back of abdomen pale brown.

♂ ♀. Length, 5 mm.

Prof. Hutton (three specimens—two fragmentary).

Fam. FULGORINA.

Sub-Fam. CIXIIDÆ.

Mr. Walker described 7 New Zealand species as belonging to the

genus *Cixius*. Of these, one certainly, and another probably, belong to *Oliarus*; a third is, I think, the type of a new genus; and the remaining four I know nothing about, but one or more of them probably do not belong to the genus *Cixius*.

70. *Oliarus oppositus* (= *Cixius oppositus*, Wlk.).

71. *O. marginalis* (= *Cixius marginalis*, Wlk.).

Some specimens from Mr. Wakefield agree pretty well with Mr. Walker's description.

AKA, n. g.

Body oblong. Head narrower than the pronotum, vertex obtusely prominent between the eyes, hind margin angularly sinuate, disc with a central longitudinal keel, and on each side a stronger one, which meet each other and the central one at the front margin; in front of these are three oval pits, of which the central one is much the smallest. Frons and clypeus strongly elliptic, with raised side margins and central keel, which, on the half of the frons nearest the vertex, becomes forked. Antennæ small, 2nd joint globose. Eyes emarginate below. Ocelli apparently two. Pronotum with a strong central keel, and one on each side, which, arising from the front margin near the central keel, makes a double curve and ends near the hind angle. Scutellum with a central keel vanishing before the apex, and an oblique curved one on each side. Tegmina rather clasping the body, costal margin slightly rounded. Hind tibiæ unarmed.

Allied to *Myndus*, Stål. From the Maori "Aka," angular. Type *Cixius finitimus*, Wlk.

72. *Aka finitima* (= *Cixius finitimus*, Wlk.).

Mr. Wakefield (four specimens).

73. *Cixius*, sp.?

Three specimens from Professor Hutton, but not in condition to be described.

74. *Cixius punctimargo*, Wlk.

75. *C. interior*, Wlk.

76. *C. aspilus*, Wlk. Probably not a *Cixius*.

77. *C. rufifrons*, Wlk.

SEMO, *n. g.*

Body oblong. Head rather wider than the pronotum, distinctly roundly prominent between the eyes. Vertex transversely oblong, crossed by two somewhat curved transverse keels, in front of the middle of the anterior of which is a small depression at the base of the frons; hind margin straight. Frons trapezoidal, broader at the apex, where its produced sides clasp the clypeus on each side; sides sharply margined; disc very convex. Clypeus exceedingly convex, almost semi-globose, with sharply margined sides. Eyes somewhat sinuate below. Ocelli two. Antennæ inserted below the eyes, short, 1st joint obscure, 2nd globose. Pronotum short, with two point-like depressions behind the centre of the front margin on each side of the obscure longitudinal keel; hind margin angularly sinuate. Scutellum with three keels, the central faint and almost or quite vanishing beyond the middle. Tegmina narrow. Hind tibiae with three teeth.

Somewhat allied to *Duilius*, Stål.

78. *Semo clypeatus*, *n. sp.*

Pale ochreous-brown. Head (except the keels of the vertex, sides of the frons, a longitudinal central line on the frons, and the antennæ), scutellum (except the side margins), apex of the tarsi, and abdomen (except the genitalia), more or less piecous or piecous-black. ♂ ♀. Length, 4–5; breadth, 2 mm.

Professor Hutton (four examples).

*Sub-Fam. ACHILIDÆ.*AGANDECCA, *n. g.*

Body oblong. Head narrower than the pronotum; vertex transverse, much broader than long, very obtusely angularly prominent between the eyes, disc hollowed, with an obsolete central longitudinal keel, strongly transversely keeled in front, and with two triangular pits between the keel and the frons, hind margin angularly sinuate. Frons and clypeus narrowly elliptic, with central keel and keeled margins; base and apex of frons equally broad. Eyes rounded, scarcely emarginate below. Antennæ short, 2nd joint sub-globose. Pronotum very short, with central keel and oblique curved side keels, which do not reach the deeply angularly-sinuate hind margin. Scutellum nearly equally long and broad, with three straight keels. Tegmina rounded at the end; radial and outer ulnar veins joined near the base, the radial and inner ulnar forked before the middle of the tegmina; several long and irregular cells before the rather numerous apical cells. Hind tibiae with one small spine and the usual apical coronet.

Allied to *Messeis*, Stål. The formation of the head and thorax is much like that of *Cixius*.

79. *Agandecca annectens*, n. sp.

Pronotum rufous-testaceous, with paler keels; head yellowish-testaceous, darker between the keels; tegmina smoky-yellowish, with the veins marked here and there with whitish; veins near the inner angle of the clavus sometimes conspicuously pale, commissure of clavus from the middle to the apex piceous; legs brownish-testaceous.

♂. Length, 5; breadth, 2 mm.

Professor Hutton (several specimens).

Sub-Fam. RICANIIDÆ.

80. *Ricania australis* (= *Pochazia australis*, Wlk.).

Taken by Mr. Lawson upon dahlia (Mr. W. L. Distant, Trans. Ent. Soc. Lond., 1878, Proceed., p. xxxix).

Sub-Fam. DELPHACIDÆ.

CONA, n. g.

Body oblong-oval. Head much narrower than the pronotum; vertex sub-quadrata, less than half the breadth of an eye, hind margin between the eyes, which extend for more than half their length behind it, straight; disc with a somewhat A-shaped keel (decidedly narrowed beyond the cross of the A), and a weaker longitudinal keel which is sometimes obsolete. Frons elliptic, truncate at each end, sides sharply keeled, centre with two (approximate) longitudinal keels gradually meeting at base and apex. Clypeus with keeled margins and convex or obtusely keeled disc. Antennæ long, equal in length to three-fourths of the clypeus and frons taken together, slightly compressed, 1st joint widened upwards, 2nd joint a little longer than the 1st. Pronotum short, more than four times broader than long, front margin truncate behind the vertex; with a central longitudinal keel, and a keel on each side which, starting from the centre of the front margin, goes in a double curve to the hind angle. Scutellum with five keels, the outer one on each side more oblique, the intermediate sometimes rather obsolete. Tegmina in macropterous (♂ and ♀) examples a little longer than the abdomen, rounded at the apex; clavus with two veins which unite beyond the middle, the single vein thus formed ending on the inner margin before the apex; corium with three veins united near the base, the outer vein forked before, and the inner beyond, the middle; six long apical cells; neuration sometimes, but rarely, variable. In brachypterous (♀) individuals, the tegmina are about half the length of the abdomen, truncale rounded at the apex, with the clavus and corium connate, and the neuration rather confused. Wings in macropterous examples about three-fourths the length of the abdomen.

81. *Cona cælata*, n. sp.

Dirty pale brown, more or less spotted and blotched with darker brown. An-

tennæ, second joint with one or two rings (sometimes obsolete, sometimes covering nearly all the joint); legs with rings, spots and streaks fuscous-brown. Tegmina very variable in colour, often hyaline or fuscous-hyaline, with the veins spotted with piceous-brown, sometimes much clouded with pale or dark piceous-brown, and the veins altogether dark; generally, but not invariably, the areas of the apical cells are clear hyaline. Back of abdomen paler in the centre, the sides with pale and dark streaks. Head, pronotum, scutellum, and hind margin of the abdominal segments, sometimes with red streaks. In macropterous examples, the central keels of the pronotum and scutellum, and the keels of the frons, are generally bright red; legs rarely tinged with red.

♂ ♀. Length, 4½–6; breadth, 3 mm.

Captain Broun (many specimens). Very variable in the markings. In brachypterous specimens, the antennæ are shorter and thicker than in macropterous.

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In the list now concluded, I have not thought it necessary to indicate specially the localities whence the insects came; in the first place, because, with our as yet limited knowledge, such details would be of little value, and, secondly and chiefly, because I have little or nothing to tell.

In a broad way, I may say that Mr. Wakefield's specimens came principally from Wellington or Canterbury; Captain Broun's from Auckland; and Professor Hutton's from Otago.

Most of the species previously recorded have no special indication of locality, but some of them, such as *Cilliphara imperialis*, must have, I suspect, been found in the northern part of Auckland, where alone, it is likely from their sub-tropical character, they would find a suitable habitat. Further investigations will, however, doubtless throw light upon this point.

What the total number of the New Zealand *Hemiptera* may prove to be, it would be useless to attempt to guess; but if the investigations of the three gentlemen to whom I have been so much indebted have resulted in nearly doubling the number previously recorded, and that without any special attention on their part to the *Hemiptera*, more extended researches ought, it may be expected, not perhaps to again double the list, but, at any rate, to considerably increase it.

In conclusion, I may say, that I will, at all times, be happy to examine and name any specimens of New Zealand *Hemiptera* that may be entrusted to me.

Perth: 1878.

ON THE PUPATION OF THE NYMPHALIDÆ.

BY W. H. EDWARDS.

(Extracted from the "Canadian Entomologist," December, 1878).

[The author commences by reprinting Dr. Osborne's paper in the Entomologist's Monthly Magazine for October, 1878 (vol. xv, pp. 59-61), and goes on to say:—]

As soon as I read this communication, I sought for butterflies of this family, and soon took females of *Graptia interrogationis* and *Danaïs Archippus*. The former laid many eggs in a bag, tied over a stem of hop, and the other a few on *Asclepias*. The larvæ from both lots have finished their pupation, and I have carefully watched the process. Dr. Osborne's statement is correct. The chrysalis of *Graptia* is sup-

ported by a narrow, white membrane or ligament, about one-tenth inch long, one end of which is pointed and fastened to the inner side of the larval skin near the extremity thereof, and the other is forked and fastened to the ends of two curved, slightly raised, longitudinal ridges, which are to be found on the ventral side of the last segment. These ends are at the anterior edge of the segment. They project sufficiently to form hooks, as it were, which hold the membrane firmly. In *Archippus* the ligament is much larger and stronger than in *Grapta*. It is broad, black, and deeply forked where it attaches to the segment. In this species, instead of low ridges, there are two rows of shining black processes, three in each row, and the outer pair are knobbed, and a little pointed anteriorly. On these outer knobs, the ligament is fastened. I do not believe that the chrysalis of *Grapta* ever seizes the loosened skin *for a support*—at any rate any support that such a hold could furnish is not essential, for I have repeatedly raised the skin with forceps entirely off the abdominal segments on the ventral side, so as to discover the distended membrane, and in several cases have cut the skin off just below the membrane at the instant the effort was beginning, for freeing the tail. In these last cases the chrysalids were seen to be connected with the skin by the membrane only, and the membrane is the lever by which the chrysalis climbs to the silk. There could not possibly have been any other support.

Réaumur's account of the pupation of the *Suspensi* was drawn up after very extended observations on larvae of several species of *Tanessa* principally (he says, several hundred caterpillars), and is given at great length. Similar statements are given by subsequent authors, often based on direct observation, but so far as I can discover, one and all describe the process as it would appear to a looker on. I noticed in Westwood and Humphrey's British Butterflies, p. 54, what is doubtless an inadvertent error:—"The chrysalis carefully withdraws its tail from the skin, *seizing hold of the outside* of the latter by pressing two of the rings of its body together, and enclosing between part of the old skin. *By repeating this process*, it at length pushes its tail upwards, till it reaches the silken button," &c. For *outside*, read *inside*.

Dr. Harris, Ins., 2nd ed., p. 282, gives an account of the transformation of *Archippus* with much detail.

"By bending together two of these rings near the middle of the body, the chrysalis seizes, in the crevice between them, *a portion of the empty skin and clings to it so as to support itself* while it withdraws its tail from the remainder of the skin. It is now wholly out of the skin, *to which it hangs suspended by nipping together the rings if its*

body; but as the chrysalis is much shorter than the caterpillar, *it is yet at some distance from the tuft of silk, to which it must climb. To do this, it extends the rings of its body as far apart as possible, then, bending together two of them above those by which it is suspended, it catches hold of the skin higher up, at the same time letting go below, and by repeating this process with different rings in succession, it at length reaches the tuft,*" &c. "We may see the whole process in the caterpillars of *Archippus*," &c. Dr. Harris drew his description from nature, and was too careful an observer to commit himself in a case like this beyond what he thought he clearly saw.

In Butterflies of N. America, vol. i, I gave an account of the transformation of *Grapta comma*, taken strictly from my own observations. In this I find no mention of the climbing by the aid of the successive pairs of segments, described by Dr. Harris as taking place in *Archippus*, but otherwise my statement agrees substantially with his. I had previously read of the transformations of butterflies in various works, and so was doubtless prepared to receive the common version of the mode, but I described precisely what I thought I saw. I have heretofore repeatedly witnessed this process in various genera; but I find by recent experience that it is impossible with a single observation, or by half a dozen, to determine all the details, and only by watching one point in one example and another in the next, and verifying each again and again, could I feel sure that I had made myself acquainted with this part of the history of a single species.¹ I have watched sixteen transformations of *interrogationis* and two of *Archippus* during the last few days, and will describe at length what I have seen. It may serve to show how the error spoken of originated and has been perpetuated by so many observers, and for more than a century, with no suspicion of wrong till Dr. Osborne made his discovery.² In *interrogationis* the period of suspension varies from six to twenty-four hours, according to the state of the weather and degree of warmth. My first observations were made under a clear sky, and mercury about 80° Fahr., in the middle of the day; the latter ones in cool and rainy weather, with cold nights. The larva of this species is suspended from a button of pink silk. At first it holds itself in a circular shape, its head turned in against segments 11 and 12, the lowest part of the curve being at 7th. After two hours, more or less (in warm weather), the curve is relaxed, and the attitude resembles figure 6, the dorsum on last segments being convex, the head turned in opposite 8 and 9, the lowest part of the curve being at 6th. Two or three hours later the body hangs straight, and the four anterior segments are bent almost

at a right angle to the others. The head continues to droop, and by this it is made certain that the final change approaches. Presently there is a twitching of the spines, first confined to one segment, but extending soon over the whole body, and changing into a waving motion. This is accompanied by a twisting of the segments beneath the skin, which increases in strength and continues some minutes. Two or three times a spasm of contraction comes on, by which the body is lifted up into the last one or two segments and let fall again. Then a creeping movement under the skin commences, extending from the posterior segments forward, and seems to break the skin loose from the body, and one wave after another runs along till the distended skin on the anterior segments bursts.  This always takes place on the middle of the dorsum, on the 3rd segment, and the mesonotum of the chrysalis is forced through, splitting the skin up to the head (or first segment), and sometimes splitting the skin of the head also. By the continued creeping movement, the body is slowly forced through the rent. As this is oblique, the ventral side of the chrysalis is fully three segments behind the dorsal in the divesting, the skin on the anterior segments fitting tight as a glove, although it is loosening and packing in a mass about the anal feet.  In about ninety seconds from the time of the rupture the skin on the dorsal side has been pushed back to 10, and the effort begins for the extrication of the tail of the chrysalis from the caterpillar skin. This tail must be withdrawn and fastened outside the skin to the same button of silk which the caterpillar clung to. At this instant the skin covers the ventral side of the chrysalis to 8th segment, but is moving up constantly, and as the chrysalis bends the posterior half of the abdomen sharply back to force the tail out of the sheath, the segments are pinched together and there is at the same time a pinching in of the skin. But there is no seizing of the *outside* of the skin; if there were no other reason, the spines would make this impossible. The tail now free, the chrysalis straightens itself up, and swinging on the ligament, lifts itself towards the silk, the last segment describing an arc of a circle of which the ligament is the radius, and the tail, which at the same instant is curved forward, is brought round and over the considerable packet of the old skin and with precision strikes the silk. An observer, knowing nothing of the ligament, seeing only the violent contortions, the abdominal segments expanding and contracting to the utmost, while at the same time the chrysalis steadily rises toward the silk, naturally concludes that the one movement is the direct result of the other. When I lifted the flap of skin entirely clear of the struggling segments and cut it off a

little below the tail, the bendings and contortions were not interrupted by my interference, nor was the effort to reach the silk in the least abated. Held firm by the stretched ligament, which was in plain view, the body rose, and the tail, which had got well outside the padded skin, and was before complete extrication bent backward, now bent forward, and by the upward swing was brought exactly to the silk. Several times as I was lifting, the skin and chrysalis together were dislodged, and fell into my hand. Then by drawing the skin back the ligament was exposed and it was distinctly seen that it was attached to the chrysalis by the pointed ends of the ridges before mentioned, and that there was no other connection between skin and chrysalis.))

After the hooklets of the tail are caught in the silk, the chrysalis whirls one way and then the other, the last segments actively twisting and screwing in order to fasten the hooklets more securely. This movement does not seem to be made for the purpose of rupturing the membrane or for getting rid of the old skin especially, for I noticed that whenever the skin parted and fell just as the silk was grasped, as did sometimes happen, the same whirling, and all the movements usually seen, followed. It is a wonderful exhibition, and the last act is beyond my comprehension,—namely, the rising of the chrysalis with no external aid save what comes from the ligament. I can only state the fact.

When the rupture of the skin of the caterpillar of *interrogationis* first takes place, and the mesonotum is made to appear, this organ is pressed down and flattened, but in a short time, and before the transformation is completed, it swells out, and becomes nearly as large and as prominent as it ever will be; the head case is pushed forward on the thorax and jammed in, so that on first issuing, the chrysalis is truncated at the anterior side of the mesonotum. When the skin is thrown off, the chrysalis hangs limp and distended, like a long cone, with no prominences except the mesonotum. Presently the segments shorten and become broader, the ends of the wing cases creep nearer the tail, the tuberculated points on the abdomen swell out, the head case pushes up, with its palpi cases, and in course of half an hour the final and characteristic shape is assumed. The change in these respects is nothing like so striking in *Grapta* as in *Limenitis*, where the chrysalis is greatly hunched and displays a prodigious mesonotum. In this case the chrysalis is at first as limp and shapeless as in *Grapta*, but reaches its proper form in the same way; the segments contracting and the processes growing and maturing as one looks at them.

The transformation of *Archippus* presented a close resemblance,

but some differences. When first suspended, which it did from a pad of white silk, the larva took the attitude of an oval, the head brought near 12th segment; a few hours later that of figure 6; and finally of a right angle, the head continuing to droop. During the last two hours there was a constant move of the head, which seemed to rub itself on the anterior legs, and several times and up to within one-half hour of the change, the larva doubled itself up and brought its head to the button of silk, as if greatly annoyed at something there. This I noticed in both the larvæ observed. Finally, the body was contracted and lifted up as in *Grapta*, and a slight creeping movement was seen, but there were no twitchings or twistings as in *Grapta*. The creeping became stronger, advancing in waves, and the strain on the anterior segments became severe, till the skin burst on the dorsal line of 2, 3, and 4, and the top of the head also was rent. The slit was oblique, and the ventral side was covered three segments beyond the dorsal. When the body was exposed on dorsum at 10 and 11, the ventral side was covered at 8 and 9, and the skin fitted tight, so that as the body bent back in the movement to free the tail the skin was pinched between the segments. The struggle became violent, the segments all along the abdomen stretching to the utmost, and then contracting forcibly, *one telescoping into the next; and in this the skin followed the segment, and was drawn in and held for an instant.* As this movement ran through the segments successively, the skin was pinched at one joint after another, and the chrysalis was evidently rising towards the silk as described by Dr. Harris. Unfortunately I was able to see the transformation in but two examples of *Archippus*. In the first one, I set myself to see how the whole change must have appeared to Dr. Harris, as he had described it minutely. In the next one I lifted the flap of skin till I saw the ligament. In so doing the whole thing unhooked from the silk, and as it lay in my hand I pulled back the skin and was able to look at the ligament with a lens. I also lifted the chrysalis by the skin, and the ligament did not part. It did so afterwards only by a strenuous effort of the chrysalis, and then remained distended, with its forks in shape. The nature of this organ must be determined by further observations. I had sent to a friend, who is an experienced microscopist as well as entomologist, a chrysalis of *interrogationis* which had been dropped in glycerine at the crisis of pupation, and he writes me thus:—"I have examined the preparation, which was in good condition except the separation of the chrysalis from the skin. I see what you call the two ridges, which exist also in the caterpillar and have between them the anus in both caterpillar and chrysalis.

Further, I find connected with the skin the whole rectum, and a little more of the intestinal canal, drawn out in pupation. A little below I see a substance which I suppose to be your membrane, about as long as the rectum, and structureless. I would suppose that the membrane belonged to the rectum and perhaps the external cover of it, if you had not written that the membrane in *Archippus* is black. I took a caterpillar (in spirits) of this species, and opening it, found that the rectum was white, or at least light colored. One should make a section of the caterpillar of *Archippus* just after suspension to discover where this black membrane comes from. The use and purpose of the knobs and bars in the chrysalids is doubtless this: in these organs are built up and developed the anal appendages of the imago."

Coalburgh, U. S. A.: *September, 1878.*

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 5.

Palaeozoic Time.

[*On the Insecta of the Permian Period, and the animals and plants with which they were correlated.*]

The Permian* Period—which brings us to the close of the Palaeozoic Age—was one of transition towards a new epoch in the world's history, in which a number of old types of animal and vegetable life appeared for the last time.

Although the Permian rocks in many instances pass upwards conformably into the Trias, the difference between the fauna and flora of the two Periods is distinctly marked, the fossils of the former being more nearly allied to those of the Carboniferous Age, than to those of the latter or any succeeding series.

The Permian rocks are extensively developed in Russia and Germany, and they also occur in some parts of Great Britain and North America; but from their comparatively limited geographical and superficial range, the number of fossils obtained from them is proportionately small, and of the *Insecta* only about thirteen species have been discovered, all of which were found in that part of Germany† which has been styled by Lyell‡ “the classic ground” of this formation on the Continent.

* This formation was so named by Sir R. Murchison, F.R.S., on account of its being more developed in the Province of Perm, in Russia, than anywhere else.

† Schwarzenbach, near Birkenfeld, Cassel; Weissig, near Töllnitz, in Saxony: Stockheim, in Thuringia, &c.

‡ “Elements of Geology,” 6th edit., p. 469.

One of the first discovered, and by far the most interesting of these insects, was obtained from an ironstone-pit, belonging to Herr Böcking, at Schwarzenbach, in the district of Birkenfeld, and was described, in 1866, by Dr. Anton Dohrn,* who named it *Eugereon Bæckingi*.†

Dr. Dohrn states that Herr Tischbein and Dr. Hagen both regarded this insect as an Hemipteron, and he adds that he was originally of the same opinion, but that after a further examination of this remarkable fossil, he decided that it could not be referred to any existing Order, as it combined characters both of the *Neuroptera*‡ and *Hemiptera*.

Dr. Dohrn does not, of course, regard *Eugereon* as a type of the common ancestor or progenitor of the *Neuroptera* and *Hemiptera*, as both these Orders were already in existence; but he is of opinion that, at a very remote period, a form existed completely intermediate between these two Orders, from which they were differentiated, and from which *Eugereon* was also descended.

As this insect could not be referred to any existing Order, it was placed by its describer in a new Order, which he created for it, and which he named *Dictyoptera*; it has recently been included by Dr. Goldenberg in his Order *Palaeodictyoptera*.§

Another fossil, scarcely less interesting than *Eugereon*, discovered by Herr Carl Rückert in the neighbourhood of Stockheim, in Thuringia, was described, in 1865, by Dr. H. B. Geinitz,|| who named it *Ephemerites Rückerti*. From its union of characters of the genera *Ephemera* and *Libellula*, Dr. Goldenberg has recently placed this fossil in his Order *Palaeodictyoptera*.

A fragment of a wing, obtained from Weissig, near Pillnitz, in Saxony, has been referred, by Herr Eugen Geinitz,¶ to a species of *Hemiptera*—*Fulgorina Kliereri*?—a specimen of which has been also obtained from the European Coal-measures, and was alluded to in the preceding paper** “On the *Insecta* of the Carboniferous Period.”

Dr. Goldenberg has recently informed†† me that he is not aware of any specimen of the last named species (*F. Kliereri*) having been discovered in Permian strata; but his opinion is that the two species of *Fulgorina*, referred to in the last†† paper—viz., *F. Ebersi* and *F.*

* “Palaeontographica,” vol. xiii, p. 333, 1866.

† For a description of this fossil see “Palaeontographica,” last cit.; also vol. xvi, p. 129, 1869, the “Stettiner Ent. Zeitung,” Jahrg., xxvii, 1867; and Goldenberg’s “Fauna,” pt. 2, *antea cit.*, pp. 11–14.

‡ It will be remembered that all the synthetic types, previously alluded to, exhibited a union of the characters of *Neuroptera* and *Orthoptera* (see *ante*, papers Nos. 3 and 4).

§ Fauna Sar. Foss., pt. 2, 1877, *antea cit.*, p. 50.

|| Neues Jahrb. für Min., &c., 1865, pp. 335–358.

¶ See Neues Jahrb. für Min., &c., 1875, pp. 6 and 12, and plate i, fig. 3, p. 112.

** See *ante* p. 171 of this vol.

†† *in litt.*, 12th January, 1879.

†† See *ante* p. 171.

lebachensis—were obtained from the Permian* and *not* from the Coal-measures.

The nine other insects discovered in strata of this Age all belong to the extinct genus *Blattina*, of the Family *Blattidæ* of the *Orthoptera*, and the majority of them were obtained from Weissig. Of these *Blattidæ*, five species — *Blattina weissigensis*,† *B. porrecta*,‡ *B. Rückerti*,§ *B. lebachensis*, and *B. gracilis*—are new to the list of Palaeozoic *Insecta*; but specimens of the remaining four, viz., *B. didyma*, *B. anthracophila*, *B. carbonaria*, and *B. Mahri*, have also been obtained from the European Coal-measures, and were included in the 30|| species referred to in the paper last mentioned. The specimen of *Blattina didyma*¶ from the Permian is, for an insect of such vast antiquity, in an unusually perfect state of preservation, the body, wings, and legs being almost entire; but the other *Blattidæ* are represented only by single wings, or parts of wings, and are of no special interest.

The *Protozoa* of this Period are principally represented by *Foraminifera*, and the *Cœlenterata* by a few sponges and corals. The *Arthropoda* include *Crustacea*, *Insecta*,** and *Myriopoda*††: but no traces of *Arachnida* have, I believe, been met with, and the *Crustacea* are much rarer than in any former Age, several Families having entirely disappeared. The *Mollusca* are tolerably abundant, especially *Brachiopoda* and *Lamellibranchiata*.

By far the most interesting fossils of this age belong to the *Vertebrata*, and include fishes—which are comparatively very abundant, Amphibians—various forms of *Labyrinthodontia*, and Lacertian, or lizard-like Reptiles.

The Permian flora was closely allied to that of the Upper Carboniferous rocks—thongh most of the species were distinct—and included ferns, tree ferns, *Equiseta*, *Calamites*, and numerous Cycads and Conifers; there were also several forms which had not been previously met with.

As already observed, the character of this Period was one of transition: “the old†† or Palaeozoic World was passing by, while within “it new types had come forth prophetic of the earth’s brighter future.”

The Avenue, Surbiton Hill :

24th January, 1879.

* Assuming Dr. Goldenberg to be right, we have thirteen fossil insects from the Permian of Europe, viz., two *Paleodictyoptera*, two *Hemiptera*, and nine *Orthoptera* (*Blattidæ*).

† Described by Herr Eugen Geinitz in *Neues Jahrb. für Min.*, 1873, pp. 692–694.

‡ Eugen Geinitz in *Neues Jahrb. für Min.*, 1875, p. 6.

§ Described by Dr. Goldenberg in *Neues Jahrb. für Min.*, 1869.

¶ See *ante cit.*

|| See *Neues Jahrb. für Min.*, 1875, *antea cit.*, plate i, fig. 1, p. 112.

** The thirteen species before referred to.

†† See a paper by Dr. H. B. Geinitz, entitled “*Fossile Myriapoden in dem Rothliegenden bei Chemnitz*,” in “*Sitzungs-Berichte der naturwiss. Gesellsch.*,” Dresden, 1872, pp. 125–131.

¶ Prof. Dana in his “*Manual of Geology*,” 2nd edit., *antea cit.*, p. 371.

SYNONYMICAL NOTES ON THE SPECIES OF *SWAMMERDAMIA*.

BY E. L. RAGONOT.

In working out the life histories of the European *Micro-Lepidoptera*, I had been struck with the confusion which exists on the synonymy of the species of the genus *Swammerdamia*, and two years ago I submitted to Prof. Zeller my views on the subject.

The confusion has been caused by the inaccuracy of the figures in Hübner's work, a change he made in the names in his catalogue, and also by the variability of the species, particularly *cæsiella*, Hb. (*griseocapitella*, Stn.).

Hübner figures three species, viz., *cæsiella*, Hb., with a white head and grey thorax (fig. 172) ; *cæsiella*, Hb. (fig. 360), with a white head, thorax and inner margin ; and *cerasiella*, Hb. (fig. 332). Of these he describes only the first, thus : "Fig. 172, *Tin. cæsiella*. The head is white, but the thorax and upper wings are of a bluish-grey colour, the latter have a brownish band in the middle, and a white spot on the costa of the wings ; the under wings and the abdomen are ashy-grey."

This description applies well to the variety of *griseocapitella* which has the thorax grey, but it suits still better *oxyacanthella*, Dup., and I would be inclined to give the name of *cæsiella* to this species, were it not that tradition makes the birch feeder (under the name of *Heroldella*) the true *cæsiella* of Hübner, and that the birch feeder has often a grey thorax.

In his "Verzeichniss bekannter Schmetterlinge," Hübner retains the name of *cæsiella* for his fig. 360 ; whilst, further on, in his genus *Swammerdamia*, he changes the name of his fig. 172 to *Heroldella*, which he places next to his *cerasiella* (fig. 332).

Treitschke, following Hübner, describes the birch feeder under the name of *Heroldella*, so do Fischer von Röslerstamm and Duponchel ; but as Hübner, according to the rules of nomenclature, had no right to change a good name once given, we must drop the name of *Heroldella* and retain that of *cæsiella* (the earlier name) for the birch feeder, which name is used by Herrich-Schäffer, Frey and Heinemann. These authors, however, seem to have entirely overlooked Hübner's fig. 172, which is the type of the species, and refer only to his fig. 360, which, I consider, represents better the sloe feeder (*spiniella*). *Griseocapitella*, Stn., may be retained as a variety of *cæsiella*, Hb., with brownish frontal tuft and dark thorax. *Nubeculella*, Tgst., would be a synonym of *griseocapitella*.

This species varies considerably: the head and thorax are sometimes quite white; at other times only the head is white; some specimens have the centre of the head brownish; and others have the thorax pale grey or whitish. The fore-wings are generally paler on the inner margin, but some specimens are of a uniform grey colour. It is because this species varies so much that I would quote the descriptions of the above authors, although they refer to the wrong figure in Hübner's work.

The following is the arrangement I have adopted in my collection, and it appears to me to reconcile the different classifications, and render to each species its particular food plant:

FORE-WINGS WHITISH OR VERY PALE GREY.

1. *alternans*, Stgr., Frey. Larva unknown. Switzerland.
2. *alpicella*, H.-S. Larva unknown. Alpine Germany.
3. *conspersella*, Tngst., Wk., Nolcken. Larva on *Empetrum nigrum*. Russia, Norway, and Lapland. The larva is "of a dirty pale greenish-yellow colour, with the head, a fine dorsal, and two broad sub-dorsal stripes, of a brown-red colour" (Nolcken).

FORE-WINGS GREY.

Head and thorax white.

4. *spiniella* (Hb., Gesch. larva), Zeller, 1871, = *cæsiella*, Hb., fig. 360, Stainton in part (the ♂). Larva on *Prunus spinosa*. Europe. I have a specimen bred from *Crataegus oxyacantha* which I also refer to this species, distinguishable by its two white costal spots. [These two costal spots are well seen in Hübner's figure 360.—H. T. S.] The larva is "reddish-brown, with a broad, ill-defined, pale dorsal line, and a broad yellowish-white spiracular stripe" (Barrett); head pale ochreous-yellow.
5. *nanivora*, Stn. The larva feeds on *Betula nana*, and is "pale reddish-brown, with dark red-brown slender dorsal and broad sub-dorsal stripes; head black" (Stainton). Scotland and Estonia.
6. ? *variegata*, Tngstr. Unknown to me. Livonia.
7. *lutarea*, Hw., Stn., Hein., = *compunctella*, H.-S., Hein. Europe. The scapulae are grey, and sometimes the head and thorax are yellowish. The larva feeds on *Sorbus aucuparia*; it is "greenish with a whitish-orange, posteriorly brownish-orange, dorsal, and reddish-brown sub-dorsal, stripes, and whitish spiracular line; head pale brownish-yellow" (Noleken).

Head white, thorax dark.

8. *oxyacanthella* (Mann.), Dup., H.-S., Frey, Hein., Zeller, = *cæsiella*, Stn. (in part ♀). The larva feeds on *Crataegus oxyacantha*, and I have reared it from *Pyrus malus*. The larva is "dark red-brown with no dorsal stripe, but with a broad yellowish, posteriorly reddish, spiracular stripe" (Barrett), head pale brown.

9. *pyrella*, Vill., Stn., Hein., = *cerasiella*, Hb., F.-R., Tr., Dup., Frey, H.-S., = *cæsia*, Hw. The larva on apple, pear, cherry and hawthorn, and probably on other fruit trees, though Prof. Zeller says he has only bred it from apple. It is "sulphur-yellow, with dark red-brown sub-dorsal stripes, and pale reddish-brown bands on the 4th to 12th segments" (Stainton).

Head and thorax white, whitish or greyish.

10. *cæsiella*, Hb., fig. 172 (nec fig. 360), H.-S., Frey, Hein., = *Heroldella*, Hb., Verz., Tr., F.-R., Dup., Zeller, var. *griseocapitella*, Stn., H.-S., Hein., *nubeculella*, Tgstr. The larva feeds on *Betula alba*. It is pale green, with darker dorsal and sub-dorsal lines; head yellowish-brown.

FORE-WINGS GREY WITH THE TIP BRIGHT OCHREOUS.

11. *combinella*, Hb., Btr., = *comptella*, Hb., Z., H.-S., = *apicella*, Don., Stn., Frey, = *aurofinitella*, Dup. The larva feeds on *Prunus spinosa*. It is "pale yellowish, with a broad pale green dorsal stripe edged laterally by an interrupted brown-red line forming spots on each segment; head yellowish-white" (v. Heyden).

Another species (*Zimmermanni*, Now.), according to the description and figure, appears to differ from the other *Swammerdamiæ*, and has been placed by Nowicki in a new genus (*Kessleria*), but I have not seen it in nature.

I may add, that I noticed among Herr von Nolcken's types, two specimens of a species which I would be inclined to describe as new.

12, Quai de la Rapée, Paris :

4th February, 1879.

ON CERTAIN BRITISH HEMIPTERA-HOMOPTERA.

BY JOHN SCOTT.

Revision of the genus EUPELIX.

My last paper with the above title will be found at p. 276, vol. xii, of this magazine. Since that time, I have desisted from describing other British genera or species of this Order because I believed that the few remaining ones, which I had not noticed in my previous papers, were so well-known and understood by every student as to require no notice from me. Nor would I now have begun afresh, had I not had some reason for doing so. The genus *Eupelix*, of which I am about to write, has the peculiarity of having, so far as I am aware, only four species in the whole world, and singularly these are all European, except *E. marginata*, Fieb. The similarity of the species has given

rise to grave doubts in the minds of some recent authors whether there were one or two of the species in Britain. But I am about to describe a third, and set forth characters whereby there may be no reason to doubt the identity of each of them, and I shall thus have removed an impression caused solely, I believe, by the want of a series of examples to enable authors to judge of their distinctness. The figures by Germar and Burmeister are sufficient for any one who possesses their works to see at a glance how the species may be recognised. The shape of the head being the character for which the word *Eupelix* was formed, I may here observe that although *helmet-shaped*, it much more resembles, to our ideas, a vertical section of a helmet.

Genus EUPELIX, Germar.

Germar, Mag. iv, 93, 22.

Head scutelliform, horizontal, apex slightly recurved; lateral margins sometimes slightly sinuate; down the centre a strong keel. *Frons* narrow, with a more or less strong central keel; lateral margins always exterior to the eyes. *Eyes* elliptical, nearly divided longitudinally into two pieces by the lateral margins. *Ocelli* slightly elevated, and placed a little beyond the middle of the lateral margin.

Thorax—*pronotum* transverse, with a strong central keel. *Scutellum* triangular, with an areuate depression before the apex. *Thighs* without spines. *Tibiæ*; exterior margin with 4–5 spines. *Elytra* coriaceous; nerves prominent.

SECTION A.

Head broader than long.

Head testaceous, almost twice as broad (measured across the middle of the eyes) as down the centre, with dark brown or fuscous-black irregular markings next the anterior margin, and a somewhat cruciform-shaped patch of the same colour at the apex. *Elytra* testaceous, nerves finely granulated; in the centre of each granule a black dot; between the nerves, towards, and at, the apex, more or less sprinkled with black dots.

Abdomen: ♂, above black; lateral margins, a narrow line within the same, commencing at about the second segment, and another on each side of the centre, testaceous; genital segments testaceous; underneath testaceous, with a fuscous black streak on each side, narrowing towards the apex, side margins interiorly somewhat fuscous. Length, 2 lines. 1. CUSPIDATA, Fab.

Germ., F. E., fasc. iv, fig. 22.

Sparingly at Boxhill in June, by searching at the roots of grass, and below fragments of chalk. Also in Scotland, by Dr. Reuter.

Easily distinguished from the following species by its broader head, and the characters thereon. The granulated nerves of the elytra and the black dots on the disc of the same, give to the insect a fuscous look.

Head testaceous, about one and a half times broader across the middle of the eyes than down the centre, with a more or less distinct, broad, fuscous line on each side of the central keel next the apex, and vanishing near the centre; a black spot on each side of the apex, and two others on the lateral margins going towards the ocelli, which last are perceptibly elevated; the margin exterior to the eyes dark brown or fuscous. *Elytra* and nerves testaceous. *Legs* testaceous. Length, $2\frac{1}{2}$ lines..... 2. **PRODUCTA.**

Germ., F. E., fasc. iv, fig. 22; Burm., Gen. Ins., 1, figs. 1 and 5.

Very nearly allied to the next species, from which it may at once be distinguished by the difference in the length of the head, and the want of the sinuation of the lateral margins in that species.

Taken under similar circumstances to the species described above, and with the following one.

SECTION B.

Head longer than broad.

Head testaceous, longer than broad, lateral margins sinuate; central keel on each side more or less dark brown or fuscous from in a line with the anterior margin of the eyes to the apex; apex with a minute dark spot on each side. *Elytra* testaceous. *Legs* testaceous. Length 3 lines..... 3. **SPATHULATA.**

Germ., F. E., xxii, 25; Panz., F. G., 164, 19; Burm., Gen. Ins., 1, fig. 6.

The length of the head, and the sinuate lateral margins will enable any one to eliminate it from the specimens of *E. producta* which he may possess, and with which I believe it will often be found to be mixed.

Taken in company with the foregoing, at Sevenoaks, in August; also at Wingham, Kent, and Ardrossan, Ayrshire.

Both Mr. Douglas and I had put on one side examples of *E. spathulata*, about which we were uncertain, and we have now been assured, through the kindness of Dr. Signoret, that our belief that they were this species is correct.

Of the fourth species, *Eupelix marginata*, Fieber, from Bona (Kat. Cicad., 1872), I know nothing, and I am not aware that any description of it has been published.

DESCRIPTION OF A NEW SPECIES OF *CUCUJUS* FROM ASSAM, AND
OF *CERATORRHINA GEMINA* FROM WEST AFRICA.

BY GEORGE LEWIS.

CUCUJUS IMPERIALIS.

Elongatus, depresso-niger, elytris atro-cyanis, C. bicolori affinis, sed multo latior; antennis pedibusque robustioribus.

Long. 9½, lat. 2½ lin.

Hab.: Sadia, Assam.

In general structure this species resembles the Indian *C. bicolor*, Smith, but it is broader, with thicker antennæ and legs: the sculpture of the thorax and the punctures of the elytra are both on a larger scale. In colour it agrees with *C. Mniszechi*, Fairm., from Japan, but the last is a more slender insect.

CERATORRHINA GEMINA, Lewis (*vide Ent. M. Mag.*, xv, 198).

Parum convexa, aureo-viridis, elytris latissime inauratis, maculâ humerali apicalique nigris, tarsis posterioribus pallide viridis.

Long. 13–16 lin.; lat. elytrorum, 5½–6½ lin.

Mas: *vertice medio profunde emarginato, utrinque angulariter prominente, clypeo ad apicem in medio processu brevi, antennis valde dilatatis; pedibus gracilibus, tibiis omnibus extus edentatis, intermediis intus sinuatis; elytris sublævigatis.*

Fem.: *capite mutico, clypeo fortiter denseque punctato, anterius leviter emarginato: tibiis anterioribus extus tridentatis, intermediis posterioribusque uni-spinosis: elytris punctis seriatis magnis parum profundis, interstitiis parce punctatis.*

Hab.: Isubu, West Africa.

This species is allied to *C. auratus*, Westwood, from which it differs in its narrower and rather more depressed form, its comparatively unicolorous upper surface being more golden in tinge, the finer sculpture of the wing-cases, and the paler colour of the tarsi. It will be observed from the diagnosis that there is considerable sexual discrepancy in the sculpture of the elytra, and this is also observable in *C. auratus*. In order, therefore, to appreciate the sculptural distinctions of the two species, individuals of the same sex should be compared.

Bagous diglyptus, Boh. (*a species new to the British list*), at Burton-on-Trent.—Two examples (δ and φ) of a *Bagous*, recently submitted to me for inspection by my friend, Mr. J. T. Harris, I find on examination to be *B. diglyptus*, Boh., a species not hitherto recorded as British. Superficially, not unlike *B. brevis*, Schönl., *diglyptus* may be at once separated from that species by its proportionately shorter and broader form, the thorax not having three foveæ just before the apex, the much shorter tarsal joints, &c.; from *lutulosus*, Gyll., which it resembles in its very short stout tarsi, it may be known by its larger size, stouter limbs, the alternate interstices of the elytra less raised, &c.

The very short broad form, uniform grey colour, the head longitudinally impressed between the eyes, the rugulose thorax, which is much constricted before the apex, and having a short dorsal channel near the base, the alternate interstices of the elytra slightly widened and raised, with the usual callus on the 5th almost obsolete, the very short stout limbs, the tibia ferruginous, much curved inwardly and thickened above the middle, and the very short tarsi with the penultimate joint simple and not bilobed, readily distinguish this species from its allies.

M. Chas. Brisout de Barneville has corroborated this species for me, and remarks that it is still very rare on the continent. One example, taken by Mr. Harris from accumulated flood-refuse in his own garden on the banks of the Trent, at Burton, in April, 1872, and a second subsequently found by Mrs. Harris crawling on a wall near the same spot.—GEO. C. CHAMPION, 274, Walworth Road, London, S.E.: *January 21st, 1879.*

Synonymic notes on some British Hemiptera.—In Dr. Puton's recently published “*Synopsis des Hémiptères-Hétéroptères de France*” (*vide p. 94, ante*), there are some points which, having reference to British species, deserve our special attention.

Nysius maculatus, Fieb., is reckoned to be only a variety of *N. thymi*, Wolff, but Dr. Puton says he has not Fieber's types.

Nysius brunneus, Fieb., is referred to *N. helveticus*, H.-Schf., as a variety; and *N. obsoletus* Fieb., and *N. ericae*, Boh., are put as synonyms of *helveticus*.

KLEIDOCERUS, Westw., is substituted for *Ischnorhynchus*, Fieb., but I cannot find that Westwood ever characterized a genus under that name. In Stephens's “*Catalogue of British Insects*,” ii, 342 (1829), the name first appeared as “*Kleidocerys*, Westw., MSS.,” and in his “*Introduction to the Modern Classification of Insects*,” ii, *Synops. 123* (1840), Westwood puts it as a synonym of *Cymus*, Hahn; being, therefore, merely a name, it cannot supersede *Ischnorhynchus*, which is a genus duly defined by Fieber.

The species *resedæ*, Panz. (F. G., 40, 20), is made to give way to *didymus*, Zett. (Act. Holm., 1819), but, according to Hagen, Panzer's description and figure were published in 1797, and his name must, therefore, be adopted.

HETEROGASTER, Schill., was superseded by *Phygadicus*, Fieb. (Eur. Hem., 201), expressly on account of the previous employment of the name in *Coleoptera* by Dejean.

STYGNUS, Fieb. The name having been already used by Laporte in *Arachnida*, was altered to STYGNOCORIS in Brit. Hem., p. 213.

PACHYMERUS. When, in 1875 (Ent. Mo. Mag., xi, 185), I repeated what had been already said by others, that the names PACHYMERUS, Le Pel. et Serv., and

ACALYPTA, Westw., were not tenable in *Hemiptera*, on account of previous occupation in *Coleoptera*, the former having indeed been expressly rescinded by Amyot and Serville for this very reason (Hém., p. 253), the late Prof. Stål wrote to me that, nevertheless, he did not see any reason for not using the names in *Hemiptera*, and that any law to the contrary must be abrogated. I had too much respect for Stål to continue the argument, but, considering the utter confusion that must prevail if the principle of *double emploie* were tolerated, and the tendency now shown to action in this direction, I think it right again to draw attention to the subject.

BEOSUS, Am. et Serv., is made to include *ISCHNOTARSUS*, Fieb. (1861) = *DIEUCHES*, A. Dohrn (1860). Fieber, however, expressly separated his genus (which includes our species *luscus*, Fab.) from that of Am. et Serv., putting three other genera between them. Dr. A. Dohrn had previously distinguished and separated his equivalent genus.

Scolopostethus decoratus, Hahn, = *ericetorum*, Leth., *melanocerus*, Thoms.

I have already (E. M. M., xiv, 13) given reasons for believing that this determination is not correct. Hahn (Wanz., i, 139) says of his *decoratus*—“Fühler schwarzbraun, das erste Glied derselben am Ende und das zweite am Grunde röthlich gelbe,” and the figure (pl. xxii, f. 71) so represents them. But these are not the characters of *S. ericetorum*, Leth., in which the antennae have the 2nd joint only pale at the extreme base, all the joints, with this exception, being black. Therefore, Lethierry’s name should stand.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham : January 13th, 1879.

Note on Halictus puncticollis, &c.—Since writing the description of *Hymenoptera* that appeared in the last No. of this Magazine, I had occasion to refer to a paper by Morawitz on some new bees from Germany, which was published in the Verhandlungen des zool.-bot. Vereins in Wien, vol. xxii, and there, at page 370, I came across the description of an *Halictus puncticollis* which agrees in every particular, so far as I can judge, with the species I have just described; it is strange we should have both selected the same name for the same insect. The species will have to stand in our lists as *puncticollis*, Mor., Verh. zool.-bot. Wien, xxii, p. 370. It is possible also that *longiceps* may prove to be his *porcus*, but here the description does not quite agree, so I must wait for further evidence.—E. SAUNDERS, Upper Tooting : February, 1879.

Note on Halictus puncticollis.—This insect is probably common here, as Mr. Saunders, on looking at my specimens of *Halicti*, picked out seven specimens (4 ♂ and 3 ♀) which had been supposed to be *H. villosulus*.—E. N. BLOOMFIELD, Guestling : February 10th, 1879.

Occurrence in Britain of Nonagria sparganii, Esper.—At the Meeting of the Scientific Committee of the Royal Horticultural Society, held on the 14th January, Mr. Sydney Webb exhibited a ♂ of a species of *Noctuidæ* new to our Fauna, which he had determined as above. He had bred it from a larva (one of many) feeding in the stems of *Iris pseudacorus* in Surrey. It is closely allied to *N. typhæ*, and, on the continent, is almost as common and as widely distributed as is that species, being priced at under sixpence by the continental dealers. The only wonder is that it has not been previously detected here. It usually feeds in *Typha*, so that its food plant here (so far as is at present known) is new.—Ens.

On the power of resisting intense cold possessed by Cheimatobia brumata.—As regards the power of *Cheimatobia brumata* to resist intense cold, it may be interesting to record what came under my observation on the 21st December last, during a frost of no common severity, and with the earth, on this high land, covered with snow.

While searching for ivy for Christmas decorations, a *C. brumata* was found at rest up an oak tree, from which some ivy had been drawn. The moth was touched with a stick and flew on the snow; far from being in a "frozen" state, it clung, when picked up, to my daughter's hand, with its wings closed, and, while we were remarking upon its condition in such severe weather, it crawled to the side of the hand and again flew off about a yard, settling on the snow, upon which it walked. The insect was by no means a fresh one, but had doubtless emerged, before the frost began, early in December.—E. S. HUTCHINSON, Grantsfield, Leominster: February 3rd, 1879.

Tineina taken and bred in 1878.—April 20th—one *Gelechia junctella*, beaten from willow, at Witherslack. April 24th—larvæ of a *Gelechia*, found at Lytham, roughly described as follows: "dark grey, red spots, feeding in sand-cocoons at roots of *Cerastium* and *Stellaria*, produced (July 6th) a little *Gelechia* which Mr. Stainton pronounces to be new, and allied to *Knaggsiella*, unless it be a very unusual specimen of *maculiferella*." More must be bred before naming. April 29th—*Micropteryx Sparmannella* and *salopiella* at Witherslack, flying in the afternoon sun. April 30th—a larva of *Diplodoma marginepunctella* at Witherslack, fed on larvæ of *Solenobia triquetrella*, and emerged June 20th; the *triquetrella* all emerge females, and are very plentiful. July 6th—larvæ of *Dep. capreola* in *Pimpinella saxifraga*, not in radical leaves, but high up the stem, green, black head, all sent to Mr. Sang. July 6th—larvæ of *Nepticula betulicola* in small contorted galleries in birch, filled with brown excrement, larvæ bright yellow, produced August 15th. July 24th—larvæ in cones on birch, green and horny looking, produced five imagos of *Gracilaria populetorum* from July 28th to August 1st. August 19th—cones on *Polygonum hydropiper* found on this date produced *Gracilaria phasianipennella* from September 1st to 10th; this and *G. populetorum* are very much infested with ichneumons. August 19th—a pupa spun up in the hollow of a blade of *Carex*, and covered all over with a thick white web, is expected to produce the long hoped for *Elachista serricornis*. August 19th—I think that this will be the date when I saw plenty of imagos of *Glyphipteryx schænicolella* flying over cotton grass on the wet moss at Witherslack, but being mistaken for *Fischeriella*, not many were taken, and no date was recorded. August to October—many larvæ of an *Elachista*, supposed to be *ochreella*, were found in a long stiff grass, plentiful at Witherslack on the wet mosses, described as blackish, reddish-brown head, and generally mining up and across. September 7th to October—larvæ of *Elachista tæniatella* found in plenty in *Brachypodium sylvaticum* at Grange. October 5th—plenty of larvæ of *Nepticula æneofasciella* in blotches in leaves of agrimony at Grange, larva yellow: can no one send me larvæ of *agrimoniæ* in exchange for these? October 5th—after great difficulty, I found on this day a few larvæ mining in *Festuca ovina*, described as slaty-brown, which are no doubt those of *Elachista dispunctella*. This confirms what I formerly said about the insect, that it would be an autumnal feeder, would hibernate in old grass stems, and change late in spring. In June, 1876, a larva was found and described as greyish-yellow, which produced imago July 8th, 1876.—J. H. THRELFALL, Preston: February 3rd, 1879.

Capture of Semasia gallicolana.—On the 19th May, 1878, we had a tremendously high wind. Entomologists, as a rule, do not like wind, but this wind produced me two specimens of *Semasia gallicolana*, an insect I had never taken before. The moths were blown off the oak trees and took refuge on some palings, where they were easily boxed.

I have placed them by the side of my solitary specimen of Stephens' *Pseudotomia obscurana*, described by him, in 1834, in the 4th volume of his Illustrations, Hans-tellata, p. 98, and at present I am disposed to consider the two species distinct, though it is quite possible that, if I had a longer series of both, my views might be modified.

Gallicolana is a very bright gay-looking insect, whereas *obscurana* is well-named, it is dull and *obscure*, the pale dorsal blotch being almost entirely suffused.

I cannot easily imagine any one confounding *obscurana* with *argyrana*, whilst the resemblance between *gallicolana* and *argyrana* is very striking. Heinemann particularly notes the similarity of the two species, in his description of *Grapholitha gallicolana* (p. 200). Nearly 50 pages earlier, he has a *Grapholitha obscurana* (p. 153), which he takes for Herrich-Schäffer's *obscurana*, fig. 307 (though objecting to the form of the wing in the figure), but he says the basal edge of the dorsal spot is *vertical*, which would never do for our *obscurana*.

Zeller, who described *gallicolana* in the Isis of 1846, p. 255, lays stress on *an elongate dark blotch along the anterior edge of the underside of the hind wings*. I do not perceive this character in my *obscurana*.

My specimen of *Semasia obscurana* was beaten from hedges at Lewisham, June 6th, 1848.

The *Semasia obscurana* of the Manual II, 241, is *gallicolana*—in that error I followed Wilkinson's "British Tortrices."—H. T. STANTON, Mountsfield, Lewisham : February 10th, 1879.

Occurrence of Tinea fenestratella (Heyden) in Britain.—I have pleasure in adding another species to the list of British *Tineæ* by recording the occurrence at Chatteris, Cambridgeshire, of *Tinea fenestratella* (Heyden), a species hitherto, I believe, unobserved in Britain, though it was discovered in Germany, as far back as 1843, by Carl von Heyden. To Mr. Stainton I am indebted for kindly determining the species; he detected it amongst a few *Tineæ* submitted to him for examination last January. The following description of the insect is given in the Entomologists' Annual for 1868, p. 8, in the article, "In Memoriam, Carl von Heyden" (and which description is translated from the Stettin. entomologische Zeitung, 1863, p. 342) :—

"Al. exp., 4 lin.

"Anterior wings rather shining, yellowish-grey, mixed with darker scales. In "the middle of the wing is an oval, whitish, almost transparent spot, and beyond "this, towards the apex of the wing, two opposite spots more indistinct, yellowish, "and elongate. The cilia are dark, with a blackish divisional line. On the grey "underside only the transparent centre spot is perceptible. Posterior wings pale grey, "with the apex and cilia darker. Head clothed with reddish-brown hairs, darker on "the crown. Labial palpi with drooping, narrower terminal joint, brown. Antennæ "rather shorter than the anterior wings, thin, brown. Thorax and abdomen brownish. "Legs yellowish; the tarsi blackish above. It has the appearance of a small *Tinea imella*, Hb., with very narrow anterior wings."

Carl von Heyden also adds, that the one specimen he then possessed (1843) was

bred from dry wood early in June. Heinemann says "the larvæ in rotten alder wood," I have no doubt, however, that those I had the good fortune to obtain (5 in number) were bred from stumps of elm trees which had been placed, twelve or fifteen years ago, in the garden in which the insects were taken, and are now very rotten and decayed. I am not aware of the existence of any alder near the locality. The first specimen was taken, at rest, in an outhouse in the garden on 24th June, 1877, the other four the following evening, on the wing shortly before sunset. The facts of my ignorance of the species I had taken, and of my seldom collecting or being in the garden where they occurred, will doubtless account for the small number of specimens seen.—HAROLD RUSTON, Ealing, Middlesex : February 6th, 1879.

Economy of Lithocolletis scopariella.—On the 27th June, 1878, Mr. Sang was searching amongst some broom, at Darlington, for specimens of *L. scopariella*. Whilst so engaged, his attention was attracted by a *Lithocolletis* struggling to escape from its pupa-case, where it was held fast by one of its legs.

The pupa-case partially protruding from the inflated mine along the broom twig, revealed where had been the feeding place of the larva !

In April, 1856, I had made the acquaintance of the larva of *Lithocolletis quinquecostella*, which had been sent to me by Herr Anton Schmid, of Frankfort-on-the-Maine, and when I noticed how it made bladdery inflations along the stems of *Genista sagittalis*, it did occur to me that *L. scopariella* might have a similar habit on broom. Since then I had bred, what appears to me identical with *L. scopariella*, from larvæ mining the small leaves of *Calycotome spinosa* in the south of France, and thenceforth my attention had been directed more to the leaves than to the stems of the broom.

I am, therefore, particularly pleased that Mr. Sang's fortunate discovery has again put us on the right scent.—H. T. STAINTON, Mountsfield, Lewisham : 6th February, 1879.

A Nepticula new to Britain.—I sent, a short time ago, some *Nepticulæ*, which appeared strange, to Mr. Stainton for identification, and he has just returned them as *lapponica*, Wocke. They are closely allied to *N. sorbi*, but "have the fascia less oblique, more yellow, and generally broader." The larvæ feed in broad serpentine mines in birch, are light in colour when full fed, and are to be found at the same time as *N. betulicola*, viz., October 1st to 20th.—J. H. THRELFALL, Preston : 18th February, 1879.

Helicopsyche bred in England.—Thirty-six years ago, R. J. Shuttleworth, of Berne, discovered the true nature of certain little heliciform cases that have several times been described as shells of fresh water *Mollusca*. He rightly asserted that they were the cases of caddis-worms ; in this he was confirmed, some thirteen years ago, by a North American species having been bred. But, until now, all attempts to breed the insects from the European forms had been without success. At last the mystery is solved, for Prof. de Rougemont, of Neuchâtel, has reared the insect from cases found at Amalfi, near Naples, and a preliminary account of it is given by him in Carus's "Zoologischer Anzeiger" for Dec. 30th, 1878, p. 393. In my "Revision and Synopsis of the *Trichoptera* of the European Fauna," part v, p. 269, I described a little insect as *Helicopsyche* (?) *sperata*, from Naples, that I thought might represent the long-desiderated imago of *Helicopsyche*. My description and figures were necessarily incomplete, for I had only seen a single specimen, and that was nearly destroyed by an accident. From information with which Prof. de Rougemont has favoured me, it appears certain that it really was *Helicopsyche*, and probably of the same species as that now bred by him ; but he has not yet quite completed his observations, and I have at present not seen his insect, although he has had the kindness to send me drawings of the neuration, &c.

I think the opinion, several times published by me, that the "*Helicopsyche*-cases" now known from nearly all quarters of the globe, might prove to be the work of more than one genus of insects, will prove correct. The European insect is perhaps not quite congeneric with that bred in North America, and it may be that the latter should take the name *Thelidomus*, employed by Swainson in 1840 for American cases, under the idea that they were shells.

I may add, that I possess a not yet fully examined insect from Saxony that probably will prove to be a *Helicopsyche*, and if so, I see no reason why we may not detect this remarkable form in the dribbling springs of some part of the south of England or south-west of Ireland.—R. McLACHLAN, Lewisham : Feb. 19th, 1878.

British Collectors.—We want, besides the excellent papers descriptive of new exotic species which have too exclusively filled our pages, records of observations on habits, life-histories, and geographical distribution of insects ; on local variation, its causes and results ; narratives of entomological excursions and captures ; observations on structure, functions, and instinct ; relations of insects to flowers ; and, in short, on all such subjects as are interesting to the greater number, as distinguished from descriptive papers which are interesting only to the lesser number. In saying this, I am fully aware of the difficulties that lie in the way of obtaining these good things. Our Secretaries and Council would be very glad to get fairly well-written and original papers on any of these subjects, but they do not come. The reason of this, no doubt, lies in a state of things which has often been lamented : namely, the too-exclusive devotion of our native entomologists to the formation of purely British collections. The exhaustion of our limited insular fauna, and the extreme unlikelihood of the discovery of new species, seem to teach no lesson to the purely British collector, and he goes on collecting, observing, and recording what has been collected, observed, and recorded over and over again. Some, it is satisfactory to notice, break through the artificial limits imposed by the majority, and extend the range of their excursions and observation to the continent. The ice once broken this way, a boundless field of interesting study lies before them ; for, by exchange and a trifling outlay of pocket-money, large collections can be formed and the mind expanded by the study of the whole Palæarctic Fauna, of which that of the British Isles is only a half-starved fragment. Even if it were only for the pleasure of tracing the wonderful local variations, the formation of sub-races and races of our common English insects, some of them of surprising beauty, over the wider continental area, one would think that every intelligent entomologist with us would be eager thus to extend his studies. And it could be done with no more expenditure of time and very little more* of money than the present exclusive pursuit of home productions. Many, of course, would plead that they collect insects only for pure amusement, caring nothing for science. To such we have nothing further to say. But we believe and hope that there are very many British collectors and observers of insects who are able and willing to take a higher view of their pursuit, and if we could only induce a sufficient number of these to take a more general interest in the study, to write papers for us, and join us, the reciprocal good effect which we aim at, viz., the enlargement and improvement of our "Transactions," and thereby the further increase of members and means, would be produced, thus, as we hope, elevating the status of entomology in this country.—*Extracted from the Address of the late President of the Entomological Society of London, on the 15th January, 1879.*

Obituary.

Frederick Smith died on the morning of the 16th of February, after a surgical operation, at the age of 73. For the moment we make simply the foregoing announcement ; an extended notice will appear in our next No.

* Very much less, in the majority of cases.—EDS.

NATURAL HISTORY OF *LYCÆNA MEDON*, HUF. ? (*AGESTIS*, OCHS.).

BY WILLIAM BUCKLER.

When Professor Zeller, in 1867, published his most interesting history of this species at pp. 73-77, vol. iv, of this magazine, he stated it to be generally accepted that *Lycæna Artaxerxes* is only a variety of *Medon*; and yet it appeared to him extremely improbable that the larva of *Medon* should habituate itself to the food-plant of *Artaxerxes*.

Since then I am not aware of any record of experiments made in accordance with Zeller's suggestion, which induces me to offer the following evidence in proof that the larva of *Medon* really does nourish itself on the same species of food-plant in England as in Scotland.

But, first in order of time, I have to mention that on June 3rd, 1877, Mr. J. E. Robson, of Hartlepool, while searching *Helianthemum vulgare* growing near the coast in his locality, found five larvae of a *Lycæna*, and at once very kindly forwarded them to me; on comparing them with the figures I had taken of larvae of *Artaxerxes* in 1868, I found them to be in every respect precisely alike. These larvae soon fed up on *Helianthemum*, protected by a glass cylinder, and they duly changed to pupæ, two of them, unfortunately, were attacked with mould, but the other three disclosed three differently marked butterflies, viz.: on July 2nd, 5th, and 7th, these appeared respectively to be *Salmacis*, *Artaxerxes*, and *Agestis* above, but to partake most of *Salmacis* beneath.

After this result, I became more than ever desirous of seeing larvae of the typical *Agestis* from the southern downs, and it was not many weeks before Mr. Wm. R. Jeffrey most kindly put me in the way of making their acquaintance from the egg onwards, by his capturing several typical females as they were flying over and alighting upon *Helianthemum vulgare*, on a Kentish chalk down. They readily deposited their eggs on sprays of the plant, and I had the pleasure to receive a share of them from my friend on 13th of September, when I found them all laid on the under-sides of the leaves to which they firmly adhered, singly, and in little groups of twos, threes, and more together.

The egg is smaller than that of *Ægon*, though very like it in form and sculpture, being circular, flattened, with a central depression on the upper surface, the shell covered with a coarse, prominent reticulation, gradually becoming finer towards the nearly smooth depression; its colour, a pale greenish-drab, continues to the last. A hole in the shell betrays the escape of the larva, which is a very slug-

gish little creature, not inclined to leave the under-side of the leaf where it is hatched, even when the leaf has become dry ; indeed, all the leaves on which the eggs were laid had curled and shrivelled so much when the larvæ were hatched, as to make their detection and rescue while alive rather difficult.

I observed the first three larvæ on 19th of September, one of them already dead, and on the 22nd, eighteen more, with some of them apparently dead or dying.

A month previously I was provided with a very large pot of turf cut from a chalk hill, and amongst grasses, *Leguminosæ*, and other low plants, some fine shoots of *Helianthemum vulgare* were also growing ; on these last the young larvæ were placed ; next morning, about half of them lay dead, and the others had disappeared. But after a day or two I began to detect signs of the survivors, by small flesh-coloured spots appearing on the upper dark green surface of a few of the leaves, these spots gradually increased in size to blotches of irregular figure, and turned of a rusty pale brown colour ; when seen from beneath against the light, they appeared semi-transparent and colourless, and sometimes then the tiny larva appeared as a dark object against the luminous blotch. By the 20th October, a few leaves had their lower cuticle almost entirely eaten away, and their upper surface turned brown, but so slow was the growth of the larvæ, they had only attained one line in length by the 3rd of November, and though they fed a little at intervals, and crept from one part of their food to another to the end of the month, yet they were never seen on any of the other plants around them, but only on the under surface of the leaves of *Helianthemum*, where they became eventually fixed for hibernation.

The pot containing the larvæ and the various plants was kept entirely uncovered inside a window of western aspect ; the grasses were much grown by the 7th of March, 1878, when I could only see two larvæ on a new shoot of their food, and on the 14th only one, whereupon I began to cut down the grass, a blade at a time, carefully, so as to lay bare the few new scattered shoots of *Helianthemum*, which were from one, to two, or three inches above ground, and very near the margin of the pot ; on the 21st, the second larva was again visible on a little shoot close to the earth, and two more larvæ, less advanced, on other small shoots, were seen on April 14th.

Here it will be proper to state the fact, that after hibernation, neither of the larvæ fed at all on any of the mature sprays of the plant, which seemed apparently healthy and vigorous, but pertinaciously

sought the young tender shoots, eating a portion from under a leaf, then a little from another leaf, or moved away entirely, creeping over the ground and through all impeding growths, until, with unerring instinct, another shoot, sooner or later, was reached : thus, was I continually losing sight of one or more of the larvæ, often for days together, but only to find them again by aid of new blotches appearing to betray them.

Towards the end of April, they ravaged so recklessly the small stock of their food remaining in the pot, never staying to clear the whole under-side of a leaf, but changing their quarters so often, that I began to fear they would desert the pot and escape altogether ; for at that time I was unable to obtain a fresh supply of their food, and, to make sure of completing my observations of the larva when full grown, I confined the two largest individuals in a bottle, and supplied them with cut portions of their food, on which they thrrove, and therein attained their full growth of barely half an inch, and on the 15th of May one fixed itself for pupation by a cincture across the back of the fourth segment, on a bit of linen, the second followed in the same way on the 16th, and on the 21st and 24th they changed to pupæ. The two remaining larvæ soon after fixed themselves, but died unchanged, probably the effect of insufficient food.

The newly-hatched larva is very minute, with a glistening blackish head, stoutish body, of light drab-green colour, velvety, and hairy ; its size is doubled in eight days ; and when a month old, it is of the usual *Lycæna*-shape, one line in length, thick in proportion, with small retractile head, the body of a dull pinkish-brown colour, with darker dorsal stripe, and rather hairy.

On waking up in spring, it is of a dingy slaty-green colour, and early in March it moults, when the old skin is left attached to the plant like an empty shell, not in the least shrivelled, but split open laterally along the ridge above the legs ; the larva now becomes quite pale green on the back, broadly pinkish along the lateral ridge, and still hairy. Early in April it is nearly an eighth of an inch long, of greenish-flesh colour, palest on the second segment and dorsal eminences, pinkish in the dorsal hollow, and also along beneath the spiracular region, the long whitish hairs closely resembling those on the food plant.

The last moult occurs about the 21st of April, when it is three-sixteenths of an inch long, and attains its full-growth of barely half an inch early in May ; during this interval, of all its characteristic details, which have been published as *Artaxerxes* (*vide* vol. v, p. 176),

I have only to say in addition of these typical larvæ, that the green is more lively and full, and the pink along the lateral region is darker, inclining to purplish.

It only remains for me to state that my experiments have proved to me the truth of what Zeller long ago suspected, and since then Newman and others have believed, that *Artaxerxes*, *Salmacis*, and *Medon* (*Agestis*), are but one species.

Emsworth : February 4th, 1879.

DESCRIPTION OF A NEW SPECIES OF *HETÆRINA* FROM COSTA RICA.

BY R. McLACHLAN, F.R.S., &c.

HETÆRINA MAXIMA.

♀ immature. Bronzy-brown. Head black above; the base of antennæ yellow: front green, clothed with blackish hairs: nasus metallic-blue, green at its base: labrum chalybeous. Thorax apparently with a yellow median carina and four yellow lines on either side (damaged). Legs blackish, distinctly yellowish internally. Abdomen bronzy; without markings.

Wings hyaline, slightly tinged, *no pterostigma*: the base of the wing (especially in the anterior) occupied by a very dense reddish network (as is usual in the ♂ of *Hetærina*), giving the wings the appearance of being reddish at that part. 27 ante-cubital, and 32 post-cubital nervules in the anterior-wings.

Length of abdomen, 38 mm. Length of posterior-wing, 40 mm. Expanse, 83 mm.

Mount Irazu, 6000-7000 ft. (Rogers).

It is much to be regretted that only the ♀ (and that immature) of this species has been received. No known species has, in this sex, the same dense reticulation at the base of the wing (the nearest approach to it being found in *H. basalis*), and it appears to me possible that the adult ♀ may have the base of the wings red, as is usual in the ♂ of nearly all the species. It is the largest yet known, the size being only occasionally attained by the ♂ of the anomalous *H. Borchgravi*.

This insect was received by Messrs. Godman and Salvin from Mr. Rogers, their collector. I believe it to represent the ♀ of an undescribed species allied to *H. basalis*, or rather to the condition of that species known as *H. californica*.

With the exception of *H. cruentata* which occurs, in the collection sent by Mr. Rogers, in great numbers, the only other *Hetærina* from the same locality is apparently a form of *H. majuscula*, but the general aspect of *H. maxima* precludes the probability of the type being a dimorphic condition of that species; the colour of the legs, and other characters, point to a connection with *basalis* and *californica*.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 6.

Mesozoic Time.

[*On the Insecta of the Triassic Period, and the animals and plants with which they were correlated.*]

With the Triassic Period we enter on a new era in Geological history, which is marked by the predominance of reptilian* life, and the first appearance of mammals, and, *probably*, of birds.

No insects have yet been discovered in the Triassic rocks† of the United Kingdom, and although on the continent of Europe the Trias is largely developed, especially in Germany, only seven species have been recorded from it.

Of these seven species three belong to the *Neuroptera*, one to the *Orthoptera*, and three to the *Coleoptera*.

Two of the *Neuroptera* were discovered by Herr C. Zinken,‡ in the Bunter-Sandstein§ of Gödewitz, near Salzmunde, and have both been referred to the family *Sialidæ* by Professor Heer, who has placed them in an extinct genus—*Chauliodites*—and named them *Chauliodites Picteti* and *C. Zinkeni* respectively. A third specimen, recently obtained from the Keuper, has also been referred by Dr. Heer|| to the same genus, and has been named by him *Chauliodites helveticus*.

The only known specimen of *Orthoptera*¶ from the Trias was obtained from the Bunter-Sandstein of Trebitz. It belongs to the family *Blattidæ*, and has been described by Dr. Heer, who placed it in an extinct genus—*Legnophora*—and named it *Girardi*, after Professor Girard, of Halle, in whose collection he discovered it.

The three species of *Coleoptera* were obtained from the Keuper of Vadutz, and have been severally named by Dr. Heer *Glaphyroptera Pterophylli*, *Curculionites prodromus*,** and *Chrysomelites Rothenbachii*.††

* The whole of the Secondary or Mesozoic Period is frequently spoken of as "the age of reptiles."

† So few insects have been discovered in the rocks of this period, that it may seem unnecessary to have devoted a separate paper to their consideration; but, for the sake of preserving uniformity of plan in this series of papers, I have thought it desirable to do so.

‡ Vierteljahrsschrift der naturforschenden Gesellschaft in Zürich (note on p. 279), 1864.

§ The Trias, as its name implies, is divided into three distinct formations, which in Germany are respectively named the Keuper, the Muschelkalk, and the Bunter-Sandstein.

¶ Flora Fossilis Helveticae, p. 77. Taf. xxix, 1877; and Heer, *in litt.*

|| Vierterjahrsschrift naturf. Gesellsch. Zürich, *antea cit.*, pp. 297, 298.

** "Le Monde primitif de la Suisse," p. 99; and Neuer Denkschriften der schweiz. naturforsch. Gesellsch., xiii, 1853. Taf. vii.

†† Flora Fossilis Helveticae, p. 76. Taf. viii (Heer, *in litt.*)

From the Trias of North America one species of *Coleoptera* has been recorded by Mr. Scudder,* who also states that certain questionable tracks in the rocks of the Connecticut Valley have been referred by Prof. Hitchcock to *Insecta* and *Myriopoda*.

Prof. Dana† has figured a fossil larva of a Neuropterous insect, obtained from Turner's Falls, Connecticut Valley, which is believed by Dr. Le Conte to have been related to the genus *Ephemera*; Dana also alludes to the tracks in the rocks before mentioned, which he supposes to have been made by the larvae of insects, and by *Crustacea*.

The *Arthropoda*‡ of this period include, in addition to *Insecta*, as we have seen, *Myriopoda* (possibly) and *Crustacea*, the latter being chiefly represented by *Ostracoda*.

The *Mollusca* are exceedingly abundant, and include, in addition to a number of genera characteristic of the period, several Palaeozoic types.

The *Vertebrata* are represented by animals of almost all the existing classes.§ The fishes are principally Ganoids; and the Amphibians belong exclusively to the gigantic *Labyrinthodontia*, which, at the close of this period, disappear altogether.

The reptiles comprise living as well as extinct Orders, the former including *Crocodilia*, *Lacertilia*, and *Chelonia*,|| and the latter *Plesiosauria*, and *Deinosauria*.

Although no remains of birds have been discovered in rocks of this age, numerous foot-prints in the Triassic strata of the Connecticut Valley are confidently believed by many geologists¶ to have been made by animals of this class.

The Mammals are represented by two small forms, both referred to extinct genera of Insectivorous Marsupials.

The Flora of the Period, although decidedly Mesozoic, included some Palaeozoic types.

The dominant forms were *Equiseta*, Ferns, Cycads, and Conifers; but no remains of true Grasses, Palms, or Angiosperms have been discovered.

The Avenue, Surbiton Hill, S.W.:
1st March, 1879.

* Geol. Mag., vol. v, May, 1868 (neither the genus nor the family to which the insect belonged is mentioned).

† "Manual of Geology," *antea cit.*, pp. 410, 411.

‡ In this and the remaining papers of the series I do not propose to refer to animals belonging to any sub-kingdom lower in the scale than the *Arthropoda*.

§ *Pisces*, *Amphibia*, *Reptilia*, *Aves*, and *Mammalia*.

|| This Order is only known at this Period by more or less doubtful footprints.

¶ Hitchcock, in Mem. of Amer. Acad. (new series), vol. iii, p. 129, 1848; and Dana. in "Manual of Geology," *antea cit.*, p. 411.

NOTES ON BRITISH TORTRICES.

BY C. G. BARRETT.

(Continued from page 149).

Spilonota rosæcolana, Dbld. There is special interest attaching to this species on account of its being either very scarce or not recognised on the continent. In Dr. Wocke's list it is only included with a query as to whether it is a variety of *suffusana*, and Prof. Zeller only recognised its distinctness on receiving a series from me a few years ago. In this country it has been known for nearly thirty years—having been described by Mr. Doubleday in 1850—but I think that no information respecting its larva has ever been published, and the only note on its earlier stages that has reached me is an observation by my friend, Mr. Machin: "larva feeding in June in shoots of rose."

Therefore, I was gratified at finding, in the summer of 1876, that the moth was rather common in a small hedge of sweet-briar in the garden, and appeared to be so especially attached to the sweet-briar that the neighbouring roses hardly furnished a specimen. It was sluggish and difficult to disturb in the day-time, but more lively towards dusk, and flying actively after dark. Early in the succeeding summer I found larvæ feeding in the young shoots of the sweet-briar, of which the following is a description:—

Thick, fat, rather wrinkled, somewhat cylindrical, but tapering at each extremity. Head brown, dorsal plate black, anal plate brown, body having the whole dorsal surface purplish-brown down to the spiracles, but the ventral surface whitish, thus leaving a curious resemblance to an infant *Cossus* larva. Very sluggish, living in the young growing shoots of sweet-briar (*Rosa rubiginosa*), drawing together the leaves and eating out the heart, often boring down into the shoot if it is succulent, but moving readily to a fresh shoot, and leaving it when full grown to assume the pupa state among rubbish. Feeding through May and until the middle of June. Pupa light brown. Imago emerging from June 29th to the end of July. Feeding also—but less commonly—on other roses, both wild and cultivated.

For comparison, it may be interesting to give descriptions of the larvæ of the allied species, all of which have been noticed before.

Spilonota roborana, Tr. Larva very short and obese, tapering almost from the middle to the extremities. Head small, light brown, dorsal plate black, anal plate very small, black also, body entirely shining brown or liver-coloured, semi-transparent, with the intestinal canal visible. Very sluggish, living in young shoots of *Rosa canina*,

R. spinosissima, and other roses, drawing and twisting the leaves tightly together, and eating out the heart. In gardens it is a great nuisance, eating out the inside of the young flower-buds directly they appear. It is rather later than *rosæcolana*, feeding through June. When full-fed it leaves the shoot or bud to spin up among leaves or rubbish, where it becomes a light brown pupa. The moth emerges from the middle of July. It is rather variable, apparently influenced by food, since specimens reared on *Rosa spinosissima*, besides being small, are generally more or less suffused with rosy or grey.

Spilonota trimaculana, Haw. (*suffusana*, Z.). Larva very short and obese, tapering from near the middle. When half grown dark liver-coloured, with short, transparent, glistening hairs, and shining black head and plates. When full grown paler in colour, and tinged with greenish-brown, sometimes yellowish beneath, head light brown, dorsal plate black, anal plate yellowish. In young shoots of hawthorn, drawing the leaves slightly together and eating out the heart. Rather difficult to find, as it generally chooses a strong terminal shoot rather high on the hedge, and does not greatly *distort* it, but merely checks its growth. Moving readily from shoot to shoot, but leaving them when full-fed to spin up among rubbish, where it becomes a light brown pupa. I found well-grown larvæ from April 27th to the middle of May. The first moth emerged on June 3rd.

Spilonota incarnatana, Hb. (*amænana*, Ilb.). I have searched for the larva of this species in its locality the last two seasons, without success (the larvæ found all producing *roborana*), and have been disappointed of the opportunity of describing it, but Mr. Hodgkinson tells me that he rears it from larvæ which are not distinguishable from those of *roborana*, feeding on *Rosa spinosissima*, in Lancashire. This agrees with Dr. Hofmann's description from Treitschke: "Very similar to *roborana*, but smaller, pupa light brown with darker wing-cases." According to Ottmar Hofmann, it feeds also on *Rosa canina* and *birch*. If correct, this must refer to the large inland variety which is found occasionally in Epping Forest and other southern localities.

While, therefore, the larvæ of these last three species are so much alike as to be barely distinguishable, that of *rosæcolana* differs from them strikingly in form as well as in colour, a distinction the more interesting as it accompanies a striking difference in shape in the fore-wings of the perfect insect.

Notocelia Udmanniana, L. The larva of this species is very well known, and has several times been described, and I only mention it to

point out—as Mr. Doubleday did to me six years ago—its close resemblance to that of *Spilonota roborana*, and also to record what does not seem hitherto to have been noticed, that in the curious ball of leaves formed by the determined spinning of the larva, along with the vigorous growth of the bramble shoot, there is a chamber of considerable size completely stuffed with the closely packed excrement of the larva.

Pembroke : 12th March, 1879.

NOTES ON THE BRITISH SPECIES OF THE GENUS *ODYNERUS*.

BY EDWARD SAUNDERS, F.L.S.

I have lately been examining our British species of this genus, with the assistance of Thomson's excellent "Hymenoptera Scandinaviæ," and I thought that the results I have come to might be useful to other British Hymenopterists. Our species of the genus may be easily divided into the three known sections, thus :—

I. Species without a raised transverse line at the base of the

1st segment of the body *HOPLOPUS*

II. Species with a raised transverse line at the base of 1st
segment :—

a. Apical joint of antennæ in ♂ recurved, basal joint
of abdomen in both sexes with long hairs *ANCISTROCERUS*

b. Apical joint of antennæ in ♂ simple, basal joint of
abdomen in both sexes naked *SYMMORPHUS*

In the first section (*Hoplopus*) are four species : *spinipes*, *melenocephalus*, *lævipes*, *reniformis*. Of these, *reniformis* is distinct by the long yellow spine on the intermediate coxae of the ♂, and the yellow spot on the clypeus of the ♀; *lævipes* differs from the remaining two in having the intermediate femora of the ♂ simple, and the thorax in both sexes truncate in front, with the angles prominent; *spinipes* differs from *melenocephalus* in being larger, with yellower markings, and the pubescence on the head and thorax denser and darker, the ♀s are easily separated, as the clypeus in *melenocephalus* is nearly entire in front, whereas in *spinipes* it is deeply notched.

In the second section (*Ancistrocerus*) *basalis* has a red basal joint to the body; *quadratus* may be separated off at once by the second segment of the body beneath being slightly raised towards the base, and then falling abruptly to the level of the transverse crenate sulcature; *parietum* can next be distinguished by the second segment of the body, beneath, beyond the basal sulcature, being quite flat longi-

tudinally, whereas in all the others it is more or less convex longitudinally, the costæ of the sulcature also are much shorter than in its allies. *Antilope* can then be separated off by the concavity of the metathorax above the insertion of the body, which is distinctly shining, whereas in the others it is quite dull. We are then left with *3-marginatus*, *3-fasciatus*, *parietinus*, and *pictus*. *Trifasciatus* may be known by its long thorax, the mesothorax being longer than wide across the tegulae; *3-marginatus* differs from the other two in having only three abdominal bands; finally, *parietinus* differs from *pictus* in having the 1st segment of the body narrower, and its band largely and suddenly dilated on the sides, while in *pictus* the bands are all linear.

The third section (*Symmorphus*) has three species: *crassicornis* may be known by its larger size, smooth and almost impunctate sides of the mesothorax; *gracilis* has many abdominal bands, the thorax truncate in front, and its angles mucronate; *sinuatus* has only three abdominal bands, the thorax rounded in front, and the angles not mucronate.

Mr. Bridgman first called my attention to *parietinus*, and remarks that there is a first-rate figure of it in Curtis's British Entomology; there is no doubt, I think, that all the species are good and distinct, they only want a little careful examination.

Holmesdale, Upper Tooting:

February 13th, 1879.

A NEW *EUDROMUS*, AND THREE NEW SPECIES OF *LEPTURIDÆ* FROM MADAGASCAR.

BY H. W. BATES, F.L.S.

In the few remarks I published in the January number of this magazine on the remarkable carabideous genus *Eudromus*, I alluded to the probability that more species yet remained to be discovered on the highlands of central Madagascar. It so happens that the next collection arriving in London from that island contained a strikingly distinct and beautiful new species of this genus, which I take this early opportunity of describing.

In the same small collection, and in a previous one of similar character, the extraordinary *Lepturidæ* of Madagascar were well represented; there being, besides *Sagridola maculosa* (Guér.) and *Logisticus rostratus* (C. O. Waterhouse), three new species of large size, one a new genus, the descriptions of which are here added.

EUDROMUS LUCIDIPENNIS.

Niger, politus, sub-opalescens : thorace sub-cordato, angulis posticis rotundatis, levissimo, sulcis tribus modice impressis : elytris elongato-ovatis, humeris nullis, carina laterali valde elevata costisque utringue quinque obsoletis, apice simplicibus : tarsis (♂) omnibus subtus dense setosis.

Long. 15 lin., ♂.

Very distinct from the allied species by the polish of its surface, which appears as though varnished, and above has opalescent reflections. The elytra are destitute of humeral angles, which are more completely obliterated even than in *Eu. striatocollis*. The eyes are rather more prominent than in that species, and the posterior orbits less tumid. The thorax is sub-cordate, but much less sinuated and narrowed behind than in *Eu. striatocollis*; there is, however, a distinct sinuation in the sides, preceding the blunt and almost rounded hind angles; the surface has a long shallow groove (the prolongation of the basal fovea) on each side the dorsal furrow. The lateral carinæ of the elytra are so prominent, that the epipleuræ towards the base are almost vertical; they are also reflexed, making the sides of the elytral surface longitudinally concave; the interstices between the indistinct costæ are excessively smooth and glossy.

Madagascar: one example, ♂, for which I am indebted to Mr. George Lewis.

ANTHRIBOLA, nov. gen. (*Lepturidae*).

*Gen. Sagridolæ affinis. Caput elongatum, ante oculos rostriforme, haud dilatum : tubera antennifera haud elevata, fronte subplana ; oculi ovati, haud emarginati, oblique positi, prominuli, subtilissime granulati. Antennæ corpore breviores (♀?) graciles, filiformes, mediâ fronte longe ante oculos inserti ; articulo basali fere linearí quam 2—4 conjunctis longiori. Thorax subcampanuliformis, ut in *Lepturis*, sed dorso leviter bigibboso. Elytra trigona, ad suturæ apicem paullulum dehiscentia, apice sinuato-truncata, extus spinosa. Pedes sub-breves, robusti, femora intermedia et postica subtus acute dentata ; tibiæ rectæ, tarsi haud elongati.*

A remarkable form, much resembling *Sagridola*, but differing in the elongated parallel rostrum and slender antennæ, with elongated scape, &c.

S. DECORATUS.

Supra ochraceo-pubescent, capite thoraceque supra vittis duabus, elytris fascia sub-basali maculari, alteraque postmediana utroque disco postice dilatata, humeris et marginibus nigris ; epipleuris nudis nitidis, testaceo-fulvis ; pedibus antennisque nigris.

Long. 9 lin., ♀?.

Madagascar.

MASTODODERA COCCINEA.

Magna, robusta, rufa; elytris paullo rufo-velutinis exceptis, nuda; prosterno medio, mesosterno et coxis omnibus nigris; capite fere ut in M. nodicollis, oculis minoribus colloque crassiori; antennarum scapo subclavato: thoracis tuberibus quatuor dorsalibus fere aequalibus, tubere laterali magno, paullo curvato: elytris amplis, apice integris, supra basin versus punctulatis; tarsis posticis articuli basali triangulari haud elongato. Long. 18 lin., ♀.

The colour of this large and conspicuous insect is nearly that of red sealing-wax, including antennæ and legs; the black portions are confined to the coxae and the surrounding parts of the sterna.

Madagascar.

The thorax is impunctate, and, like the rest of the body, slightly shining. Some patches of silky pubescence on the elytra have, in certain lights, a beautiful rosy tint.

MASTODODERA DIFFORMIPES.

M. nodicollis angustior, capite, corpore subtus, antennis et tibiis nigris, thorace sanguineo, elytris fulvis subglabris margine laterali et sutura anguste nigris: pedibus posticis (præcipue tarsis) elongatis, tibiis apice intus subito dilatato-sublobatis, tarsis testaceo-flavis; femoribus omnibus rufo-castaneis basi nigris, tarsis 4-anticis nigris. Long. 10 $\frac{1}{2}$ lin., ♂.

The head is more elongated in front of eyes, and the base of the antennæ proportionately more remote from the latter than in *M. nodicollis*; but the shape and granulation of the eyes are the same. Head and thorax are covered with close minute punctures; the latter has four rounded, slightly elevated tubers on the surface, besides one, more conical, on each side, a little before the middle. The elytra are less broad at the shoulders, and are singly somewhat narrowed towards the apex, the latter briefly truncated. The dilatation of the apex of the posterior tibiae forms an obtusely angular, compressed lobe. The claw-joints of the tarsi are dilated almost as much as in *Logisticus rostratus*.

Madagascar.

Bartholomew Road, Kentish Town:

March, 1879.

Is Dytiscus latissimus found in North America?—My regretted friend, the late G. R. Crotch, has recorded this species as North American, chiefly, I believe, from information furnished to him by myself. In the Trans. Am. Ent. Soc. (December, 1876, p. 250), Dr. Horn has published the following note on the subject:—“*Dytiscus latissimus*, Lin., should not be included in our lists. I am satisfied that the species was never alive on this side of the Atlantic, and from the number of

specimens sent me from time to time for determination, identical with those of England, and pinned with English pins, I am convinced that there must be great carelessness or deception on some side. We have enough species legitimately introduced without bringing dead ones on pins."—Very good, Dr. Horn!—But I am sure my talented friend will forgive me for suspecting that, notwithstanding the rather tall tone of his note, the deception may be with him; and for the following reasons, viz.: that the species does not occur in Britain, *a fortiori* not in "England," and that the British pin is evidence rather of a Canadian, than a continental-European, origin for the "number of specimens;" most Canadian collectors having formerly used British pins. Next, that the limited distribution of the species in the old world and the area in which it there occurs render it very probable that it exists also in North America, though perhaps not descending so far to the south as to reach the United States. The evidence of the existence of this remarkable species in North America is, however, undoubtedly in need of confirmation. Perhaps some Canadian reader of this magazine may be kind enough to give us a note on the point.—D. SHARP
Thornhill, Dumfriesshire: 18th March, 1879.

Notes on some species of British Hemiptera.—*Peritrochus nubilus*, Fall. (c.f. E. M. M., vol. xi, 267, and xv, 202).—I took a single example out of a tuft of grass at the side of a path in Darenth Wood on 2nd October last.

Pilophorus perplexus, Doug. and Scott.—At the beginning of July, among a number of *Formica fusca*, I saw some larvæ of this species running up and down the stem of an apple tree; before the end of the month there were adults in the same situation, and shortly afterwards I found them on the various trees of the garden, where no larvæ had been seen.

The genus *DICRANONEURA*, or, as Hardy imperfectly wrote it, "DIKRANEURA," appears not to be accepted on the continent, *vice Notus*, Fieb. (1866), although it is identical and dates from 1850 (Trans. Tyneside Nat. Field Club, i, 423). The character of the neuration of the type, *D. variata*, is well expressed—"Wings with the upper nerves disposed in two forks, the upper opening inwardly on the base, the 2nd shorter-pronged, outwardly on the apex." This configuration is excellently represented for the same species (*Notus aridellus*, Sahlb.) by J. Sahlberg in the "Not. Fenn.", xii, tab. i, fig. 21. The "forks" lie reversed as to each other, the parallel prongs resembling those of musical tuning-forks, and are connected by a short transverse nervule, which Hardy appears to have overlooked, as he could easily do, for it is slight and mostly transparent:—he says, respecting it, "no apparent cross nerve."

Dicranoneura variata, Hardy.—Of this very common species the colour of the elytra varies from pale green to dark green, sometimes with a reddish flush. Mr. G. Norman lately sent some examples, taken by him at Forres, of which the greater portion of the corium of the elytra was of a deep orange-red, thus making the specific name very appropriate. This deep red colour does not appear on southern examples.

Typhlocyba blandula, Rossi.—On the 23rd March last, at West Wickham Wood, I found this species abundant on the green leaves of brambles. It is to be noticed, that, however much the red colour of the elytra varies in intensity, the portion next the costa is always clear and pale; and that in the posterior tarsi of the ♂ the last joint only is black on the posterior half, while in the ♀ this joint is pale like the others.

Typhlocyba tiliæ, Geoff. (*c. f.* E. M. M., xii, 79, and xiv, 132).—At the same time and place as above I took three ♂ and one ♀ from a fir tree. In this species it is to be observed that the costal area on the whole length of the elytra in both sexes has a vittate suffusion of rose colour, which is not apparent in the otherwise very similarly marked *T. blandula*. In the ♂ the posterior tarsi are wholly black, but in the ♀, except the claws, they are wholly pale.

Typhlocyba rosea, Flor.—In the E. M. M., xii, 77, I indicated this species as British, on the strength of one example, but I find now, on the re-examination of it by the side of the ♀ *tiliæ*, above mentioned, that it is only that species, and that I had not observed the peculiar great length of the 1st joint of the posterior tarsi, characteristic of *rosea*, is wanting in my example. *T. rosea* must, therefore, be expunged from our list, but I hope only temporarily, for, as it is found on spruce firs (*Pinus abies*) it may surely occur in Britain.

Typhlocyba quercus, Fab.—At the beginning of July I saw this species in all stages of existence, except the adult, on the underside of the leaves of cherry trees; subsequently, the first-developed insects were to be seen alongside pupæ, and afterwards, for two or three months, plenty of adults were to be met with on every tree in the garden.

Typhlocyba debilis, Doug. (E. M. M., xii, 204).—This still remains scarce, and hitherto I have seen only the ♀. I found one on oak at Darenth Wood, October 2nd, and one on beech at the Addington Hills, October 14th. Mr. Edwards also took one on beech at Norwich (p. 136 *ante*). M. Lethierry reports that the species has been found in France—in the Landes and the Hautes-Pyrénées (Comptes rendus Soc. Ent. Belge., 7 March, 1878)—but the food-plant is not yet ascertained.

Typhlocyba nitidula, Fab.—I have examples of this with the black colour on the corium of the elytra so much extended that it covers nearly the whole surface, and I believe, as indeed M. Lethierry himself suspects, that this form is his *Anomia Norgueti* (Hém. Nord, p. 73).

Typhlocyba gratiosa, Boh.—Last year, for the first time, I found the ♂ on beech trees, September 7th, but then newly developed and limp, there were also females; on the 27th, I obtained plenty of the ♀ fully coloured, but no males. I do not understand how, in so short a time, the males had vanished, except by supposing they had fulfilled their functions and died. The females always long survive the males.

Typhlocyba Douglasi, Edwards (E. M. M., xiv, 248).—On the 28th September I got ♂ and ♀ out of beech trees, on the leaves of which I am convinced the species must live, there being scarcely any other kind of tree in the place, and it comes only from the beech.

Eupteryx stachydearum, Hardy.—In his description of this species (Trans. Tyneside Nat. Field-Club, i, 422), Hardy says, “legs entirely yellow, or the greater part of the tarsi black.” This difference of coloration is a sexual character; last autumn I captured a great many examples on some plants of balm (*Melissa officinalis*) in the garden, and found that in the male the second joint of the posterior tarsi was always more or less black, and in the female it was always pale like the other joints. There could be no doubt that they were the sexes of one species, for I saw many *in cop.*

Eupteryx melissæ, Curt.—As Curtis says, and Marshall also observes, the elytra

are of a delicate sea-green instead of the more yellow colour of the preceding species; the stature is also smaller, and the tarsi are pale in both sexes. The species was abundant on the balm-plants, above mentioned, from August to October.

Eupteryx vittatus and *E. pictus* also occurred on the same plants, but not many of either.

Trioza galii, Foerst.—I find, that in some of the examples captured in August (*vide p. 92 ante*), the white markings on the abdomen have now disappeared, but in others they remain. I think that those authors who have not adverted to the white markings must have had before them examples in which the markings had become evanescent by lapse of time.

Aphalara exilis, Weber and Mohr.—On the 14th October I found several individuals of each sex, the male predominating, in tufts of grass growing by the road-side at the Addington Hills. I had previously sought on the heather in vain. The species has been found on fir and other trees, but, as far as I am aware, the food-plant is not known.

Aphalara polygoni, Foerst.—On the 2nd September, on a plant of *Polygonum hydropiper*, I found two examples, ♂ and ♀, so flaccid and colourless that they could not have emerged from the pupa-state for more than a few minutes. On the 28th Sept., on the same plant, I found several individuals fully developed and coloured. On previous occasions I have taken the species in autumn on fir trees, and, in June, on *Rumex acetosella*, on which last it was also found by Haliday; but it was originally discovered by Foerster on *Polygonum*.

Rhinocola aceris, Lin.—I saw a few soft, newly emerged individuals on *Acer campestre*, at Lee, on August 1st; these, I think, were of a second brood, the first appearing in June, but the occurrence of two broods has not been recorded.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: *January 23rd, 1879.*

Morayshire Hemiptera.—The following species of *Heteroptera* I have added to the list published in 1877 (*Ent. Mo. Mag.*, xiv, 165).

Microphysa pselaphiformis.

Conostethus brevis, Reuter.—In profusion, on thrift and *Carices*; Bay of Findhorn, 17th June and afterwards.

Plestiocoris rugicollis.—I have found, this season, in profusion, on hoary sallow and *Myrica gale*.

Salda lateralis, Kinloss.

Agaliastes saltitans, at Findhorn.

Agaliastes Wilkinsoni, *Dictyonota strichnocera*, *Phytocoris dimidiatus*; Burgie and Pluscarden.

Berytus pygmæus.

Dicyphus stachydis, Reuter, == *collaris*, Flor; in profusion on *Stachys*. This is the species I gave in my last list, in error, as *D. errans*.

Gerris odontogaster, Loch Romach.

The following *Homoptera* have occurred here during the past season, and have been named for me by the kindness of Messrs. Douglas and Scott.

Cixius cunicularius, Fab., *C. nervosus*, Lin., *C. intermedius*, Scott, *C. contaminatus*, Flor.

Liburnia guttula, Germ., *L. similis*, Kirschb., *L. forcipata*, Boh., *L. pellucida*,

Fab., *L. extrusa*, Scott, *L. neglecta*, Flor, *L. cognata*, Fieb., *L. limbata*, Fab. *forma macroptera*, abundant in Butler's Marsh and Scrapehard Pond.

Dicranotropis hamatus, Boh. *forma macroptera*, on hazels, Sanquhar, in July.

Aphrophora alni, Fall.

Philænus spumarius, Lin., *P. exclamationis*, Thunb., *P. lineatus*, Lin.

Ulopa reticulata, Fab.

Megophthalmus scaniens, Fall.

Eupelex sp. ?, larva on a dry bank.

Acocephalus rusticus, Fab., *A. bifasciatus*, Lin., *A. albifrons*, Lin., *A. polystolus*, Fieb., *A. carinatus*, Stål.

Macropsis lanio, Lin.

Idiocerus populi, Lin., *I. confusus*, Flor.

Bythoscopus alni, Schr., *B. fruticola*, Fall.

Agallia puncticeps, Germ., *A. venosa*, Germ.

Tettigonia viridis, Lin.

Euaeanthus interruptus, Lin., *E. acuminatus*, Fab.

Alebra albostriella, Fall.

Cybus smaragdulus, Fall.

Chlorita flavescentis, Fab., *Ch. apicalis*, Flor.

Dicranoneura variata, Hardy, sometimes cherry-red in colour. *D. aureola*, Fall., on *Carices*, Findhorn Marsh; new to our lists (*vide p. 202 ante*).

Typhlocyba decem-punctata, Fall., *T. quercus*, Fab., *T. ulmi*, Lin., *T. tenerrima*, Schäff., *T. nitidula*, Fab., *T. geometrica*, Schr., *T. rosæ*, Lin., *T. alneti*, Dahlb., *T. blandula*, Rossi, *T. tiliæ*, Geoff.

Eupteryx vittatus, Lin., *E. notatus*, Curtis, Butler's Marsh, on grass, September, *E. urticæ*, Fab., *E. auratus*, Lin., *E. pictus*, Latr., *E. stachydearum*, Hardy, on *Teucrium*, *E. pulchellus*, Fall., *E. Germari*, Zett.

Cicadula sexnotata, Fall.

Thamnotettix cruentata, Panz, on *Vaccinium* and *Empetrum*, *Th. splendidula*, Fab., *Th. torneella*, Zett., *Th. intermedia*, Boh., *Th. virescens*, Fall., *Th. quadrinotata*, Fab.

Athysanus grisescens, Zett., common, Butler's Marsh, *A. sordidus*, Zett., *A. obsoletus*, Kirschb., *A. plebeius*, Fall., *A. obscurellus*, Kirschb., *A. subfusculus*, Fall., *A. prasinus*, Fall., *A. distinguendus*, Fall.

Allygus mixtus, Fab.

Deltocephalus abdominalis, Fab., *D. sabulicola*, Curtis, *D. striatus*, Lin., *D. socialis*, Flor, *D. ocellaris*, Fall., *D. pulicaris*, Fall., *D. pseudocellaris*, Flor.

Arytæna ulicis, Curtis, *A. genistæ*, Latr.

Psylla Försteri, Flor, *Ps. alni*, Lin., *Ps. buxi*, Lin., *Ps. salicicola*, Först., *Ps. pineti*, Flor, *Ps. mali*, Först., *Ps. fraxinicola*, Först., *Ps. fraxini*, Lin., *Ps. cratægi*, Scop., *Ps. peregrina*, Först.

Trioza urticæ, Lin., *T. acutipennis*, Zett., common on *Carices*, in a small loch in Sanquhar, August to December.

Aphalara exilis, Weber and Mohr, *A. polygoni*, Först., *A. picta*, Zett., *A. nervosa*, Flor.

Rhinocola ericæ, Curt., with the elytra having clear brownish dots, being the form mentioned by Flor; common on ling, May to September.—G. NORMAN, Cluny Hill, Forres : February, 27th, 1879.

Helicopsyche bred in Europe.—The heading of the notice on *Helicopsyche* in the last number (p. 239) of this Magazine, conveyed an erroneous idea, as the context shows. For “England” read “Europe.”

I have since received specimens of larvae (with cases) and of the insect (in alcohol) from Professor de Rougemont. The ♂ is probably my *H. (?) sperata*; the ♀ I received was that of some *Tinodes* (or genus allied thereto), and has no connection with *Helicopsyche*. Professor de Rougemont informs me that he has since detected the true ♀.

In the published report of the Meeting of the Italian Entomological Society for November 24th, 1878, there is an apparently independent account of the breeding of *Helicopsyche* from the pens of Signor Tassinari (who described the cases as shells) and Professor Targioni-Tozzetti, the President of the Society, with an outline figure of the supposed ♀, and an imperfect description. This ♀ is also a *Tinodes*, or allied thereto.

Immediately after my previous notice was in print, I received the cases and insects of two Brazilian species of *Helicopsyche* (in the broad sense), forwarded by Dr. Fritz Müller.—R. McLACHLAN, Lewisham : 17th March, 1879.

Capture of Odynerus basalis.—On the 14th July last I captured two specimens of the very rare wasp, *Odynerus basalis*, Smith, in the Isle of Purbeck. Had I known their rarity at the time I might have taken more, but I was busy in capturing other rare species, such as *Anthribus albinus*, *Cloresoma Schillingi*, *Ebulea verbascalis*, and *Pempelia Davisella*. The wasp is well described by Mr. Smith in the Entomologists’ Annual for 1869, p. 73, where Mr. Rothney’s capture of the species is mentioned : but, strange to say, Mr. Smith has omitted the species altogether from his List of Aculeate Hymenoptera. It constructs round nests of sand at the tips of the spear-like grass which generally grows on sand-hills. Next summer I hope to get more specimens and knowledge.—C. W. DALE, Glanville’s Wootton, Sherborne : Mar. 17th, 1879.

Record of a butterfly new to the fauna of Japan.—I have recently obtained from Yokohama an example of *Charaxes Narcæus*, Westwood, and I believe this is the first specimen of the species from the Japanese Archipelago ; it was originally recorded from North China.—GEO. LEWIS, 3, Green Street, Grosvenor Square : 18th March, 1879.

On the pupation of the Nymphalidæ.—In anticipation of the event which has actually occurred, viz., the re-publication of the article on this subject, from the “Canadian Entomologist,” in this Magazine, I refrained from posting a letter which was already written calling attention to the very interesting communication of W. H. Edwards, of which I had already received a copy through the courtesy of the author. I will now only ask permission to observe that we have here the existence of the ligament demonstrated in two new species, and, indeed, of different sub-families, of the *Suspensi* : and that it is found in another family, belonging to the *succincti*, viz., in *P. brassicæ* (and I believe also in *A. cardamines*), I have already shown. It becomes interesting, therefore, to enquire how far its presence may be traced in other genera and families of this Order, and I hope that, during the coming summer, much infor-

mation on this subject will be obtained. Naturally differences of structure and in the mode of pupation will be observed in different species ; so that inferences from observations on one or two species might lead to error if generally applied. In describing the pupation of *Graptia interrogationis*, Mr. Edwards says (p. 224), "It is a wonderful exhibition, and the last act is beyond my comprehension, namely, the rising of the chrysalis with no external aid save what comes from the ligament. I can only state the fact." If, when the chrysalis is suspended by the ligament alone, its tail is too short to reach the button of silk, it is evident these parts can only be brought together in one (or both) of two ways, viz., by the lengthening of the tail, or the shortening of the ligament. Whether or not the former contributes to the results, it does seem that not only the ligament but the whole internal lining of the caterpillar skin is elastic, or at least subject to shrink up, especially when exposed to the action of the air. In making specimens to show the ligament, I found that it was necessary not to pin it out at the full stretch it would easily bear at first, but that it must be considerably relaxed, or it was sure to part in drying from its attachment to the chrysalis. But that the tail of the chrysalis itself also increases in length by a process of growth is also extremely probable. At the moment of exclusion the anterior horn of the chrysalis of *A. cardamines* is a minute (ventrally) incurved process, and it may be almost seen growing till in an hour or two it had attained the complete size, when it is equal in length to the posterior horn. Mr. Edwards has noticed and remarked upon this out-growth of the mesonotum of the chrysalis of *interrogationis* (p. 224 ante) : at first, he says, "this organ is pressed down and flattened, but in a short time, and before the transformation is completed, it swells out, and becomes nearly as large and as prominent as it ever will be." What takes place in the mesonotum of *interrogationis*, and in the anterior horn of *cardamines*, and probably more or less in all parts of the chrysalis, need only take place to a small and not noticeable extent in the tail of the suspended pupa in order to equalize its length with that of the suspending ligament, itself perhaps shrinking up under the action of the air.—

J. A. OSBORNE, Milford, Letterkenny : *March*, 1879.

Description of the larva of Myelois cibrum.—On the 26th of April last, I received through the kindness of Mr. John Wilson, of Bermondsey, a few larvae of this species. Some of them were apparently almost full-grown, so I described them at once, as follows :—

Length, when at rest, about three-quarters of an inch, and, when crawling, quite an inch ; rather plump, and of nearly uniform width throughout ; head highly polished, considerably narrower than the second segment ; body cylindrical, tapering very slightly towards the anal segment ; the segmental divisions well marked ; there is a polished plate on the second, and a smaller one on the anal segment ; skin rather soft, with a semi-translucent appearance ; a short hair springs from each tubercle.

Ground colour a very pale olive-green, inclining to drab ; head and frontal plate intensely black, the small anal plate not so conspicuously dark. A darker shade of the ground colour, broadly bordered on each side with dull whitish stripes, forms the dorsal band ; sub-dorsal stripes white, but there are no spiracular lines ; spiracles round, they, and also the tubercles and hairs, are black.

Ventral surface and prolegs very pale dingy greyish-green, the legs black and polished.

Feeds in the dried stems of thistle, eating neat circular holes through to enter a fresh stem, or to quit an old one. When full-grown spins a net-like cocoon of white threads in the cavity formed by having eaten away the pith in the stem, and in this changes to a pupa. This is about five-eighths of an inch long, slender, and of the ordinary shape; the eye-, leg-, and antenna-cases prominent, the last especially so, being raised quite on the top of the thorax, and extending from the head to the base of the wings; there are also two slight prominences extending over the base of the wings in front. Ground colour almost uniformly bright glossy pale brown, the upper side of the thorax, segmental divisions, and side tubercles, rather darker brown. The imagos began to appear on July 6th.—GEO. T. PORRITT, Highroyd House, Huddersfield: *March 5th, 1879.*

On the Australian Ecophoridae.—The extraordinary specific development of this group in Australia affords a remarkable parallel to the similar excessive multiplication of species in the genera *Eucalyptus* and *Acacia* amongst plants in the same region. Out of about 800 species of *Micro-Lepidoptera*, which I have classified, 210, or more than one-fourth, are referred to this family, placing it first on the list; the *Gelechidae* being just short of 200. Those few which have as yet been described by Walker, Zeller, and others, have been indiscriminately cast into *Ecophora*, Z.; but it is not a little curious that I find, on examination of the venation and other characters, that there is amongst them not a single true *Ecophora* (or perhaps one only), except the imported *pseudospretella*. All alike (excepting a single genus of about fifteen species, characterised by the excessively long basal joint of the antennæ, but possessing the venation of *Ecophora*) differ from *Ecophora* in that vein 7 of the fore-wings runs to the hind margin, or in one group to the apex, never to the costa. The only European genera represented are *Harpella*, by seven species, and *Blastobasis*, by two: *Endrosis lacteella* has also been imported. The other genera are probably wholly endemic, as the group appears hardly at all represented in other main regions.

Some progress has been made towards a knowledge of the larvæ, which do not seem to have the taste of *Ecophora* for dried material. The larvæ of the genus with elongated basal joint of antennæ all feed in spun leaflets of *Leguminosæ*, chiefly *Acacia*. Others live rather gregariously, several together amongst a good deal of web, on *Eucalyptus* and other trees. From the crambideous habit of one large group of handsome species, it is tolerably certain that their larvæ must live in the roots of grass, but I have not yet succeeded in finding them. Those of another smaller genus feed beneath the fibrous bark of trees. One very abnormal insect has a case-bearing larva, the case consisting of a stout piece of straight twig, hollowed out into a cylinder; it feeds on the *Eucalyptus*. Probably the more remarkable modes of life remain yet to be discovered.—E. MEYRICK, 243, Macquarie Street, Sydney: *January 20th, 1879.*

Elachista perplexella double brooded.—Last spring, at the end of March and beginning of April, I found small yellow larvæ in *Aira cæspitosa*, at the same time as those of *E. apicipunctella*. Thinking that they must be young larvæ of that insect, I did not examine them closely at the time; but found, when they left the grass, that they were still yellow. One of them fortunately pupated, and emerged as *E. perplexella*, previously only one brood (feeding in June b, and emerging in June e)

appeared to be known here; so that it may be of some interest. The egg must be laid in July, and the larva hibernates.—JOHN SANG, 6, Chestnut Street, Darlington: February 28th, 1879.

The food and habits of Velleius dilatatus.—For a long time it was a mystery to me why *Velleius dilatatus* dwelt only with hornets, and how it happened that it also lived in harmony with them; I conjectured that the *Velleius* must in some way be of service to the hornet-colony, otherwise the hornets would not tolerate its presence, yet I was not then sure of what its food consisted. To solve this question I had again to take a hornets' nest, but on account of its unfavourable situation I could only extract from it seven larvæ, and of these only one entire, the other six were injured and perished.

As only one *Velleius* was developed, I at once, by means of a pencil, gave it honey, which it ate with the greatest avidity; as I withdrew the pencil it clung to it so fast that I could thus drag it quite round the room. On the second occasion it at once recognised the pencil and approached it; it also drank much water; and I saw that it was very readily fed,—just like a young bird. As this kind of feeding took up too much of my time I gave it a piece of sugar, on which it remained for half a day, and would not leave it until it was satisfied. Thus there can be no doubt that these insects derive their nourishment from sweets, and that they partake of the same food as the hornet-brood.

The *Velleius* tears to pieces, with the greatest tiger-like fury, all insects which are injurious to the hornet-brood, especially the *Myriopoda*—*Cryptops*, Leach, and *Scolopendra*, Koch,—; these resist so strenuously, that only a confused action can be seen, but nothing distinguished, yet their dead dry bodies are thrown about with the greatest rage on every occasion. The *Myriopoda* which live among plants and decaying matter, such as *Geophilus*, Leach, are not touched, even if they crawl about on the *Velleius*, as also is the case with all other insects which are not injurious to the brood. It is not to be attributed to the hornets that they clear out all such animals from the hollow trees they select for their nests, for I had an opportunity to examine thoroughly the inside of one tree and found no creature which could be injurious to their brood, whilst, in other hollow trees, *Myriopoda* and other predaceous creatures swarmed. Thus I believe that no hornets' nest can thrive in a hollow tree without the presence of *Velleius*, and who knows whether the sharp, musky odour of this insect may not even contribute much to its security by keeping enemies at a distance?—the odour is so powerful that five or six of the *Velleius* will sensibly perfume a room. It therefore appears that *Velleius* eats the honey, and in return protects the hornet-brood, and the colony generally, by keeping off their foes.

Observation of *Velleius* soon brings conviction that it is very intelligent, at any rate, much more than most other beetles: the species is among beetles what parrots are among birds. When newly developed it is very shy, but it soon loses its wildness, at least when close to its food. It is lively and ever ready for conflict, and if disturbed from its rest, or if it becomes aware of an enemy, it springs on the intruder with out-spread wings, and uses its strong mandibles as weapons of attack. It flies easily, and this power is very serviceable, for it often has to travel great distances when seeking hornets' nests.

It occasionally happens that hornets make their nest for several years successively

in the same tree ; this occurs especially in oaks when the inner space is sound, but the more general case is that the walls of the cavity crumble down by progress of decay, the rain penetrates, and the nest perishes ; then such trees are forsaken, and *Velleius* has to find new nests. When it is engaged in such wanderings an entomologist may occasionally find an example, but in greater number it is only to be obtained in hornets' nests.

J. ERNÉ (Mittheilungen der schweizerischen entomologischen Gesellschaft, vol. v, p. 369, September, 1878).

[This article, which contains much that is new and interesting, forms the sequel to an excellent communication, by the same author, on the natural history of the *Velleius*, published in the "Mittheilungen," vol. iv (1877), but which is too long to reproduce here : I may, however, revert to its salient points hereafter.—J. W. D.]

ENTOMOLOGICAL SOCIETY OF LONDON.—5th February, 1879. SIR J. LUBBOCK, Bart., M.P., V.P.R.S., President, in the Chair.

The President named Messrs. H. W. Bates, J. W. Dunning, and F. Smith, as Vice-Presidents for the year.

Mr. Elwes exhibited a very interesting collection of *Lepidoptera* from an island at the mouth of the River Amur. The species generally were very European in character, and specifically identical with ours in some cases. Two of the most striking insects were (1) a butterfly, recently described as *Lühdorfia Putziloi*, closely allied to the genus *Thais*, and remarkable for the female possessing curious large waxy-looking abdominal appendages ; (2) *Saturnia Artemis*, allied to the North American *Actias Luna*.

Mr. C. O. Waterhouse exhibited a curious spider from West Africa, recently described by Mr. Butler as *Gasteracantha Cambridgei* ; in form and colour it strikingly resembled a small crab.

Mr. Champion exhibited the example of *Harpalus oblongiusculus*, recorded in this Magazine at ante p. 203.

Mr. Swinton called attention to a statement by Mr. Wood-Mason to the effect that a *Mantis* had never been heard to stridulate, and referred to Kirby and Spence's Introduction to Entomology, 7th ed., p. 493, where it is stated that Colonel Goureau has noticed that *Mantis religiosa* when alarmed produces a sound by rubbing the sides of the abdomen against the borders of the wings and elytra.

The Rev. A. E. Eaton read notes on the homologies of neurulation in insects, and, acting upon Professor Westwood's suggestion at the Meeting on December 4th, he had prepared a number of diagrams of the neurulation of various *Lepidoptera* and *Trichoptera*, coloured so as to show the homologising nervures, &c.

The Secretary read a note by Dr. Fritz Müller with reference to the mimicry of species of *Acræa* by *Eueides pavonia*, in which he remarked that this case presented the singular feature of the mimicking butterfly agreeing more closely with the males of that mimicked, instead of with the females as is usual.

Mr. Butler read a paper "On the *Lepidoptera* of the Amazons, collected by Dr. Trail," part iii, *Noctuitæ*.

Mr. C. O. Waterhouse read a description of a new genus and species of *Cucujionidæ*, found in an orchid house in England.

Mr. F. Moore communicated "Descriptions of the species of the Lepidopterous genus *Kallima*."

March 5th, 1879.—J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the Chair.

The Chairman, in a short address, referred feelingly to the great loss the Society had sustained by the death of Mr. Frederick Smith, who had been again nominated as one of the Vice-Presidents at the previous meeting.

Mr. J. T. Harris, of Burton-on-Trent, was elected a Subscriber; and Mons. C. Brongniart, of the Musée d'Histoire Naturelle, at Paris, was elected a Foreign Member.

Sir S. S. Saunders exhibited a series of species of *Halictus* from Greece, including new forms.

Mr. Wood-Mason recurred to Mr. Swinton's observations at the previous meeting regarding the stridulation attributed to *Mantis religiosa*, by Col. Goureau, and denied the existence of any true stridulating organs in the insect, the noise being merely caused by the rustling of the wings.

Mr. W. Cole called attention to Dr. Kerner's essay on "Flowers, and their Unbidden Guests," in which it was suggested that flowers were, as a rule, not attacked by larvæ, because they contained principles distasteful to them. Mr. Cole was of the opinion that the caterpillars, in neglecting flowers, had a regard for their own safety, rather than that they found them distasteful, and alluded to the fact, that the larvæ of many species, and even of almost entire genera, feed by preference on flowers. Mr. Meldola saw no difficulty in Dr. Kerner's statement, and suggested that in the case of flower-feeding larvæ, the digestive organs might be so modified as to permit of the colouring matter being permeated in an unaltered condition, in the same manner that chlorophyl passes unaltered into the tissues of green caterpillars that feed on leaves, as had been proved spectroscopically.

Mr. Elwes mentioned an instance of injury to bulbs of *Sternbergia* by some larva, which Mr. McLachlan suggested was probably that of the dipterous genus *Merodon*.

Dr. Sharp communicated a paper on *Coleoptera* from the Hawaiian Islands.

Mr. Cameron communicated a paper on new or little known species of British *Hymenoptera*.

Reviews.

THE BUTTERFLIES OF NORTH AMERICA, by W. H. EDWARDS; 2nd series, part vii, 4to. Boston—Houghton, Osgood & Co.; London—Trübner & Co. 1878.

We have frequently, on former occasions, spoken in terms of unqualified praise of preceding parts of this magnificent work. The part before us maintains the high reputation the author has gained amongst entomologists to its fullest extent; in fact it is, if possible, an advance on all previous parts, both in the beauty of the plates and the excellence of the text. The first plate, with four figures, is occupied by *Papilio Indra*, Reakirt, a species of very local distribution, and apparently confined to Western California. On the second plate, with eight figures, are represented *Anthocharis Genutia*, F., and *Julia*, Edwards, two species with curious falcate anterior-wings. The third plate, with eight figures of the butterfly and many of the larva, &c., is devoted to *Colias Eurytheme*, Boisd., to which are united *Keewaydin* and *Ariadne*, Edw., as polymorphic conditions. We have no space to devote to a consideration of the manner in which the author shows that the various forms are due to the brood

to which they belong, the species varying from two-brooded to many-brooded according to locality. The fourth and fifth plates are crowded with figures of *Phyciodes* (an extensive American genus allied to *Melitaea*). Of various forms of *Ph. Tharos* there are no less than twenty-seven figures of the butterfly and many of the egg, larva, and pupa. Two other species, *Ph. Phaon* and *Vesta*, are also represented. The author regards all these as originally one, but *Phaon* and *Vesta* having become established as distinct species, remain so, whereas *Tharos* appears in all sorts of seasonal and other forms. By a series of patient experiments in breeding from particular batches of eggs, and by subjecting some of them to artificially cold temperatures, the author succeeded in manufacturing (if we may use such a term) seasonal forms almost at will, and even in producing forms that in nature were only looked upon as remarkable aberrations. It should be remarked that seasonal dimorphism (or polymorphism) is almost as strongly marked in the larvæ of these insects as in the imago. The whole history is so interesting that short extracts could not do justice to it; it is a striking exemplification of how very little we know of the habits of the many thousands of so-called species of butterflies that exist on paper, and it is one more proof of the necessity for concentration in the studies of entomologists.

NOTES OF OBSERVATIONS ON INJURIOUS INSECTS. Report for 1878, drawn up by E. A. ORMEROD. 8vo, pp. 27. London—West, Newman & Co. 1879.

Miss Ormerod (assisted by other entomologists) is doing good work in her disinterested endeavours to spread a knowledge of the habits of injurious insects amongst horticulturists and agriculturists. This third Report is nicely got up and the illustrations will attract the attention of those for whose benefit it is intended. Twenty-one species, of various Orders, are treated upon. It was a mistake to include *Colias Edusa* among the pests; we do not suppose that any one was a penny the worse off for the extraordinary abundance of this beautiful butterfly in 1877, and by associating it with bad company, Miss Ormerod may unwittingly add to its persecution, as if it had not enough already in "picture" makers, bird-stuffers, and small boys; but it is expressly stated that it is included in the hope that observations on its habits may throw some light upon other intermittent appearances, such as that of *Athalia spinarum*, &c. We believe we are correct in stating that these Reports are intended for gratuitous distribution.

Obituary.

Frederick Smith.—In our last number (*ante p. 240*) we briefly announced the death of this well-known entomologist, under peculiarly painful (and almost sudden) circumstances, after a surgical operation, at the age of 73.

He was born, we think, in London, in 1805, of Yorkshire parents, but we are unacquainted with his early history. His occupation, when he became known as an entomologist, was that of an engraver on steel, and to this, by no means at any time lucrative employment, was added that of a small business in the south of London. As an engraver he was instrumental in the re-production of the works of several celebrated artists. At the same time he was deeply engaged in entomological pursuits, and especially on observations on the habits of *Hymenoptera*. These pursuits, combined with his skill as an engraver, probably brought him under the notice of John Curtis; at any rate, we know the latter was assisted by him in some of the later plates of the "British Entomology."

For a short time he was Curator to the then young Entomological Society of London. After the death of Edward Doubleday, in 1850, he was appointed an Assistant in the Zoological Department of the British Museum, and, in 1875, he became Senior Assistant, which post he held at the time of his death. He was President of the Entomological Society of London in 1862 and 1863.

It is not possible for us to give even the titles of the papers published by him in the Journals and the Transactions of various Societies, to the number of over one hundred. Many of these, combined with his general "Catalogues" of the *Hymenoptera* in the British Museum, were executed "to order," and were better than could be said of the bulk of contemporaneous publications issued from the same source. In these, as in all his work, he suffered from the want of general and special education ; it is a marvel he succeeded so well. He was more fitted for a field naturalist. In the field he was at home ; in the study his enforced work must have cost him painful and arduous labour. His keen powers of observation rendered all his field work of the utmost value, and the results appear (especially) in his various "Catalogues" (unfortunately of necessity so termed) of the British *Hymenoptera*, published by the British Museum, which were illustrated (as were many of his other papers) by plates drawn and engraved by himself, and of surpassing accuracy. His "Catalogues" of the British Aculeate and Fossiliferous *Hymenoptera* are in the hands of all. So lately as 1876, a "Catalogue" of British Bees, from his pen, was published, practically a second edition of that which appeared in 1855, and it might have been better for the author's reputation if this second edition never had appeared, for it shows too plainly his inability to keep pace with the progress of scientific knowledge ; the modern system of minute analysis was too much for him. It is only to a few that is given the power of accommodating themselves to conditions up to an advanced age : how many of us will be among those few, or know when to stop ?

It is not by his monographic or literary work that the name of Frederick Smith will endure. It will endure from his conscientious and original observations in the field. We have heard a great deal lately of the lives of such men as Thomas Edward and Robert Diek. It was to this class that Frederick Smith originally belonged ; if circumstances had permitted him to accumulate the same amount of general knowledge and to attain the same position, without the necessity of doing clerk's mechanical work, the world would have mourned the loss of a naturalist of a high order.

His attention was not confined to *Hymenoptera*. His knowledge of *Coleoptera* (especially *Curculionidae*) was extensive, and his British Museum work included a Catalogue of *Passalidae*.

It will be strictly in keeping with his conservative character if we allude to the tenacity with which he adhered to old ideas as opposed to modern. This was strikingly exhibited in the manner in which he persisted in acting the part of champion against those who, on the testimony of modern scientific explorers, ventured to doubt the luminosity of *Fulgora* : we might cite other analogous instances.

Socially he will be long missed, for he added much to the enjoyment of many festive gatherings of entomologists and other naturalists.

He leaves a widow, three sons, and a daughter, to deplore the loss of a good husband and father. One of his sons is well known as an artist in natural history subjects ; another is earning fame for himself as a conchologist in the British Museum.

In referring to his Museum work, we must not forget the unwearied kindness and courtesy with which during many years he assisted students and other visitors to the Insect room ; and the generosity and trouble which he bestowed in naming and adding to the collections of beginners.

DESCRIPTION OF TWO NEW EUROPEAN SPECIES OF PSYLLIDÆ.

BY JOHN SCOTT.

Genus TRIOZA, Först.

TRIOZA DICHROA.

♂. Black. *Face-lobes* long, projecting somewhat forward, somewhat stout at the base, apex acute, almost as long as the crown down the centre; divergence not so great as the base of either. *Antennæ* white, 1-2 joints black, apex of the latter white, from about 5-8 brownish, 9-10 black. *Elytra* clear, transparent, apex somewhat acute, about $2\frac{1}{2}$ times as long as broad; costal margin considerably convex from the base to the apex, and forming a continuous curve, dorsal margin slightly convex from the apex to the inner branch of the dorsal fork, then slightly concave to the claval suture where it recures to the base; nerves fine, slightly brown, especially towards and at their apices; radial cell lanceolate; nervelets brown or fuscous; exterior branch of the dorsal fork forming a long curve. *Legs* pale yellow. *Abdomen* and *genitalia* green.

Head: crown and *face-lobes* black, the latter long, projecting slightly forward, viewed from the side very slightly concave on the anterior margin; almost as long as the crown down the centre; somewhat stout at the base, apex somewhat acute; divergence not so great as the base of either. *Antennæ* white, 1-2 joints black, apex of the latter white, from about 5-8 brownish, 9-10 black.

Thorax: *pro-* and *mesonotum* black, except the apical portion of the latter, which is pale yellow. *Elytra* clear, transparent, about $2\frac{1}{2}$ times as long as broad, apex somewhat acute; costal margin considerably convex, and from base to apex forming an almost continuous curve; dorsal margin slightly convex from the apex to the inner branch of the dorsal fork, then slightly concave to the claval suture, where it recures to the base; radius slightly convex towards the dorsal margin; radial cell lanceolate, length of the cell, measured on the costal margin, a little longer than the distance between the apex of the elytron and that of the cell; nerves slightly brown, especially at their apices; nervelets brown or fuscous; exterior branch of dorsal fork forming a long curve. *Sternum* pale yellow or slightly brownish. *Legs* pale yellow; *tarsi*—1st pair generally black.

Abdomen green; *genitalia* green, processes, viewed from the side, broad, somewhat rectangular; length about $1\frac{1}{2}$ times the breadth of the base, outer margin concave at the apex, so that it appears to be produced into a short tooth; inner margin with a minute blackish spot at the apex; *genital plate* as high as or a little higher than the processes, base broad, apex narrow, exterior margin somewhat “ogee”-shaped, apex acute, upper margin concave.

♀. Pale yellowish-green. *Eyes* purplish. *Face-lobes* pale, slightly projecting forward and somewhat concave on the anterior margin, as in the other sex. *Legs* pale; *tarsi*—1st pair pale, 2nd joint black; 3rd pair, *tibiae*—vandykes (or frills) at the apex black.

All the other characters as in the ♂.

Length, 1 line.

Astrakan.

In appearance somewhat like *T. abdominalis*, Flor, but the great difference lies in the form of the exterior branch of the dorsal fork of the cubitus, also in the shape of the genital organs of the ♂.

I have been enabled, through the kindness of M. Jakowleff, to describe this and the following species, but in neither case does he furnish me with the name of the food-plant or the date of capture.

Genus APHALARA, Först.

APHALARA JAKOWLEFFI.

Chocolate or reddish-brown. *Crown, pro- and mesonotum* thickly punctured, having somewhat the appearance of being very finely scabrous. *Elytra* opaque, with a broad, almost black, velvety band round the apex, in which is a narrow, white transverse line; *costal margin* at the base slightly, and at the centre very perceptibly, concave; *radial cell* elongate, apex acute. *Wings* white, opaque; *costal nerve* for half its length from the base brownish-yellow, ulna red. *Legs* red-brown; *thighs* and *tibiae* on the sides with narrow, transverse, slightly waved, frosted, silvery-white bands; *tarsi* and *claws* of the 3rd pair red. *Abdomen* above almost black, with a yellow line down the centre, widening to the apex; beneath, deep yellow; *genitalia* of the ♂ deep yellow.

Head: *crown* thickly punctured, having somewhat the appearance of being very finely scabrous. *Antennæ* yellowish or somewhat ruddy-brown, 1-2 joints ruddy-brown; 9-10 black, base of the former broadly yellowish or ruddy-brown.

Thorax: *pro- and mesonotum* thickly punctured, having somewhat the appearance of being very finely scabrous. *Elytra* opaque with a broad, almost black, velvety band round the apex, in which is a narrow white line extending from near the upper nerve of the furcation of the superior arm of the cubitus to, or slightly beyond, the upper nerve of the inferior arm of the same; *costal margin* at the base slightly concave, at the centre very perceptibly concave; *radial cell* elongate, apex acute, length about two-thirds the distance from the base to the apex; *dorsal marginal appendage* and *nerve* deep, velvety, brown-black, with two white oblong spots between the claval suture and the first nerve of the fork of the cubitus, round the apex a broad, almost black, velvety band, in which is a narrow white line (sometimes having a few very minute black dots on its surface) traversing the space between the upper nerve of the furcation of the superior arm of the cubitus to a little beyond the upper nerve of the inferior arm of the same; *marginal apices* of the nerves white; next the *costal margin* and extending to the apex of the *radial cell* a triangular, almost black, velvety patch, divided by a trapezoidal white spot, interior to this last is a triangular, more or less distinct, pale brown patch extending across the elytron, having its apex on the *costal margin* near the commencement of the concavity of the same.

Wings white, opaque; costal nerve for half its length from the base brownish-yellow; ulna red. Legs red-brown; thighs and tibiæ on the sides with narrow, transverse, slightly waved, frosted, silvery-white bands; tarsi and claws of 3rd pair red.

Abdomen above almost black, with a deep yellow or orange-yellow line down the centre, widening to the apex; beneath deep yellow or orange-yellow; genitalia of the ♂ deep yellow, side view somewhat roughly resembling a 7-shaped character.

Length, $1\frac{1}{4}$ line.

Astrakan.

Unlike every other European species with which I am acquainted.

1, St. Mildred's Terraee,
Bromley Road, Lee, S.E. :
2nd March, 1879.

DESCRIPTION OF A NEW GENUS AND SPECIES OF HETEROMEROUS *COLEOPTERA* OF THE FAMILY *CISTELIDÆ* FROM HONOLULU.

BY CHAS. O. WATERHOUSE.

The species here described has been in the British Museum collection for some years, but without a name. Upon examination it has proved to be new to science, and to have characters which separate it from any genus known to me. I propose to call the genus *Labetis*.

LABETIS, *n. gen.*

Eyes reniform, widely separated above. Anterior coxae slightly separated. Anterior tibiæ flattened, gradually but slightly becoming wider from the base to near the apex, at the apex suddenly enlarged on the outer side; the tibiæ of the intermediate and posterior legs slightly enlarged at the apex. The 3rd and 4th joints of the anterior and intermediate tarsi furnished with a lamella, the 3rd joint of the posterior tarsi has a well developed lamella. The other characters as in *Allecula*, as given by Lacordaire (Gen. Col., v, p. 502).

This genus closely resembles *Allecula*, but the anterior tibiæ are unlike those of any of the family, resembling slightly those of *Microzoum* in the *Opatrides*, but more elongate, and without any mesial tooth.

LABETIS TIBIALIS, *sp. n.*

Elongato-ellipticus, convexus, flavus, nitidus, subitus piceus; thorace dense punctato; elytris fortiter punctato-striatis, interstitiis sat convexis crebre punctatis.
Long. $5\frac{1}{2}$ lin.

Sordid yellow, moderately shining, less so on the head and thorax; body beneath shining, pitchy. Head densely and rather strongly punctured. Thorax one-third broader than long, gently convex, gently narrowed from the base to the front, densely and strongly punctured, the anterior angles obtuse and not prominent, sides gently arcuate anteriorly, the posterior angles nearly right-angles, but blunt.

Elytra at the base distinctly broader than the thorax, the apical third arcuately attenuated, strongly striated, the striae closely and rather strongly punctured, the interstices gently convex, moderately, distinctly, and closely punctured. Antennæ slender, about three-quarters the length of the elytra.

Hab. : Honolulu, Hawaiian Islands.

A single example received from the late Mr. W. Harper Pease.

British Museum : *March*, 1879.

DESCRIPTIONS OF TWO SPECIES OF *CÆNIS* (*EPHEMERIDÆ*) FROM LAKE NYASSA.

BY THE REV. A. E. EATON, M.A.

A packet containing specimens of *Cænis*, and endorsed "Edible midges, which the natives of Nyassa make into cakes," was forwarded to me by Mr. H. B. Cotterill last December. They were caught by him on board a boat, about the middle of the lake, between Livingstonia and Makanjeras, while passing through a cloud of them, on the 25th of January, 1877. The gloominess of the suburban atmosphere in winter has caused their determination to be delayed. They represent the following two species, of which the second appears to be the most plentiful.

CÆNIS KUNGU, sp. n.

Imago sicca.—*Corpus isabelinum v. furfurosum, subtus pallide oehraceum, femoribus lutescentibus, tibiis tarsisque albidis, nisi tibial anticâ maris forsan pallide nigricanti exceptâ. Alæ vitrinae, pallidissime costas versus plus aut minus infuscatae, costâ cum nervis paucis proxime sequentibus nervulisque transversalibus interjacentibus atro-piceis.*

Long. corp. ♂ circiter 3·5, ♀ 4·5—5·0; al. ♂ 3·0, ♀ 3·5—3·75; set. ♂ subim. 1·75 mm.

CÆNIS CIBARIA, sp. n.

Imago sicca.—*Caput supra nigricans, antennis albis. Thorax pallide fuscescens, suturis apiceque mesothoracis nigris. Pedes albidæ, femoribus supra maculâ unicâ trigonali præapicali nigrâ magnâ, coxisque extra nigris. Alæ vitrinae crassioribus nervorum cum nervulis transversalibus interjacentibus plus aut minus opace nigricantibus. Abdomen supra nigricans, ad juncturas late lateraque versus albidum, atque segmentis 2—6 vel (♀) minus opacis, vel (♂) albidis: subtus ubique pallidum.*

Long. corp. ♂ 2·5—2·75, ♀ 4·0; al. ♂ 2—2·25, ♀ 3·0 mm.

I may add, that some outlines of part of the external anatomy of these species will be found in the Appendix to the Journals of the late Captain Elton, recently published by J. Murray.

Bromley, Kent : 19th March, 1879.

ON HETEROCHEROUS LEPIDOPTERA COLLECTED IN THE HAWAIIAN ISLANDS BY THE REV. T. BLACKBURN.

BY ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

The following is an account of two small series of moths forwarded by the Rev. T. Blackburn during the past year.

The entire collection represents fifteen species, of which ten are new to science; this unusual percentage of novelties is probably due to the wholly unworked localities in which most of them have been obtained.

Fortunately, in the present instance, collector's notes of considerable interest accompany the insects.

LEUCANIIDÆ.

LEUCANIA PHOTOPHILA, *n. sp.* (No. 60).

Greyish whitish-brown, sericeous; primaries with seven triangular marginal black dots; an arched discal series of seven or eight epineural black dots; secondaries slightly greyer in tint than the primaries, with the outer margin irregularly white from the radial vein to the anal angle; the veins terminating in indistinct dusky dots; fringe white; abdomen whitish, tinted with yellow towards the anal extremity; under-surface of the wings sericeous white; primaries with a marginal series of six or seven black dots: body below sordid whitish; tarsi grey banded with white at the extremities of the joints.

Expanse of wings, 1 inch, 5 lines.

"Occurs about Honolulu, generally flying to light in the evening, much more rarely than *L. dislocata*."—T. B.

NOCTUIDÆ.

AGROTIS SUFFUSA, W. V. (No. 55).

Oahu.

This species did not come in previous consignments, it is perfectly distinct from the insect noted in E. M. M., xiv, p. 185, which is identical with the following—

AGROTIS, *sp. n.* (No. 11).

A single example; it arrived in six or seven pieces, being apparently rotten from damp: although I have succeeded in patching it together, it is not fit to be made into a type: in marking it somewhat resembles *Spaelotis*.

AGROTIS ARENIVOLANS, *n. sp.* (No. 7).

Silver-grey, shining; primaries with blackish costal margin, interrupted by three white dots towards the apex: discoidal cell smoky-brown, excepting at the base, discoidal spots smoky-brown with white border edged with black, the "orbicular" spot pyriform, the "reniform" semicircular, its front margin being also bisinuate; median vein white; a large, fusiform, black-edged, sub-median, smoky-brown patch,

attenuated towards the base; two similarly coloured patches at the base of the median interspaces, and a third on the last sub-costal interspace; two black dashes on the radial interspaces, and a third in the sub-apical furea of the sub-costal vein; an irregular smoky-brown marginal border, its inner edge zigzag; a marginal series of black spots, followed at the base of the fringe by a slender whitish line; secondaries slightly brownish, with white fringe; antennae, crest and front of collar dark grey; centre of collar occupied by a curved white line, back of collar brownish; thorax longitudinally streaked at the sides with brownish, and with a blackish dorsal crest; abdomen brownish, clothed at the base with white hair: under-surface white; primaries sordid, the discoidal area grey; internal border opaline; a series of blackish marginal dots; secondaries with a broad silvery-greyish external border, limited internally by a sub-angulated grey stripe: discoidal cell terminating in a small black spot; palpi, tibiae, and tarsi dusky; anal tuft pale testaceous.

Expanse of wings, 1 inch, 5—7 lines.

♂, ♀. "Island of Maui, flying by day on sandhills near the sea."—T. B.

This species belongs to the *A. jaculifera* group, its nearest ally is apparently *Agrotis munda* of Australia, but it differs very greatly even from this species, at first sight seeming more nearly to resemble Felder's "*Mamestra maori?*"

HYDROCAMPIDÆ.

OLIGOSTIGMA CURTA, n. sp.

Closely allied to *O. obitalis* from Australia, with which it agrees in marking, but smaller with much shorter primaries: white, the body crossed by black-edged orange belts; wings with slender black marginal line, close to which is an orange stripe; a sub-marginal black line; a black-edged orange discal belt; primaries with a second more slender stripe, the upper half of which is almost wholly orange, and widely convex, so as to cross the disc just beyond the cell; a black discocellular dot; two black oblique stripes across the basal area and parallel to the lower half of the inner discal stripe, the outer of these two variegated with orange; secondaries crossed by two black lines, the outer one of which is abruptly elbowed so as to join the discal belt near the middle: under-surface paler than the upper-surface.

Expanse of wings, 6½ lines.

"Not uncommon about grassy streams in mountain valleys, when such can be found, and that is seldom."—T. B.

BOTYDIDÆ.

BOTYS ACCEPTA, Butler (No. 17).

A small example of this apparently common species.

BOTYS CONTINUATALIS (*Salbia continuatalis*, Wllgr.) (Nos. 21, 22).

"About the commonest Lepidopteron here."—T. B.

Wallengren's description of this species must have been taken from a rubbed example. I therefore append a more complete description:—

Sepia-brown, scarcely shining; wings crossed by a nearly straight, internally black-edged white stripe, slightly sinuous on the primaries, and continued inwards to a short distance along the inner margin; discocellulars black; external border greyish, an almost marginal narrow black stripe, the extreme margin also very slenderly blackish; fringe pale, white in secondaries: primaries with two more or less prominent, divergent, whitish, longitudinal streaks, the upper one just above the median vein, from the emission of its first branch to the black edge of the discal stripe, the lower one from the base to near the middle of the interno-median interspace: abdomen with white edges to the segments: under-surface pale sericeous greyish-brown, wings crossed by an inconspicuous paler stripe corresponding with the white stripe of the upper-surface: fringe of palpi white, legs sometimes white below, body occasionally whitish with pure white segmental bars; sides of palpi black.

Expanse of wings, 1 inch, 1—3 lines.

I have founded this description upon four tolerably fresh examples; one of these has the ground-colour of the primaries rather more rufous than the secondaries, but is in other respects perfectly typical: the species, as might have been supposed from Wallengren's description, is quite unlike any form of *Salbia*, and is evidently allied to *B. accepta*.

BOTYS DEMARATALIS, Walker (No. 19).

"Very local, occurs in high mountain localities, five or six miles from Honolulu."—T. B.

BOTYS LOCALIS, *n. sp.* (No. 61).

Greyish-fuliginous, irrorated with black scales: wings with whitish external border and fringe, extreme margin and a submarginal series of almost confluent dots, black; primaries with a black dot in the cell, and slightly concave discocellular line; two slightly wavy blackish lines from the median vein to the inner margin; a diffused, arched, dark, discal streak; secondaries with an oblique, dark brown discocellular line; an undulated and sub-angulated, dark brown discal line, bounded externally by a pale diffused belt: posterior edges of the abdominal segments pale, but not white; under-surface altogether paler, palpi with white fringe, tibiae and tarsi whitish; the discal line of secondaries not bounded by a pale belt as on the upper-surface.

Expanse of wings, 9½ lines.

"A very local species; Oahu."—T. B.

MECYNA EXIGUA, *n. sp.* (No. 62).

Primaries white, densely irrorated with black; two ill-defined, white-edged, black basal spots; a trisinuated, white-edged, oblique black line just before the middle; a second zig-zag, white-edged, black line limiting the external border, which is blackish, crossed by a sub-marginal series of white-bordered black dots; outer margin grey; a marginal series of black dots; fringe grey, traversed by a dusky line; secondaries ochreous, with a broad, binsinuated, external, black-brown border, which emits a streak along the median vein to the base; external half of abdominal border also blackish; fringe ochreous, tipped with blackish: head and thorax white,

flecked with grey; abdomen pale sordid ochreous: primaries below shining leaden-grey; the costal margin, internal border, and base of fringe white; secondaries pale stramineous; apex irrorated with grey; three apical, marginal, angular, blackish liture; fringe at apex tipped with grey: body below white, palpi grey.

Expanse of wings, $8\frac{1}{2}$ lines.

"Flies by day over flowers in hot sunshine; Maui."—T. B.

Allied to *M. ornithopteralis*, but with considerably shorter palpi, and altogether much smaller.

LARENTIIDÆ.

LARENTIA INSULARIS, *n. sp.* (No. 63).

Primaries silvery-white, densely irrorated with sooty-black, the base and a broad irregular oblique belt of the usual form sooty-black, traversed by numerous parallel, zig-zag jet-black lines; discoocellars jet-black; a costal sub-apical sooty-black spot, bounded externally by an undulated white line; a regularly sinuated sub-marginal blackish line, alternately spotted with black and white (the white spots being placed upon the veins, and the black spots between them); a marginal series of jet-black spots in pairs; fringe grey, traversed by a blackish line; secondaries silver-grey, with a feeble pearly lustre; a central, irregular, slightly darker but indistinct belt; marginal black spots and fringe as in primaries: body grey, flecked with black; posterior margins of the abdominal segments spotted with black and edged with white: under-surface silver-grey, wings with slightly darker basal area and broad central belt traversed by wavy pale lines; discoellular spots black.

Expanse of wings, 1 inch, 5 lines.

Seems to come nearest to *L. Kollarriaria*, but, excepting in structure, more nearly resembles *Petrophora prunata* var. *nubilata* of Packard's Geometrites: the species, according to the Rev. T. Blackburn, "occurs sparingly on Haleakala, elevation 900—1000 feet."

"I succeeded in capturing only two specimens; and expense, labour, and time involved in visiting the locality are so great, as to render a repetition of my visit improbable."—T. B.

PSEUDOCOREMIA PALUDICOLA, *n. sp.* (No. 58).

♂. Primaries above varying from golden-brown to shining fuliginous, speckled with black, crossed almost in the middle by an irregular dusky belt, the inner margin of which is bisinuated, and the outer margin multisinuate and sub-angulated, both margins marked upon the veins by black dots; reniform spot well marked, blackish; indications of a dusky line limiting the external area; a marginal series of black spots: secondaries pale pinky-brown, frequently with a central undulated series of blackish spots: body coloured in correspondence with the wings: under-surface pale shining sandy-brown, with the internal areas of the wings (particularly the primaries) more or less suffused with silvery-grey; the whole surface irrorated with black or grey; the discoellular, and a more or less extended discal series of spots, black.

Expanse of wings, 1 inch, 1—2 lines.

♀. Larger, the wings more elongated, the ground colour of the primaries lighter or darker fuliginous; the central belt indistinct: otherwise as in the male.

Expanse of wings, 1 inch, 4— $5\frac{1}{2}$ lines.

"The dark form is the ordinary one. I bred a lot from pupæ, so know the lighter form (of which I got three) is pretty certain a

variety. It is very local, occurring here and there in profusion in marshy spots high up the mountains."—T. B.

SCOTOSIA RARA, n. sp. (No. 59).

Primaries above dark fuliginous-brown, flecked with black; limits of the central belt indicated by two irregularly undulated transverse black lines; reniform spot distinct, black-edged; a sinuous sub-marginal pale line limited internally by a diffused blackish stripe, and bounding the external area; a marginal series of black spots, enclosing whitish dots; fringe blackish; secondaries sericeous greyish-brown, traversed by a series of blackish dots beyond the cell: body coloured to correspond with the wings: primaries below greyish, flecked with blackish, costa sandy-yellowish flecked with black; discocellulars dusky; a discal series of blackish spots, becoming quite black towards the costa; a marginal series of black spots; secondaries whitish, speckled with blackish; a dusky triangular discocellular spot; a bisinuated discal series of black spots; a marginal series of black spots; fringe grey: body below sordid white, legs marbled with black. Expanse of wings, 1 inch, 10 lines.

Although the example is not in good condition, I have described it, as Mr. Blackburn tells me that it was obtained at a place which he may never visit again, and seems to be both rare and local. "It occurred upwards of 4000 feet above sea level, on Haleakala (an extinct volcano); island Maui." The male, which Mr. Blackburn retains, has strongly pectinated antennæ. This *Scotosia* is most nearly allied to *S. dubitata*.

PHYCIDÆ.

PLODIA INTERPUNCTALIS, Hübner (No. 23).

Mr. Blackburn remarks of this species, "Apparently a *Phycis*; very likely not indigenous, I have not found it commonly."

TINEIDÆ.

SCARDIA LIGNIVORA, n. sp. (No. 56).

♂. Ground colour of primaries sericeous whitish, irrorated with blackish scales; costa crossed close to the base by a black spot; an oblique brown bordered black dash from the sub-costal nervure to the inner margin, followed by two or three black dots; remainder of the wing occupied by three alternate triangles margined and intersected by a W-shaped white line; the first and third areas (bounded by the white line) blackish, the second area enclosing two brown spots; three elongated impressed black spots bounding the outer edge of the white line near apex; fringe white; secondaries silvery, slightly brownish towards apex; fringe whitish-brown: thorax whitish-brown, flecked with darker scales, head whitish; abdomen grey, with whitish edges to the segments: under-surface metallic-silver, without markings.

Expanse of wings, 10½ lines.

♀. Larger than the male, the ground colour of primaries pinky, the dark areas less distinct, washed with laky-brown, the first triangular area interrupted by a longitudinal black discoidal dash, which is broken near its inner extremity by a whitish spot; secondaries greyer, abdomen ochraceous both above and below, wings below of a greyer silvery-colour.

Expanse of wings, 1 inch.

"Bred from larvæ feeding on very rotten wood, in mountain forests; Oahu."—T. B.

This species is very distinct from any *Scardia* hitherto recorded.

DESCRIPTIONS OF NEW SPECIES OF *TRICHOPTERA* FROM
SCANDINAVIA.

BY PASTOR H. D. J. WALLENGREN.

LIMNOPHILUS INSTILLATUS.

Alis anticis fuscis, punctis vitreis rarioribus sparsis, lineola vitrea ad thyridium et ad arcum maculaque ad anastomosin sat magna vitrea; posticis fumato-vitreis, apicem versus obscurioribus; pedibus testaceis, anteriorum tibiis tarsisque fusescenti submaculatis; tuba anali fæminæ lata, superne visa in apices duos subdivergentes desinente, sed a latere visa margine superiore arcuatim profunde excisa, deinde obliqua et in angulum obtusum infra desinente. ♀. *Exp. alar. 21 mm.*

Ad Bergen Norvegiae a Dom. Siebke defuncto quondam lectus mihique donatus.

L. auriculæ similis, sed punctis pallide vitreis, macula fenestrata alarum anticarum carenti, formaque tubæ analis abunde distinctus.

LIMNOPHILUS SCALENUS.

Alis anticis griseis, pallido-flavicanti obsolete irroratis, cellula discoidali scapo duplo longiore, cellula dorsi exteriore haud ad finem cellulæ discoidalis extensa, cellulæ que apicis 1^{ma} et 2^{da} ad basin latissimis; posticis vitreis, subinfumatis, cellula discoidali scapo fere longitudine æquali, furcaque cubiti contra tertiam partem cellulæ discoidalis incipiente; appendicibus analibus maris superioribus longis, exsertis, a latere visis obtuso-acutis, inferne haud excisis; intermediis pallidis, valde exsertis, porrectis, connexis, sensim angustioribus, reliquis longioribus; inferioribus parvis, adscendentibus, acutis. ♂. *Exp. alar. 15—19 mm.*

Ad Jokstuen in alpibus Dovrensis die 24 Julii à Dom. Siebke lectus mihique donatus.

L. extricato et L. hirsuto affinis, et minor, notisque suprà exhibitis abunde diversus. Fæminam nondum vidi.

LIMNOPHILUS HYALINATUS.

Alis anticis pallide ferrugineis, diaphanis, costis obscurioribus, puncto vitreo ad thyridium, maculaque obscurioribus irregularibus atque obsoletestissimis cellularum apicis, maris de cetero unicoloribus, fæminæ vero macula solita fenestrata obsoleta, maculaque vitrea sat magna sed obsolete ad anastomosin in cellulis apicis 3—6; cellula discoidali scapo plus quam duplo longiore, cellulaque dorsi exteriore ad initium cellulæ illius non extensa; alis posticis vitreis, apice flavicante, cellula discoidali scapo haud longiore furcaque cubiti fere contra medium cellulæ illius incipiente; appendicibus analibus maris superioribus edentatis, productis, a latere visis latis, inferne late excisis, apicibus obtusis, exsertis et decurvatis, a tergo visis gracilioribus, ad basin distantibus, sensim decurvatis, apicibus fere contiguis; intermediis brevibus, atris; inferioribus latis, brevibus, adscendentibus, superne truncatis, margine tenui nigro. ♂ ♀. *Exp. alar. 30—32 mm.*

Ad Jokstuen in alpibus Dovrensis Norvegiae a Dom. Schøyen repertus mihi-que benevole donatus. L. pantodapo affinis, sed colore appendicibusque diversus.

LIMNOPHILUS RHANIDOPHORUS.

Pedibus testaceis, femoribus fuscis; alis anticis fuscis, punctis minutissimis pel-

lide vitreis, rarioibus, præsertim in parte apicali et ad marginem anteriorem sparsis, punctoque pallide vitro majore ad thyridium, ad arculum, et ad basin cellularum apicalium 1, 3, 5; cellula discoidali scapo longiore, cellulaque dorsi exteriore ad initium cellulae illius non extensa; posticis vitreis, apice obscuriore, cellula discoidali scapo longiore, furcaque cubiti contra tertiam partem cellulæ illius incipiente; segmento dorsi octavo apice obtuso nec producto; appendicibus dualibus maris superioribus productis, elongatis, a latere visis latis, margine superiore modice arcuatis, margine inferiore exciso, apice obtuso, a tergo visis ad basin haud distantibus, sensim divergentibus, sed apicibus incurvatis, fere contiguis; appendicibus reliquis haud discernendis. ♂. *Exp. alar. 30 mm.*

Ad Jokstuen in alpibus Dovrensibus Norvegiae a Dom. Schøyen captus. L. fuscicorni affinis. An Phryganea fumigata, Germar, vera?

STENOPHYLAX THEDENII.

Pedibus totis testaceis coxisque concoloribus; alis anticis griseo-testaceis, ad marginem interiores et in parte posteriore pallide fusco-irroratis, puncto vitro ad arculum et ad thyridium; cellulis apicis 1^{ma} et 5^{ta} ad basin obliquis, 2^{da} et 4^{ta} truncatis, illa latiore, 3^{ia} angulata, cellula discoidali scapo nonnihil longiore; posticis vitreis, furca cubiti contra partem tertiam cellulæ discoidalis incipiente, cellulis apicis ad basin latis, 2^{da} omnium latissima, 1^{ma} et 5^{ta} longissimis, æqualibus, obliquis, 3^{ta} angulata, 2^{da} et 4^{ta} truncatis; appendicibus analibus maris superioribus latis, a tergo visis subquadrangularibus et connatis, a latere visis obtusis, margine exteriore oblique truncato; intermediis brevissimis, subtriangularibus, nigris; inferioribus latis, adscendentibus, brevibus, margine exteriore arcuato, margine superiore oblique truncato, crenulato, nigro, angulo acuto, nonnihil exerto. ♂. *Exp. alar. 28—30 mm.*

E Lapponia Sueciæ inferiore, sed exemplum ad Holmiam a Dom. Thedenio captum etiam ad hanc speciem sine dubio referendum, etsi alæ anteriores haud fusco-irroratae appareant. In exemplo illo typico, margo alæ anterior usque in cellulam discoidalem irroratione fusca caret. Species S. fusorio affinis.

Farhult Succiæ : Martii, 1879.

Notes on butterflies observed in the Valais in 1878.—During the early part of last summer, in company with my friend, Mr. P. L. Slater, F.R.S., and party, I spent about three weeks in the Valais of Switzerland, and, during that time, we devoted a considerable part of our energies to butterfly-catching. As the two valleys where we spent the greater part of our time are rather out of the beaten track of tourists, and have possibly not been visited by English entomologists before, I think a few notes on our captures may be worth inserting in this Magazine. The valleys visited, the Vals d'Hérens and d'Anniviers, are two of the lateral valleys which run from the main chain of the Pennine Alps into the Rhone Valley, debouching into it between the better known valleys of Chamounix and Visp.

In the Val d'Hérens, we made Evolena (about 4,500 ft. above the sea) our head quarters, staying there a week, and making excursions thence higher up the valley, including a two days' stay at Arolla, at the head of the valley of the same name, a most lovely spot (about 6,500 ft.), close to the Glacier d'Arolla, and overshadowed by many magnificent snowy peaks, such as Mont Collon, the Dent d'Hérens, and

others. Unfortunately, the weather at this period was not propitious, but, one beautiful day in the Val d'Arolla, showed what might have been done with better weather. From the Val d'Hérens we went over the Col du Torrent (about 8,000 ft.) into the Val d'Anniviers, where we spent a week at Vissoye (about 4,500), and from there, after an ascent of the Bella Tola (10,000 ft.), Selater descending the other side to the Turtman Thal, returned to Sierre, whence I returned home, via Brieg and Paris, whilst Selater continued over the Furka and thence home by Lueerne, obtaining thus a few additional species.

The time (from about June 25th to July 15th) was probably, on the whole, as good as any we could have chosen, though certainly too early for the highest ranging species. The weather was only moderately good, fine and wet days being in about equal proportion. Nevertheless, we managed to see or capture in that time 83 species of butterflies, and brought back about 600 specimens of these, as well as about 150 *Heterocera*, more than double that number of *Coleoptera* and *Hemiptera*. In the present notes, however, I only notice the *Rhopalocera*, not having as yet determined fully the other groups. I may perhaps mention, to show the abundance of butterflies in the Alps under favourable circumstances (*i. e.*, on a fine day), that one day (July 6th), at Vissoye, we captured (or saw) no less than 45 distinct species, and on two or three other days, both there and in the Val d'Arolla, the number observed exceeded 40. In the following list I have only enumerated the more interesting species, and have followed Dr. Staudinger's catalogue (1871) throughout.

Papilio Machaon—only a few specimens, occurring singly in various localities, but never very high up. *Parnassius Apollo*—common about Vissoye, also a few at Evolena and in the Arolla Valley; this species flies slowly and steadily, but, if alarmed, goes off at a great pace, and is not then easily caught: *P. Delius*—this species occurred, flying with the last, in the Val d'Arolla, and was rather abundant on the slopes of the Col du Torrent, above the Val d'Hérens; both it and *P. Apollo* vary much in the size, number, and intensity of the red ocelli and spots; this species is not found so low as *P. Apollo*, not, according to our experience, much below 6,000 ft.: *P. Mnemosyne*—this species occurred with the last in the Val d'Arolla, and on the Col du Torrent; the curious ovisae, with which, in this genus, the females are provided, is, in *P. Mnemosyne*, much larger than in the other two, and of a white colour; all the three species frequent the wetter slopes on the sides of the valleys: the occurrence of *three* species of this genus together in exactly the same locality, as was the case at one point in the Val d'Arolla, is certainly very remarkable, considering the resemblance in habits of the different forms. *Aporia crataegi*—one of the most abundant butterflies in Switzerland, and extending some height up. *Pieris napi*, ab. ♀ *bryoniae*—a few in the Val d'Arolla, and on the Col du Torrent and Furka, with males of the ordinary form; specimens vary considerably in darkness: *P. Callidice*—not common in the Arolla Valley, especially at Arolla itself, and a few on the Col du Torrent, Furka, and Bella Tola at high elevations (8,000 ft. or so); the flight of this species resembles that of a *Colias*, more than that of our ordinary English whites. *A. Belia*, var. *simplonia*—this species occurred with the last in the Val d'Arolla, and was rather numerous in the meadows outside the inn there. *Leucophasia sinapis*—very common at Evolena and elsewhere. *Colias Phicomone*—a few of this mountain species in the valley at Evolena, but commoner on the slopes around and higher up the valley towards Arolla; also on the Furka and Bella Tola. *Thecla*

rubi—two or three specimens at various places; on the Bella Tola at about 6,500 ft. *Polyommatus virgaureæ*—males very common in the valley at Vissoye, also in the Turtman Thal and near Zinal, but I only saw a single female; one male from Vissoye is remarkable for being of a yellow colour above: *P. Hippothoë*, var. *Eurybia*—this alpine form of *Hippothoë*, from which it differs in the duller colours of the male, and in the female being almost unicolorous brown above, and greyer beneath; occurred sparingly at Evolena, more commonly at Vissoye, where it occurred with *P. virgaureæ*, and also on the St. Gothard route, between Andermatt and Amsteg: *P. Dorilis*, var. *subalpina*—two specimens, one at Evolena, the other on the Bella Tola; of the alpine form of *Dorilis*, which differs from the type in being unicolorous above, and with no redness beneath. *Lycæna argyrotoxus* (*Ægon*)—this blue swarmed in the lower part of the Val d'Arolla, rising in crowds from the muddy water in the roads, &c. *P. Argus*—I secured two specimens from amongst the crowds of the last, and doubtless passed over many more; will somebody explain why, in two such closely allied species, one (*Ægon*) should possess, the other (*P. Argus*) want, the “hornstachel” on the fore tibiae: *P. Eumedon*—rather common at Evolena, and one on the Furka. *L. Escheri*—two specimens, one in the upper part of the Val d'Anniviers, coming down from the Col du Torrent, and another at Evolena: *L. Corydon*—Evolena, Zinal, &c., and one, remarkable for the brightness of its blue, which approaches that of *Bellargus* (*Adonis*), at about 6,500 ft. on the Bella Tola: *L. Hylas*—several at Vissoye, and also occurred at Evolena and in the Val d'Arolla, but only one female: *L. Damon*—only one, a male, above Evolena: *L. minima* (*Alsus*)—very common; I was surprised to see our little “Bedford blue,” so local an insect in England, in the Alps at elevations of 6-7,000 ft., as at Arolla and on the Col du Torrent; also on the Furka: *L. semi-argus* (*Acis*)—common at Evolena, Vissoye, Arolla, &c.: *L. Alcon*—rather common at Evolena, and one at Vissoye: *L. Arion*—occurred at every place we visited. *Limenitis populi*—a single specimen of this fine species in the river-valley at Vissoye sitting on the poplars, and safely secured by Slater. *Melitæa Cynthia*—Slater secured a single male of this species on the Furka; we were probably too early for it elsewhere: *M. Aurinia*, var. *Merope*—a single specimen at Arolla, one in the Turtman Thal, and a fine series from the Furka: *M. cinxia*—Vissoye, Evolena, &c., common: *M. Phæbe*—Evolena, Val d'Arolla, and common about Vissoye and at Sierre. *M. didyma*—common at Vissoye and Sierre: *M. Dictynna*—fairly common at Evolena, Vissoye, Arolla, &c.: *M. Athalia*—common, Evolena, Vissoye, Arolla, &c.: (*M. Parthenie*—one at Lausanne). *Argynnис Pales*—one at Arolla, and tolerably numerous at high elevations (7-8,000 ft.) on the Col du Torrent and Bella Tola; also occurred on the Furka, and between Andermatt and Amsteg; we did not see the var. *Arsilache*: *A. Dia*—one at Sierre: *A. Amathusia*—fairly common at Vissoye and Evolena, in damp places along the valleys: *A. Ino*—with the last: *A. Lathonia*—one near Vissoye: *A. Niobe*, var. *Eris*—one at Vissoye, others on the St. Gothard route; we did not see *Paphia* or *Adippe*: *A. Aglaia*—rather common. *Erebia Epiphron* (the form *helamus*?)—sparingly in the higher parts of the Vals d'Herens and d'Anniviers; also on the Bella Tola, Furka, and the St. Gothard route: *E. Ceto*—very common in the valley at Evolena, and a few elsewhere: *E. Stygne*—this species also abounded at Evolena, but occurred higher than the last, frequenting, not the meadows near the river, but the rocky slopes at the side of the valley; also sparingly at Arolla, Zinal, in the Val d'Anniviers, and on the St. Gothard; nearly every specimen is a male: *E. glacialis*,

var. Alecto—a single specimen of an *Erebia* which I saw at the end of the Arolla Glacier (about 7,000 ft.), and, after a hard run over the stones of the terminal *moraine*, secured, turns out to belong to this species: *E. lappona*—this species had the highest range of any, according to our experience; it occurred tolerably common about the higher slopes of the Col du Torrent, and also on the top of the pass (about 8,000 ft.) ; in descending from the Bella Tola I caught one specimen on the snow at about 9,000 ft., and saw others at nearly the same elevation; it was common on the Furka: *E. Tyndarus*—this species we only met with on the Col du Torrent, at from about 6,500 ft. upwards; it was not common: *E. Ligea*?—I believe that several *Erebias*, from Evolena and Vissoye, are referable to the true *Ligea*: *E. Euryale*—being common at Vissoye and Evolena, in the valleys, and a few in Arolla Valley and the Furka. *Chionobas Aëllo*—I caught two specimens in the Val d'Arolla, at about 6,000 ft., and afterwards another in the Val d'Anniviers at the foot of the Col du Torrent, at about the same elevation; Slater found it commonly on the Furka, and secured both sexes. *Satyrus Hermione*—this fine species was common about Vissoye, particularly frequenting the slopes of some dry rocky ground in the valley, exposed to the sun; it has a sailing *Sibylla*-like flight; also in the Turtman Thal: *S. Actaea*, *var. cordula*—this species was also common at Vissoye, occurring in the same localities as the last, but nearly all caught were males. *Pararge Mæra*—this is one of the commonest butterflies in the Swiss valleys, at moderate heights; it loves to rest on the surfaces of rock overhanging the roads, and on walls, &c., exposed to the sun, starting out moderately like a grayling, the grey under-surface matching well with its chosen haunts: *P. Hiera*—we were apparently too late for this species, only securing a few worn specimens in the Val d'Hérens, between Evolena and Arolla. *Cænonymphia Satyriion*—this pretty little “heath” was common at Arolla on damp ground, but also occurred more sparingly around Arolla, in the Turtman Thal, on the Col du Torrent, and on the St. Gothard route; the males were much commoner than the more brightly coloured females. *Syricthus carthami*—not common; a few in the Val d'Anniviers, at Arolla, Vissoye, and Zinal: *S. alveus*?—Vissoye and on the Bella Tola, but I am not sure that the specimens are rightly determined, owing to the difficulty of this group: *S. cacaliae*—sparingly at Vissoye and Evolena, but tolerably common at higher elevations on the Col du Torrent, the Bella Tola, and Furka: *S. Sao*—one at Vissoye. *Nisoniades Tages*—abundant, flying over wet ground, at Arolla.—W. A. FORBES, St. John's College, Cambridge: 16th February, 1879.

Von Harold's remarks on Japanese Hydrophilidæ.—Herr von Harold, in his Beiträge zur Käfer-fauna von Japan (Berl. ent. Zeit., 1878, p. 69), gives a note on these insects, which seems likely to cause a good deal of confusion to those who may follow it. He suggests that *Megasternum distinctum*, Sharp, may probably be the same as Motschoulsky's *Pachysternum hæmorrhoum*; though it would be difficult to suppose, he adds, that such a sufficient observer should have overlooked the absence of emargination on the front tibiæ. This is a curious remark for such an accurate naturalist as von Harold to make, for, in my description of *M. distinctum*, I said expressly that it “has the anterior tibiæ simple at the extremity.”

This oversight of Harold's is accompanied, however, by a second equally great one, viz., that Motschoulsky expressly states that *P. hæmorrhoum* has the front tibiæ emarginate! His words are “Forme ovalaire atténuee des *Cryptopleurum*, mais avec les jambes antérieures échancreées sur leur face extérieure.”

Von Harold's remarks had better therefore be withdrawn or explained. But I may observe that when I made my description of *M. distinctum* I compared the insect with Motschoulsky's descriptions and came to the conclusion that it was not *P. hæmorrhoum*; and I see, on again going over the question, no reason to doubt that I was right in my conclusion: independently of the quasi-generic differences of the two, Motschoulsky's diagnosis of *P. hæmorrhoum* is quite inapplicable to *M. distinctum* in two points, viz., "pedibus piceis," and "elytris . . . interstitiis basi convexis." Farther, I think that Harold had not my *M. distinctum* before him when he wrote the remarks above alluded to, for his phrase, "Thorax sehr fein punktirt," is not applicable to my insect. The probability seems to be that Harold's supposed *P. hæmorrhoum* is a species still in need of a name.

It may not be amiss to add that Harold, in his remarks on *Cercyon Sharpi* (*l.c.*), has mistranslated my statement about the tibiae of *C. dux*. I said (Trans. Ent. Soc., 1873, p. 65) "allied to *C. littoralis*, but has the anterior tibiae simple at the extremity." Harold says, however, that I remarked that "*dux* has the front tibiae unarmed" ("unbewaffnet"). Such, however, was not my meaning. Actually, in *C. dux* the front tibiae are armed externally with very short setæ or spines; the tibiae are dilated at the extremity, and their outer angle is extremely rounded, and the lower part is densely set with very short spines, among which may be perceived two longer, but yet quite short teeth. This structure can only be distinctly recognised when recently developed specimens are examined, for the fossorial habits of the species cause the front tibiae to be much worn and altered, by the grinding down of the spines and edges. By using the term "simple at the extremity" I did not at all intend to refer to the armature of the outer edge, but to the fact that the tibiae in *C. dux* show no trace at all of the prolongation and narrowing of the apical portion which gives the appearance of an emargination at the extremity in *C. littoralis*. I think, however, that *C. Sharpi* will prove not to be synonymous with *C. dux*.

Harold cites also, in the same paper, *Cyclonotum orbiculare*, L., as a Japanese species, and adds that *C. breve*, Sharp, is certainly the same species. Here again I must differ from him. He goes on to add that in the European specimens of *C. orbiculare* the palpi are of a reddish-yellow colour. This is, however, not the case, and I suspect Harold's error arises from his not having distinguished the south European *C. hispanicum* from the more northern *C. orbiculare*. I think if Harold will go over the matter again he will perhaps agree with me in considering *C. orbiculare*, *C. hispanicum*, and *C. breve* as distinct, although very closely allied species. The North American *C. globulosum*, Kl. (*rotundatum*, Dej.), is another of these closely allied forms, and there are others in various parts of the world, even in tropical Africa, and in Australia, all of them presenting an extraordinary similarity in size, form, and appearance, so that by a hasty observer they would easily be called "all one species," but, when careful examination is made, structural differences may be found to corroborate the slight distinctions of the more superficial characters.—D. SHARP, Thornhill, Dumfries : 31st March, 1879.

Note on Homalota egredia, Rye.—There can, from the description, be no doubt that *Liota hypogaea*, E. Mulsant and Cl. Rey, is identical with this species. I do not know for certain which name will stand; my species was described in the number of this Magazine published on 1st January, 1876; Mulsant's was described, as new, in the *Annales de la Société Linnaéenne de Lyon* (*n. s.*), xxii (for 1875, with date 1876 on title), p. 191. But if, as is most likely from the extreme confusion attending the multiple publications of these authors, the insect is also their *Aleuonota hypogaea*,

described as new in *Opuscules Entomologiques*, xvi, p. 175, and included in the *Zoological record* for 1875, vol. xii, p. 299, my species must fall.—E. C. RYE, 70, Charlwood Road, Putney: April, 1879.

A species of Aphodius new to Britain.—I have for some years had separated in my collection some examples of an *Aphodius*, near *inquinatus*, which are evidently *A. melanostictus*, Schüpp., Er. Compared with *inquinatus*, the majority are conspicuously larger, with more developed limbs, and the ground colour of a darker testaceous colour, *the sides of the thorax entirely reddish-testaceous*, and the black streak in the second interstice of the elytra reaching further towards the middle. In all but one of my specimens also, the black line connected with this streak is carried towards the apex and connected in the lower third with the lateral black line, which is not the case in any of my varieties of *inquinatus*. The specimens are from the Manchester district.—ID.

Insects at Zanzibar.—[Mr. Joseph Thomson, of the Royal Geographical Society's African Expedition, has sent to his friends in Scotland some notes on the Island of Zanzibar; amongst them are the following entomological extracts, which will no doubt interest the readers of the Ent. Mo. Magazine.—D. SHARP.]

"In our walk to the woods, we cannot but be astonished at the absence of beautiful butterflies. In all my perambulations I have as yet only seen three large species, although there are innumerable small forms. The dragon flies make up somewhat for the scarcity of the former; these voracious beings are in great abundance, many of them of large size and great beauty; I have caught more than thirty species, and I have seen as many more, which I have not yet captured. Entering the woods, our attention is attracted by the huge millipedes, 6 or 8 inches in length, wriggling amongst the branches, and the equally large land snails (*Achatinæ*) with shells half a foot in length, crawling with steady pace along the banana leaves. Looking up to the mango trees, a curious nest-like object formed of leaves drawn together is noticeable, which suggests the idea that they are nests of the tailor bird; but, on going near to examine, we are filled with surprise to find them swarming with large ants; in fact, they are the nests of these wonderful little creatures. If you disturb them, you will find that they well deserve the name of mago-moto (fire water) which they receive here. Further on our attention is drawn from tree gazing by the cry of our guide, 'siafa, siafa' (ants, ants), and looking to the ground, a broad band of what appears to be motionless ants is seen extending across the path. On closer examination, the band, to our astonishment, resolves itself into a tunnel of these creatures, through which the others are pouring in apparently endless multitudes. The unwary pedestrian, who unwittingly tramps on this tunnel, will find, to his agony, that his trousers have been converted into a channel up which they rush, and, with a fiendish vengeance, they will let him know that they are not to be touched with impunity.

"In our long delightful walk, night has surprised us, and warns us to turn our backs on the malaria of the damp ground. The tepe-tepe has hushed its tooting, and is replaced by the more sombre sounds of the owls. The goat-sucker flits about like an uneasy spirit, and a large owl-like frugivorous bat hovers here and there over a mango tree. The deafening music of the *Cicadæ* is in full force, with all its marvellous ringing of bells, jingling of rings, and whistling of steam engines, while the frogs in the marshes add to the din by their incessant clatter from a thousand throats. In the hedges and amongst the trees, fireflies, like little shooting stars of earth, glance and scintillate through the murky gloom, recalling old legends and stories of fairies and elves."

THE

C. V. RILEY,
Washington, D.

ENTOMOLOGIST'S MONTHLY MAGAZINE:

CONDUCTED BY

J. W. DOUGLAS.

E. C. RYE, F.Z.S.

R. McLACHLAN, F.R.S.

H. T. STANTON, F.R.S.

VOL. XVI.

"In Nature's infinite book of secrecy
A little I can read."

SHAKESPEARE.

248871

LONDON:

JOHN VAN VOORST, 1, PATERNOSTER ROW.

1879-80.

LONDON :

NAPIER, PRINTER, SEYMOUR STREET, EUSTON SQUARE.

MDCCCLXXX.

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THE

Entomologist's Monthly Magazine

VOLUME XVI.

NOTES ON THE GENUS *CÆLIOXXYS*, AND AN ADDITIONAL SPECIES
TO THE LIST OF BRITISH HYMENOPTERA.

BY EDWARD SAUNDERS, F.L.S.

This genus is well known to Hymenopterists by the curious six-spined apex of the abdomen of the ♂ (N.B.: the spines are on the 6th segment) and the acuminate apex of the ♀; but the species bear such a strong general resemblance to each other that they are probably more or less mixed up in many collections.

On the continent there are two distinct sections of the genus, one of which only we have found in England at present, the first in which the white bands of the body are formed of scale-like hairs, and the second containing our British species, where the hairs are of the more usual type, although very beautifully feathered. The hairs of the species of this genus are well worth the trouble of examination. The scale-like hairs of section 1 consist really of a mid-rib with hairs branching from it in several directions, but these branches are packed so closely together, that a dense oval mass is formed which, under a low power, looks far more like a scale than the ordinary hair of a bee.

We, at present, know of 5 British species:—No. 1, *vectis*, is one of the largest, only being equalled in size by large *rufescens*; it may be known from all the others by the blunt end of the external spine of the posterior tibiae: this may seem a slight character but it is most constant and easily observed. The other 4 species can be divided into 2 sections. The 1st, containing *4-dentata* and *rufescens*, has the apex of the 4th segment of the body beneath in the ♂ deeply emarginate, and the 5th segment in the ♀ rounded at the apex; the 2nd, containing *simplex* and *acuminata*, Nyl., has the 4th segment entire in the ♂, and the 5th segment in the ♀ truncate at the apex. *4-dentata* differs from *rufescens* in having no lateral tooth at the apex of the 5th segment in the ♂, and the apical ventral valve in the ♀ elongate and lanceolate, whereas, in *rufescens*, it is shorter and triangularly truncate at the apex. I look upon *umbrina*, Smith, as only a small form of *rufescens*.

Acuminata and *simplex* are very closely allied, especially in the ♂. In the ♀ of *acuminata*, the 4th segment of the body beneath is very largely and remotely punctured, and the 5th segment above has no pilose band; in *simplex*, the 4th segment of the body beneath is closely and finely punctured, and the 5th segment above has a narrow pilose band. The ♂ of *acuminata* differs from *simplex* in having the punctuation of the 4th segment beneath as coarse and remote as that of the 2nd and 3rd, and a distinct lateral spine on the apex of the 5th segment above. *Simplex* has no distinct spine on the 5th segment, and the 4th is certainly more closely punctured than the 2nd and 3rd.

We are indebted to Mr. Bridgman, of Norwich, for the discovery of *acuminata*, who found 2 ♂ and a ♀ in his collection. In looking over my specimens of *simplex*, I find a ♂ and ♀, which, I believe, came from Scotland. The species is quite distinct, and I hope will turn up again now its characters are known.

(N.B.—The emargination of the 4th segment in the ♂ is hard to see on account of the pilose band, but is best observable by looking from the direction of the apex).

Holmesdale,
Wandle Road, Upper Tooting:
13th May, 1879.

NOTES ON THE BUTTERFLIES OF THE EASTERN ALPS.

BY H. J. ELWES, F.L.S.

I do not suppose that anything I have to say in this short sketch of a few days' collecting will be novel, but it has struck me forcibly how very little has been done or written by Englishmen to work out the *Lepidoptera* of Europe. As an ornithologist, for I do not pretend to be an entomologist, I feel proud to say that not only has the finest and most exhaustive work ever produced on the zoology of any part of the world (I mean Dresser's "Birds of Europe") been written by an Englishman, and founded, in a great measure, on the studies and explorations of Englishmen, but also, that if one wants recent and accurate information on the birds of any part of Europe, except Germany and France, it is to be sought in the pages of the "Ibis."

On the contrary, if one wants to learn anything about the *Lepidoptera* of Europe, one must begin by learning German, in which language five-sixths of everything worth studying on the subject has been written. It cannot be from ignorance, or from want of enterprise, that this strange neglect and indifference to continental entomology has arisen, but rather from the old-standing narrow-

minded prejudice, which makes so many of our most enthusiastic collectors and best observers restrict themselves entirely to British species.

It seems, however, as though a wider and more enlightened spirit was springing up, and, in hopes that a few more years will show a great advance in this branch of natural history, I venture to give the results of my first attempt to learn something of the *Lepidoptera* of Europe. Having never seen the east of Switzerland, and hearing that it was wilder, less overrun by tourists, and richer in rare plants and insects than the west and north, I arrived at Chiavenna, about two hours from the head of the Lake of Como, at 11 a.m., on July 6th. The scenery of the valley, on account of the luxuriance of its vegetation and the height and steepness of the surrounding mountains, reminded me somewhat forcibly of the inner valleys of Sikkim ; and the steamy heat, which prevailed after some wet days, called to mind the glorious months I had spent in the sweltering gorges of that incomparably rich and interesting country.

Swallowing a hasty meal, which, to my surprise and disgust, consisted, in the land of rice, fruit, and tomatoes, solely of roast beef and bad potatoes, I went up the Val Bregaglia, at the foot of which Chiavenna lies, and was soon fully occupied with the numerous butterflies which were out. Several species, including *Polyommatus Gordius*, *Lyceena Arion*, *Pararge Mæra*, *Pap. Podalirius*, *Melitæa didyma*, and many others—were abundant ; but on this day, as on others, I was obliged to pass by many *Geometræ* and other insects, which would have been no doubt, to a more experienced and enlightened Lepidopterist, the best worth observing and collecting.

Everything must have a beginning, and when one is in light marching order, without setting-boards, pill-boxes, or other apparatus, it is impossible to preserve everything one meets with.

A number of rare ferns were growing near the pretty waterfall on the north side of the valley, and showed, as well as the vines, that the climate of this valley, though so close to the glaciers, is a very mild one.

Next morning I started early by diligence for the Engadine, and about half-way up the valley got down to walk over the pass, as the sun was well up and the day fine. *Parnassius Apollo* appeared at about 3500 ft., and was easily captured ; *Argynnis Amathusia* was the next good thing, flying, in company with *Aglaia* and *Pales*, over the as yet unmown meadows ; *Melitæa Dictyna*, *M. Parthenie*, and *M. Phœbe* were also taken, the former in abundance ; and *Erebia Ceto* and *Melampus* a little higher. Curiously enough, I saw, in this valley,

neither *Euryale* or *Libea*, usually so common at 3500 ft. In a wet and stony pasture, about 5000 ft., I was delighted to find *Parnassius Delius*, and caught several without much difficulty. On the stony flowery débris left by the river floods, *Lycæna Corydon*, *Eros*, and *Argus* were numerous, whilst *Pap. Machaon*, *Vanessa Antiopa*, and *Colias Edusa* gave colour to the scene.

After a good lunch at the new inn at Casaccia, I walked on over the pass, which rises steeply through a rich pine wood and suddenly opens out at the top into a country which resembles some parts of Ross-shire much more than anything I have seen in Switzerland. There is hardly any fall on the east side of the pass, and a good sized lake lies a mile beyond, at the foot of which is the village of Sils. Here I stopped, and next day had a most enjoyable and productive excursion in the Val Fex, which literally swarms with alpine butterflies, and produces many rare and local *Geometræ* and *Noctuæ*. I was much struck with the luxuriance of the pasture and vegetation in the upper Engadine, at elevations of 6—8000 ft., and though the climate is said to be severe, and the winter very long, I certainly thought that the forest extended to a higher elevation than in the Valais or in the Oberland.

On the ridge between the Val Fex and the Val Fedoz I found *Pieris Callidice* fairly numerous, though from its very straight and rapid flight, hard to catch. This species rarely descends below the tree limit, and is like *Chionobas Aello* quite characteristic of the stony hill-sides of the Upper Engadine. The latter insect I was rather surprised to find, as it is supposed to be what I may term a biennial, appearing only every alternate year, and, as it was found in the Albula district in 1871, '73, and '75, I did not expect it now. I was, however, lucky enough, after some hard work, to take it in the Val Fex, as well as above Pontresina and near Bergün, as low as 5000 ft. It is the only Alpine representative of a characteristic Arctic genus, and, like so many of the Alpine butterflies, is still, I believe, only known in its perfect state.

On this day in the Val Fex, between 5500 and 8500 ft., I saw and caught 30 species of *Rhopaloeera*, including *Erebia Melampus*, *Tynularus*, *Gorge* var. *Triopes*, and *lappona*, the last very abundant and variable both in size and in the marking of the under-side; *Argynnис Pales* and its variety *Isis*, *Melitæa Cynthia* and *M. Aurinia*, var. *Merope*, *Lycæna orbitulus*, *Pheretes*, *Egon*, *Argus*, *semiargus*, and *minima*, *Cœnonympha Satyrion*, *Vanessa Antiopa*, *Syriodus* 2 species (which I believe to be *cacaliæ* and the rare *Andromedæ*, though I confess that the distinctions of species in this genus are not very clear to me as yet), *Colias Phicomone*, and others.

At Sils, there is an old German carpenter who has a fair knowledge of the local species of *Lepidoptera*, and has collected a good deal in former years. He had a good many *Bombyces*, *Noctuæ*, and *Geometræ* in his boxes ; some of which are rare and local, and, having been employed by Dr. Staudinger and others, had a very good notion of their money value.

In the evening, I went down the valley to St. Moritz, where *Hepialus humuli* swarmed at dusk, and next day walked to Pontresina, taking plenty of *Colias Palæno* in the open parts of the pine woods. At Pontresina, I found that Herr Saratz, who has a fine local collection of birds well stuffed by himself, was out ; but his son showed me a lot of young larvæ of the rare and beautiful *Chelonia Flavia*, which he had reared from the egg and hoped next year would produce moths. This is another of the insects which is supposed only to appear every second year. Professor Zeller, in his exhaustive account of the *Lepidoptera* of the Upper Albula district, where this fine species is abundant, gives full details of what is known about it (see *Stett. ent. Zeit.*, 1877, 430).

In the fine larch forest above Pontresina, I found *Leucophasia sinapis* up to at least 6500 ft., which is higher than I had any reason to believe it was found. In most of the Alpine valleys there are two generations, but, in such a short summer as that of the Upper Engadine, there can hardly be time enough for more than one.

The next day I intended to go up the Val Bevers and over a pass at its head to the Albula, but could find no one who knew the road. The rocks of Val Bevers, being calcareous, produce many interesting plants, and the rare *Lycæna Donzeli* was found here fairly abundant by Herr Rudolph Zeller, of Zürich. As it was, I took the usual road over the Albula Pass, which is a stony barren wilderness, reminding one of the hills of Jura, or some of the Ross-shire mountains.

At a few hundred feet below the summit of the pass, on the north side, is an unpretending though fairly comfortable little inn, called the "Weissenstein," which, on account of the numerous rare plants and insects found in the neighbourhood, is a favourite station for naturalists. Here Professor Zeller made his head-quarters, and here may usually be found some collectors, from Germany or Switzerland, in search of *Chelonia Flavia*, *Arctia Quenseli*, or some of the other rarities of the neighbourhood.

Though I was only able to stay one night at the "Weissenstein," I was successful in getting a good series of the rather rare *Erebia glacialis*, which was plentiful on the steep slopes of loose stones

("gerolle" in German), which fill up a great deal of the heads of the valley; *E. Gorge* was with it, but not so numerous, and *E. lappona* very abundant on the pastures around. On the same "gerolle" I found sitting on the stones the rare Geometer *Gnophos Zelleraria*, and was lucky enough to get two pairs of *Pieris Callidice* at the same time. At the remarkable springs which form the source of the Albula, *Parnassius Delius* was abundant, and here its larva was discovered by Professor Zeller feeding on *Saxifraga aizoides*.

Close to the head of the pass, among the bare boulders, surrounded by unmelted snow, were flying specimens of our *Lycæna minima* (*Alsus*) as fresh and lively as on the most sheltered bank at home; and *Lycæna Orbitulus*, *Eros*, *Optilete* and *Pheretes* were found in greater or less abundance. In the evening, I walked down the valley about 8 miles to Bergün, a large thriving village at about 4500 ft. elevation, and found a most comfortable old-fashioned inn, kept by the ex-mayor of the commune, Herr Cloetta. From what I hear this house is much to be preferred, at any rate for bachelors, to the new hotel, and I certainly found a warmer welcome and a more moderate bill than anywhere else I stayed in Switzerland.

The environs of Bergün are very rich in *Lepidoptera*, several hundred species being enumerated in Professor Zeller's paper in the *Stett. ent. Zeit.* for 1877. I was only able to stay one whole day here, and this I spent in a walk up the Tuorsthral, where I added several good species to my list. *Parnassius Apollo* and *Delius* flew here in company; *Argynnis Amathusia*, *Dictyna*, and *Euphrosyne* were not uncommon, though the season of *A. Thore*, which is found here in June, was now over; several *Lycænæ*, as *Hylas*, *Eumedon*, *Corydon*, *Œnon*, were common; *A. cratægi*, *Colias Hyale*, *Polyommatus Dorilis*, var. *subalpina*, *Erebia Stygne*, *Euryale*, and *Goante*, *Syriethus alveus*, and others, made up a good day's work.

So finished a most agreeable and successful week, in which I took over 70 species of *Rhopalocera*, and 20 or 30 of *Heterocera*.

I believe that in some parts of Southern Tyrol, or the Italian side of the Alps, this number might be considerably exceeded, but there are so many unexplored valleys in all parts of the Eastern Alps that no entomologist need be at a loss where to go.

Preston House, Cirencester:
April, 1879.

P.S.—Since writing this I have seen Mr. Forbes' account (vol. xv, p. 275) of his experience farther west at the same time. He seems to have found the valleys of Arolla and Anniviers even richer than the Albula and the Engadine. The most remarkable species mentioned by

him, which do not occur farther east, are *L. Damon* and *L. Escheri*, *Anthocharis Belia*, and two species of *Satyrus*, which genus seems to be altogether wanting in the Albula Valley. The occurrence of all the three European *Parnassius* in one valley is also very remarkable.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 7.

PART I.

Mesozoic Time.

[*On the Insecta of the Jurassic* Period, and the animals and plants with which they were correlated.*]

From the rocks of this Period—which consist in ascending order of the Lias and Oolites—so large a number of fossil insects has been obtained that it would be impossible even to name the genera to which they have been referred, in a paper of moderate length.

I have, therefore, divided this paper into two parts, in the first of which I propose to enumerate the principal families and genera of the *Insecta* which have been discovered in the Lias, and, in the second part, those obtained from the Oolites.

Lias.

Great Britain.

In some sections of the Lias, or in the Rhætic† series, between it and the Trias, remains of insects have been found massed together in such abundance that the beds containing them have been called the “Insect Limestone.” These fossils have been obtained chiefly from the *lower*‡ division of this formation in Gloucestershire, Worcestershire, Warwickshire, Somersetshire, and Monmouthshire.

The majority of these Liassic insects were discovered by the Rev. P. B. Brodie, Mr. H. E. Strickland, the Rev. F. W. Hope, and Mr. E. T. Higgins; a few specimens were also described by the two first-named gentlemen, but for the determination of the bulk of them we are indebted to Prof. Westwood,§ to whom nearly 300 specimens were submitted.

* So named from the mountain range of the Jura on the western borders of Switzerland, in which the Lias and the Oolitic limestones are largely developed.

† The Rhætic beds are, more strictly, beds of passage between the Trias and the Lias, than part of the latter formation.

‡ I have recently received from C. Moore, Esq., F.G.S., of Bath, a considerable collection of fossil insects (including *Coleoptera*, *Orthoptera*, *Neuroptera*, &c.) from the *upper* Lias of Ilminster.

§ See “Introductory Observations,” by Prof. Westwood, to Brodie’s “History of the Fossil Insects in the Secondary Rocks of England.” London : 1815.

These fossils have been referred to the Orders *Neuroptera*, *Orthoptera*, *Coleoptera*, and *Hemiptera*; and one or two specimens have been doubtfully referred to the *Diptera*.

The *Neuroptera** included the genera *Orthophlebia*, *Hemerobius*, *Chauliodes*, *Agrion*, *Æschna*, *Libellula*, *Heterophlebia*, and *Ephemera*; and the *Orthoptera* were represented by *Gryllus* and *Blatta*.

The *Coleoptera*—which was far more numerously represented than any other Order—comprised specimens of the following Families, viz.: *Scarabæidæ* (*Melolontha*), *Hydrophilidæ*, *Gyrinidæ*, *Buprestidæ*, *Elateridæ*, *Lampyridæ*, *Chrysomelidæ*, *Curculionidæ*, *Carabidæ*, and *Telephoridæ*.

The few specimens of the *Hemiptera* which have been discovered have been referred to the genera *Cimex*, *Belostoma*, and *Cicada*.

No traces of *Hymenoptera* or *Lepidoptera* have been recorded, and the remains which have been referred to the *Diptera* are very doubtful.†

Although, as a rule, the insect remains from this formation are very imperfect and fragmentary, the wings of some of the *Neuroptera* are preserved in the greatest perfection.

The majority of the species seem to have been of very small size, and indicative, if considered apart from the other animal and vegetable remains of the Period, of a temperate climate.

Continental Europe.

A few elytra of *Coleoptera* have recently been discovered in Rhætic‡ beds, in the Province of Schonen, in Sweden.

These remains have been referred by Professor Heer to seven species, which he has described,§ and severally named—*Hydrophilites Nathorsti*, *Buprestites rugulosus*, *Curculionites parvulus*, *Curculionites Carlsoni*, *Elytridium Angelini*, *Elytridium lœvигatum*, and *Carabites deplanatus*.

From the lower marls of the Lias at Schambelen, in the Swiss Alps, some 2000 specimens of fossil insects have been obtained. These fossils have been carefully studied by Dr. Heer,|| who has referred them to 142¶ species which are distributed amongst the following Orders, viz.: *Neuroptera* (7 species), *Orthoptera* (7 species), *Hemiptera* (12 species), and *Coleoptera* (116 species).

* Brodie's "Fossil Insects," *antea cit.*, and "Fauna der Vorwelt" (Insecten und Spinnen) by Dr. Giebel. Leipsic: 1856.

† Of one of the supposed *Diptera* from the Lias, Prof. Westwood observes, "seems like the body of one of the Tipulidæous insect;" of another fragment, he says, "may possibly be Dipterous, allied to *Asilus*." Brodie's "Fossil Insects," *antea cit.*, p. 128.

¶ See note, *ante p. 7.*

§ Aftryek ur Geol. Föreningens i Stockholm Förhandl. 1878. No. 49, Bd. iv, No. 7.

|| See "Die Urwelt der Schweiz," *antea cit.*

¶ Exclusive of one species, supposed by Heer to belong to the *Hymenoptera*.

One small wing has been described by Dr. Heer as being that of a Hymenopterous insect, but, for the reasons given in my second* paper, I am of opinion that this supposed Hymenopterous wing probably belonged to an insect of another Order.

The *Neuroptera* included 6 species of *Termites*—referred by Heer to two genera†—and one species of *Libellulidæ*, *Aeschna Hageni*, which, with the exception of *Gynacantha plagiata*,‡ is probably larger than any known living species, and is especially interesting as being the oldest known dragon-fly, if we except that very doubtful fragment from the American Coal-measures, which has been referred by Seudder§ to the genus *Libellula*.

The *Orthoptera* comprised 3 species of *Blattidæ* (*Blattina formosa*, *B. angustata*, and *B. media*), 3 species of *Acridiidæ* (*Gomphocerites Bucklandi*, *Acridiites deperditus* and *A. liasinus*), and one species of *Forficulidæ* (*Baseopsis forficulina*), which differs much from all living forms.

The *Hemiptera* belonged to the families *Cercopidæ*, *Cicadidæ*, and *Lygaeidæ*.

The *Coleoptera* are represented by 116 species, which are distributed amongst the following families, viz.: *Carabidæ*, *Gyrinidæ*, *Nitidulidæ*, *Peltidæ*, *Cryptophagidæ*, *Lathridiidae*, *Mycetophagidæ*, *Byrrhidæ*, *Hydrophilidæ*, *Aphodiidæ*, *Buprestidæ*, *Elateridæ*, *Telephoridæ*, *Cistelidæ*, *Curculionidæ*, and *Chrysomelidæ*.

The *Buprestidæ* are represented by no less than 33 species, referred by Heer to seven genera, two of which still exist, whilst the others (*Glaphyroptera*, *Micranthaxia*, *Buprestites* and *Chrysobothrites*) are extinct. Of the 33 species of *Buprestidæ*, 16 are placed by Heer in the extinct genus *Glaphyroptera*.

The *Elateridæ* are represented by 10 species, the most abundant of which is *Elaterites vetustus*.

Of the *Byrrhidæ*, four species have been determined, three of which—*Byrrhidium arcuatum*, *B. morio*, and *B. troglodytes*—are said to be amongst the most abundant|| of the Schambelen fossils.

The carnivorous beetles are represented by 29 species, including *Carabidæ* (11 species), *Telephoridæ* (3 species), &c. The *Hydrophilidæ* comprise 15 species, and the *Gyrinidæ* 6 species, all of which latter family are remarkable for their small size.

The *Lamellicornia* and *Chrysomelidæ* are poorly represented, and the *Longicornia*, *Xylophaga*, *Brachelytra*, and *Coccinellidæ*, are altogether absent.

* *Ante*, p. 54.

† Viz.: *Clathrotermes* and *Calotermes*.

‡ See Trans. Ento. Soc. Lond., 1878, part i, plate iv.

§ *Ante*, p. 172.

|| See "Die Urwelt der Schweiz," *antea cit.*

From a comparison of the Orders, families, and genera of the fossils obtained from Schambelen with those obtained from the English Lias, it appears that the insect fauna of Switzerland, during this part of the Jurassic Period, was closely allied to that of England.

The varied habits and modes of life of the Liassic *Insecta* are highly suggestive of the probable land and freshwater conditions of Europe, during the period of their existence; and some of the species lead to the inference of the contemporaneous existence of certain Orders of animals, and of plants, of which no remains have been preserved to us.

In the second part, of this paper I shall enumerate the families and genera of the *Insecta* obtained from the Oolitic rocks—including the “Stonesfield Slate” and the “Purbecks” of the United Kingdom, and the “Solenhofen Slate” of Bavaria—and I shall conclude with a brief notice of the principal types of animal and vegetable life characteristic of the Jurassic Period.

Surbiton, S.W.: April, 1879.

DESCRIPTION OF A NEW SPECIES OF THE LEPIDOPTEROUS GENUS
PAIS (FAM. AGARISTIDÆ).

BY ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

The following very distinct new species has just been brought to me by my cousin, Miss J. K. Lorimer, who has been staying for the last two years at the Gordon Mission, Natal.

PAIS GORDONI, *n. sp.*

Primaries sulphur-yellow, crossed by black lines nearly as in *P. decora*, Linnæus, the chief difference being that the outer or discal line forms a less distinct **B** by union with the reniform spot; discoidal spots outlined in black, with black centres, the outer spot with variable zone (throwing back processes to the orbicular and to a similar circular spot below it, in the type specimen), the basal lines and the lower half of the zone enclosing the spot on interno-median area deep red from the median to the internal vein; a distinct sinuated grey-edged red stripe (*not* confounded with the other markings) just beyond the black discal line; a series of longitudinal black internervular dashes from immediately beyond the red stripe to the outer margin, which is also black; fringe white, tipped here and there with black; secondaries dark red with deeper, almost plum-coloured, outer border, upon which are eight rather large orange spots; median vein and the commencement of its branches, together with the basal half of the second median interspace, orange; discocellulars dusky; outer margin black; fringe of outer margin black at base, ochreous externally; fringe of abdominal margin ochreous, extremely long; head black, spotted with sulphur-yellow; thorax sulphur-yellow, longitudinally striped with black, the inner margins of the tegulae ochraceous; antennæ and upper surface of palpi black; abdomen bright golden-yellow, banded with black; legs black, banded with bright ochreous; wings below altogether duller than above, the black lines and zones on the primaries obsolete, excepting the commencement of the discal line; the pale areas ochraceous; a black marginal line; pectus ochreous, streaked with white; venter white, with black bars across the last three or four segments.

Expanse of wings, 2 inches.

Tugela River, South Africa.

Type in B. M.

British Museum: May, 1879.

DESCRIPTIONS OF SOME NEW HOMOPTEROUS INSECTS FROM
CENTRAL AMERICA BELONGING TO THE FAM. MEMBRACIDÆ.

BY W. L. DISTANT.

ADIPPE MACULATA.

Head and frontal portion of pronotum luteous, the last with two small black spots placed transversely and close together on the centre immediately above the head, and a central fascia of the same colour above these, on the disc. Pronotum luteous but divided by black fasciæ into the following large spots on each side, namely, five dorsal, of which the fourth and apical are largest and palest, and three along the lateral basal border, situated a little behind the first dorsal three, and of which the second and third are much paler in colour. Under-side of body bright orange, legs black. Tegmina black, with a large hyaline spot a little before the apex.

The pronotum is coarsely and rugulose punctured. Length, 7 mill.

Irazu, 6-7000 ft. (Rogers).

Allied to *A. zebrina*, Fairm., and *A. histrio*, Walk.

POLYGLYPTA GODMANI.

Dark blackish-green, with some lateral luteous linear markings, of which the most distinct are one (longest) extending through the humeral angles from base of anterior process to base of pronotum, and two smaller parallel ones a little behind that. Eyes dull luteous, legs ochreous, femora, excepting apices, black. The anterior process is strong and horizontal. Pronotum with thirteen longitudinal carinæ.

Total length, 14 mill.

Irazu, 6-7000 ft. (Rogers).

Allied to *P. tredecim-costata*, from which it is at once distinguished by its more than twice greater length, its coloration, &c.

TELAMONA SALVINI.

Head luteous, wrinkled, with five central impressions, the middle one of which is largest. Pronotum luteous, varied with fuscous, deeply and thickly punctured. Humeral angles prominent, spotted with black in front. Dorsal process occupying about the anterior half of the pronotum, about twice as long as high, somewhat angularly truncated behind, sloping and very slightly rounded in front, upper surface almost level, slightly hollowed towards the centre, with two large foveæ on each side at base, frontal one somewhat semicircular, posterior smaller and rounded. The process is somewhat fuscous, very thickly punctured, with three small creamy spots, one on the upper and two on the frontal edge. The pronotum is crossed by two broad fuscous bands, one extending through the posterior portion of the dorsal process, and the other sub-apical. Tegmina hyaline, base ochreous, opaque, and punctured, nervures shining fuscous, a large sub-apical spot and some irregular markings on basal third, dark castaneous. Legs luteous, femora with a sub-apical fuscous band, tibiæ sulcated and irregularly spotted with fuscous.

Tegmina reaching a little beyond apex of pronotum.

Length, pronot., 10 mill.; exp., hum. ang., 6 mill.; length, tegm., 9 mill.

Chinautta, 4100 ft. (Salvin).

In colour approaching *T. cyrtops*, Fairm., in structure apparently (from description) *T. mexicana*, Stål.

HYPHINOE CORNUTA.

Olivaceous, thickly and coarsely punctured. Tegmina, lateral and upper borders of the humeral horns, and dorsal ridge of the pronotum, castaneous. Tips of the humeral horns, extreme apex of pronotum, and a rounded spot situated at about the centre of the lateral borders of the pronotum, black. Legs dull ochraceous, tibiae sulcated and strongly pilose.

The humeral horns are very robust, sub-acute, and directed upwards; the disc between them is broadly hollowed, rounded and deflexed anteriorly, where there is a central, longitudinal, impunctate, slightly raised line.

Length, pronot., 14 mill.; exp., hum. horns., 7 mill.; length, tegm., 12 mill.

Irazu, 6-7000 ft. (Rogers).

The humeral horns will at once distinguish this species from any other of the genus as yet described.

1, Selston Villas, East Dulwich :

12th May, 1879.

REMARKS ON SOME BRITISH HEMIPTERA-HETEROPTERA.

BY DR. O. M. REUTER.

(Continued from vol. xv, page 67).

HADRODEMA PINASTRI, Fall. This species occurred in July and August, 1876, very abundantly on firs near Forres, but it is to be remarked that all the specimens I saw were of the ochreous variety; in South Finland, on the contrary, where the species is rather common, I have only once taken an ochreous example, all others being black. The ochreous specimens resemble in colour the scales on the young shoots of the firs. Perhaps there exists in the North of Scotland some enemy to *H. pinastri*, which does not occur in South Finland; and in consequence of this only the individuals favoured by protective resemblance remain and propagate (?).

LOPUS SUPERCILIOSUS (Cat., p. 48, 2). According to most authors, we must regard this species as only a variety of *Lopus gothicus*, L.; to the same belongs also as a synonym, *Lopus affinis*, Jakovl., from Derbent, which does not at all differ from *L. gothicus*, var. *superciliatus*. I possess quite similar specimens from Sweden and Derbent.

STIPHROSOMA LEUCOCEPHALA, Fall. Dr. Puton had the kindness to communicate to me some specimens of a *Stiphrosoma* from the collection of Fieber, labelled "Anglia, an n. sp.?" These specimens, smaller than *leucocephala* usually occurs, and having the head piceous, belong to

St. steganoides, J. Sahlb. (Notis. Fauna Flora Fenn., xiv, p. 306), which may be regarded as only a dark variety of *St. leucocephala*. The form occurs in Russian Lapland (Sahlberg), I have found it in company with the typical form near Stockholm, and Dr. Gredler has sent me specimens from Tyrol.

ANTHOCORIS SAROTHAMNI (Saund., Syn., p. 618). Referring to this species, Mr. Saunders says that it is only "a dark, nearly black, variety of *A. nemoralis*, with entirely black antennæ." He adds that he had "repeatedly found it with the paler forms and intervening varieties." At Forres, in the North of Scotland, *A. sarothamni* was very common during the summer of 1876, on the broom, and I collected a great multitude of this species, but I could not find any "intervening varieties" between it and *A. nemoralis*. I regard them therefore as good, different species, and more especially because they are also distinguished by some characters which Mr. Saunders seems not to have observed, and which I will note in the following parallelism:—

1. Hemielytra with the whole cuneus and the posterior half of the embolium and *also of the corium* very shining. All the three veins of the membrane *very distinct, elevated* A. SAROTHAMNI, D. et S.
2. Hemielytra opaque, with only the cuneus and the apex of embolium shining. Membrane with three veins, of which *the exterior is the most elevated*, the intermediate less conspicuous and *the interior nearly obsolete*.

A. NEMORALIS, Fabr., auct.

Anthocoris Minki, Dohrn (Stett. ent. Zeit., 1860, p. 162), is a variety of *A. nemoralis*, which species varies very much in colour, and sometimes has the antennæ quite black, as in *A. sarothamni*; but all these many varieties are nevertheless distinguished by the above-mentioned characters, which differentiate them from the mostly smaller *A. sarothamni*.

ACOMPOCORIS NEMORALIS (Cat., p. 95). Following Prof. Stål (Hem. Fabr., i, 90, 1), Messrs. Douglas and Scott have accepted the name *nemoralis* for *A. pygmæus*, Fall., considering *Acanthia* or *Salda nemoralis*, Fabr. (E. S., iv, 76, 35, and S. R., 116, 15), to be the same as that species. But if *A. pygmæus* in the typical collection of Fabricius is put under the above-cited name, this must have been by mistake. The diagnosis of Fabricius in S. R. is the following: "S. atra elytris puncto medio albo, alis [= membrana!] fuscis basi albis;" and he says further, "Habitat in Seländiæ Quercu." These characters do not agree with *A. pygmæus* (but accord with *Anthocoris nemoralis*, auct.); and the *Acompocoris* lives not in oaks, but in *Pinus sylvestris*.

TRIPHLEPS OBSCURUS (Cat., 52, 2), which Douglas and Scott have described in Brit. Hem., 503, 2, cannot be the same as *Rhynarius obscurus*, Hahn (W.-I., i, 110, fig. 59). It is clear from Hahn's description and figure that his species is synonymous with *Tr. niger*, Wolff, Dougl. and Sc. I cite only the following words from the description by Hahn, p. 111: "die Füsse schwarz mit Ausnahme der Spitzen der Schenkel und der Schienen des ersten Fusspaares, welche *bleichgelb* sind." Douglas and Scott say concerning *Tr. niger*, p. 502: "Legs black; tibiae: 1st pair only yellow;" and on the contrary in the diagnoses of *Tr. obscurus*, p. 503: "Legs testaceous; thighs: 3rd pair in ♂ brown; 2nd and 3rd in ♀ black, except the apex." I have received from Mr. Saunders specimens from England, which agree with the description of *Tr. obscurus*, by Douglas and Scott, and which I have found belong to *Tr. latus*, Fieb. (*sec. spec. typ.*). But according to my last examination of the *Anthocoridæ*, *Tr. latus*, Fieb., is synonymous with *Tr. minutus*, Fall. *Tr. minutus*, of Fieber, do not occur, as far as I know, in Sweden; and, as Linné has described his *Cimex minutus* in the Faun. Suec., 941, the name *minutus* must be employed for the Swedish species, which is *Tr. latus*, Fieb.; and the name *Tr. minutus*, Fieb., *nec* Linn., Fall., must be changed.

Mr. Saunders (Synops., p. 620, 2) regards *Tr. obscurus*, Dougl. and Sc., as only a pale variety of *Tr. niger*; but the description given by Douglas and Scott is opposed to this supposition. They say, concerning *Tr. obscurus*: "Antennæ—thin, almost filiform; in the ♂ not much thicker than in the ♀;" which in no respect accords with *Tr. niger*.

The three British species could best be distinguished by the following characters:—

1 (2.). The two posterior pairs of tibiae or at least the posterior tibiae piceous or almost black. Antennæ in ♂ and ♀ dissimilar, ♂ thick. Pronotum posteriorly aciculated and wrinkled, not punctured.

TR. NIGER, Wolff. (♂ = *compressicornis*, F. Sahlb.)

2 (1.). All the tibiae pale testaceous. Antennæ in ♂ only a little thicker than in ♀, pale or only towards the apex fuscous.

3 (4.). Pronotum with the sides toward the apex more rounded and extended (♀), or almost straight, and only at the angles more rounded (♂), in the anterior two-thirds finely marginated; the apical angles deflected and provided with a foveola without any anterior border; the apex between these angles, immediately behind the narrow apical constriction ("apical-ring"), about three-fifths, almost one-half, narrower than the base; the disc with a rather narrow median *callus*, which occupies only two-fourths of the width of the pronotum at this place, the lateral limb therefore being broad; the disc behind the callus strongly and densely wrinkled and punctured, the punctuation on the middle and sides equal; hemelytra pale testaceous, unicolorous, or only with the cuneus more or less piceous, more rarely also the base of the clavus is of this colour.

TR. MINUTUS, Linn., Fall. (= *latus*, Fieb., = *obscurus*, D. et S.).

4 (3.). *Larger*; pronotum with the sides toward the apex *very much narrower*, rather *slightly rounded*, anteriorly *narrowly extended*, almost as far as to the posterior angles acute and finely marginated; the apical angles deflected and provided with a foveola; the apex between these angles, immediately behind the apical ring, four-sevenths or almost one-third narrower than the base; the disc with a *broad* callus, which is greatly extended toward the sides, making *the greatest part of the breadth* of the pronotum at this place; the lateral limb therefore between the callus and the margin being *narrow*; the disc behind the callus only *in the middle* transversely wrinkled, toward the *more shining sides* *rather strongly but less densely punctured*, the basal limb and the angles themselves smooth; hemelytra *very distinctly punctured*, pale testaceous, mostly with at least the cuneus and *the apex or the whole commissure of the clavus* piceous.

TR. MAJUSCULUS, m. (= *minutus*, Fieb.).

These last two species vary to quite testaceous and unicolorous hemelytra and thighs; the latter species varies very much in the extension of the piceous colour of the hemelytra.

XYLOCORIS ATER (Cat., p. 52). *Anthocoris obscurella*, Zett., which is cited as being a synonym of this species, is very distinct, and belongs to the genus *Scoloposcelis*, Fieb. (*vide* Reut., Öfvers. K. Vet. Ak. Förh., 1871, p. 413).

(*To be continued*).

Carabus auratus, Lin., in the Borough Market, London.—I this morning had given to me three (two ♂ and 1 ♀) very fine specimens of the above beautiful insect. That they should be found running about the stones of a London market does at first seem somewhat remarkable, and certainly not a place where an entomologist would go in anticipation of finding such an insect, especially as it must be ranked among the rarest of our British *Carabi*. As few instances have been recorded of its having been taken in England, I at first thought they might have found their way into this strange locality in the sacks of turnip tops, which come from the south coast at this time of the year; but, upon second thoughts, I think it is more probable that they may have been brought across the channel packed in the pads of lettuce and salad which come from the south of France in large quantities in the months of April and May. This is a very common beetle in France, where it is known by the name of "Jardinier," but becomes rare as we advance northward, being seldom seen in Germany or Sweden.—T. R. BILLUPS, 4, Swiss Villas, Coplestone Road, Peckham: *May 14th, 1879.*

Lebia crux-minor, L., near Basingstoke.—I have recently obtained a specimen of this rare species from the neighbourhood of Bradley, near Basingstoke. It was accidentally sent up to some friends of mine in some moss intended for Easter decorations. I thought a notice of this capture might be interesting to the readers of your Magazine.—W. J. SAUNDERS, Wray House, Wimbledon: *May, 1879.*

Is Dytiscus latissimus found in North America?—In the April No. (vol. xv, p. 252) of the Magazine, I find some remarks by Dr. Sharp relative to the occurrence

of *Dytiscus latissimus* within our faunal limits. This species was added by Mr. Crotch to the "check list," on information furnished by Dr. Sharp. I subsequently protested against the addition of this or any other European species to our list, unless on well authenticated evidence. In times past it was a common occurrence to have European species sent me from Canada, under circumstances admitting of very little doubt of their foreign origin. It is, of course, possible for a species occurring in our fauna to reach a European student before being seen by us here; but I think it extremely unlikely that one so large as the species above quoted would reach Europe before falling under our notice. After reading Dr. Sharp's almost crushing remarks on my protest, it will be well to go twice over his penultimate sentence—"The evidence of the existence of this remarkable species in North America is, however, undoubtedly in need of confirmation."—GEO. H. HORN, Philadelphia, U. S. A.: April, 1879.

On the cocoons formed by Hypera rumicis and its parasites, and Cionus scrophulariae.—Some observations from the "Address of the late President of the Entomological Society of London, on the 15th January, 1879," quoted in the March number of this Magazine, p. 240, have induced me to suppose that the following notes may not be unacceptable. In Westwood's "Modern Classification," vol. i, p. 343, it is stated that—"The larvae of the genus *Hypera* form small oval cocoons, like gauze, composed of loose threads, permitting the larvæ or pupæ to be seen through the meshes, and attached on the under-sides of various leaves, &c." On the same page, speaking of *Cionus*, it is said:—"Schäffer has figured the transformations of the *C. scrophulariae* (Abhandl., vol. iii, pl. 9), under the name of "der Kropfkrauts Russel-kafer." The cocoon is formed with open meshes, like that of the *Hyperæ*.

As far as regards the cocoons of *H. rumicis*, I have found them as frequently on the upper as on the under-side of the leaf. In one instance I found four cocoons attached underneath in the space of an inch and a half along the angle of the midrib where the parenchyma had been eaten away, and only a rusty network of nerves and reddish epidermis remained, exactly matching the cocoons in colour and appearance. I was much struck also with the resemblance of the cocoons on the upper surface to those rusty stains so common on the leaves of the various species of *Rumex*. These stains are circular, consisting of an outer broad brownish-red margin and a central paler yellowish disc. Now, as the cocoon is a globular reddish net-work, it necessarily looks darker on the circumference where the meshes are massed together; but besides this, the contained larva, being lighter, especially on the ventral side—yellowish, or dirty white—imitates the lighter central disc of the dock-stain. It would not be safe to infer that all, even striking, resemblances are necessarily cases of imitation or mimicry. On the other hand, as by far the greatest number of the objects in the field of vision at any moment are not seen in the *macula lutea*, or point of most perfect sight, very superficial resemblances may afford very efficient protection. If the general effect on the eye is the same, and if the thing imitated is very much more common than the thing imitating, the protection is good. Both these conditions are present in the case of the *Hypera* cocoon. *Cionus scrophulariae* also in shape, size, and colour, and in its relatively large, circular, black dots, very much resembles the flower-buds of its food-plant, among which it is generally to be found. It is true it has two of these black dots for the flower-bud's one, but so situated that only one of them is usually seen at once. Mr. Rye has noticed ("British Beetles," p. 195), a

similar "mimicry" in *C. blattariae*. "In repose, with its legs contracted, it affords an exact representation of a small patch of bird-droppings." The larva of *H. rumicis* bears also a close likeness to the flowering tops of the *Rumex*, among which it feeds. Nevertheless, it appears to be very liable to the attacks of parasites, and indeed of two species of *Ichneumonidae*. The cocoon of the one is larger ($2\frac{1}{4}$ — $2\frac{1}{2}$ lines in length), looser in texture, and attached to the outer *Hypera*-cocoon by an open mesh-work of threads, and remains always white in colour. On one occasion I extracted a white apodous larva, which had just emerged from the body of a *Hypera*, from the *Hypera*-cocoon, and kept it several days in a watch glass. For four or five days it kept on spinning as if making a cocoon, but without investing itself in the web. On the third day it had deposited a great thickness of silk on the glass, the absence of surrounding points of attachment (normally afforded by the *Hypera*-cocoon), apparently preventing it from forming a cocoon; and had become quite a purple-brown in colour from the shining through of its contents. On the fourth and fifth days it seemed still spinning, but languidly; but on the seventh it was quiet, contracted, and thickened. I did not succeed in obtaining a pupa from it. Kirby and Spence say, "Introduction," vol. iii, p. 225, "It is a general rule, that those larvae which spin cocoons never in ordinary circumstances become pupæ without having thus enclosed themselves." Many of the *Hypera* larvae which I bred, however, pupated without forming cocoons, and the same thing happened, less frequently, with *Cionus scrophulariae*, of which I shall have more to say anon. The second parasitic cocoon is much smaller ($1\frac{1}{2}$ lines long), elongate, egg-shaped, compact in structure, and lying loose within the *Hypera* cocoon. When fresh it is white like the larger one, but on the second day begins to acquire a pink or reddish colour at the ends, which gradually deepens and extends, till on the third or fourth day only a narrow equatorial belt of white remains, the rest of the cocoon being of a dusky purple. Similarly belted cocoons are mentioned by K. and S., vol. iii, p. 221. "Sometimes the same cocoon is of two different colours. Those of certain parasites of the tribe of *Chalcidites*, &c., Latr., the motions of one of which I noticed on a former occasion [vol. ii, p. 296], are alternately banded with black or brown and white, or have only a pale or white belt in the middle, which gives them a singular appearance." But their account of the manner in which this difference of colour is produced does not seem to apply in the case of the *Hypera* parasite. "In both cases the difference of colour depends upon the different tints with which the silky gum is imbued in the reservoirs: the first portion of it is white, and with this the larva first sketches the outline of its cocoon, and then thickens the layers of silk considerably, in those parts where the white bands appear: when these are finished, its stock of white silk is exhausted, and the remainder of the interior of the cocoon is composed of brown silk." My cocoon, which was made in the end of July or beginning of August, 1877, is now (Apr., 1879) of a brittle, membranous, or gummy texture. The fly has escaped out of a circular opening near one of the ends. I have cut it open and perceive that, while the thickness of the shell is if anything darker at the equatorial region than elsewhere, the outer whitish belt seems quite superficial, and looks almost as if it could be peeled off. Corresponding with this white external equatorial belt, there is on the inner surface of the shell a dark opaque ingrained belt; and to the one side of this, and partly overlapping it, a superficial belt of white glistening silk, with a groove in the middle running round the inside of the shell. On the cut edge of the cocoon it can be

seen that the main thickness of the shell is of one colour and texture, and that the white belts are very thin and superficial. The coloration would seem to be produced by the effusion of some gummy fluid in the ends of the cocoon, which extends through the substance of the silk by capillary attraction. The whole inside has a varnished appearance.

The spinneret of the larva of *H. rumicis* is anal; the silk issues in a very thick clear transparent thread, which eventually becomes reddish-brown. The pupa in the cocoon is sometimes very active, making three or four evolutions on its long axis, now in one direction, and again in the opposite. It seems to be excited to activity when brought near the light. K. and S. mention the same thing of *H. arator* (vol. ii, pp. 294, 5).

I have reared many beetles of *Cionus scrophulariae* from the grub, and found its cocoons in great abundance on *Scrophularia nodosa*. I am therefore at a loss to understand the statement already quoted from Westwood, apparently on the authority of Schäffer, that "the cocoon is formed with open meshes like that of the *Hyperæ*." All those which I have seen were close and membranous, of the kind described in K. and S., vol. iii, p. 227. The substance seems even thicker and tougher than that of *Zygæna filipendulae*. These cocoons are prolate spheroids, lemon-shaped, but not pointed at the ends, and are sparsely covered in the middle region with raised whitish "goose-skin" points, which appear to be produced by the subsequent filling up of small openings left in the original making of the cocoon. A cocoon seen in the unfinished state would present eribriform openings, but would not even then be like the network cocoon of *Hypera*. In about a fortnight the *Cionus* beetle cuts a circular lid out of one end, which either falls off or is pushed open as a hinge, and out of this opening the imago emerges, not always without some effort and difficulty. In the case of those pupating without a cocoon, most perished. The pupæ at first are extremely delicate, almost like transparent glass; become greenish or whitish and opaque after some time; and, if exposed to too dry an atmosphere, both pupation and the exclusion of the imago are rendered impossible, or difficult. Therefore, I imagine a close membranaceous cocoon is a necessity.—J. A. OSBORNE, Milford, Letterkenny: April, 1879.

Great flight of beetles.—On Saturday, May 3rd, a flight of small beetles fell on the water and banks of the Crinan Canal at Cairn Baan, in Argyllshire. The flight extended for about a mile, or perhaps rather less, up and down the canal, just opposite the Cairn Baan Hotel. The weather was calm, though cold, but at 1 p.m. a whirlwind or storm suddenly arose, and at once ruffled the surface of the canal. Some persons at a distance observed a dark cloud hanging over the spot. When the storm had passed, the people about saw myriads of beetles on the water-banks and roads. Some of the insects were struck with violence against the windows of a cottage, and startled the inmates. The description given of the appearance on the surface of the canal was "as if some one had strewed the water with corn;" others said "it was like stones on the water, and they wondered how the stones got there, and why they did not sink."

They were swept away from the doorways and paths, and even to-day (May 13th) there are a good many left in the corners of the loch and by the edge of the canal. One man said that it would not have taken long to get a barrowful. Some little

alarm was felt, as neither water nor tobacco seemed to kill them.—C. W. MAPLETON, Duntroon Castle, Lochgilphead, N. B.: 14th May, 1879.

[The beetles, of which some have reached me alive, are the very common *Galeruca capreae*, which usually lives on willows or osiers. Their occurrence in such numbers is paralleled by the swarms of a *Galeruca* recorded in Dr. Katter's Ent. Nachrichten, vol. ii, p. 53, in Northern Norway, during a storm.—E. C. R.]

Note on Horama Panthalon, Fabr.—I am indebted to the Rev. T. A. Marshall for a specimen of this interesting species. It differs from *H. pretus*, Cram., in the yellow hind wings, and from *H. diffusa*, Grote, in the markings on the body. Mr. Marshall states that it is very common at the north end of Antigua from February to September, but that he has not met with it in the south-west of the island. "When flying," he adds, "it is singularly like the common wasp of Antigua (*Polistes Poeyi*), having the same distribution of colours." Walker placed this species among the undetermined species of *Zygænidæ*, and I am not aware that any author before Mr. Marshall succeeded in identifying it, though Walker subsequently described the same (or a very closely allied species) from St. Domingo, as *H. pretus*, var. β (Cat. Lep. Het., vii, p. 1632). The species of *Horama* appear to be local; thus *pretus* is recorded from St. Thomas and Jamaica, *Panthalon* from Antigua and St. Domingo (?), and *diffusa* from Cuba. Walker's *H. pretus*, vars. γ and δ , from Venezuela, are probably also distinct species.—W. F. KIRBY, Dublin: May 3rd, 1879.

Curious structure in a Lepidopterous insect.—The Canadian Entomologist (vol. xi, p. 47) has an article on *Callimorpha interrupto-marginata* by Mr. Sievers of Newport, Ky., in which is the following passage:—"On squeezing the body of the male, two plumes, over an inch long, and of exceedingly delicate structure, issue from the hind segment. I drew the attention of Mr. W. H. Edwards of Coalburgh Va. to these singular appendages, and he sent specimens to Dr. Hagen at Cambridge, who replies, that in 'Psyche,' No. 6, Cambridge, October, 1874, Mr. H. K. Morrison had described similar organs in *Agrotis plecta* and *Euplexia lucipara*." Can any of your readers say whether this has been observed in British specimens?—N. F. DOBRÉE, Beverley, E. Yorks: May 1st, 1879.

Cossus ligniperda.—On the 19th April, four well-grown larvae of *Cossus ligniperda* were dug up in my garden, not far from some young willows. I put them in a jar with some earth; they burrowed at once, and seemed inclined to stay there. The willows do not appear to have been touched by them, and there are no other trees near. Is it not unusual for these to burrow?—M. S. JENKINS, Palace Road, East Molesey: May 19th, 1879.

[It is a common practice for the larvae of *C. ligniperda* to wander, when full-fed, from the trees in which they had lived, and to burrow in the earth before changing to pupæ.—Eds.]

Description of the larva of Mamestra abjecta.—That I am able to offer some account of the hitherto undescribed larva of this species is due to Mr. Samuel Stevens, whose kindness in imparting to me for the purpose all the knowledge he acquired of it when he discovered the larva some years ago, I have most thankfully to record.

Although thus instructed, it was, however, in vain that I hunted for the larva in 1877, through the end of May, onward to 11th of June, the day on which I chanced to find under a stone, within a neat little cavity of another stone beneath, embedded in stiff soil, a fine pupa, which, on the 12th of July following, produced a remarkably handsome female specimen of *abjecta*.

Having so far proved this species to exist on the south coast, I felt encouraged to resume the search in 1878 in the same locality, where, during the months of May and June, I found larvæ of other species, from time to time, yet not one to satisfy me until the 3rd of June, but on that day I felt hopeful of having found *abjecta* in a young larva adhering to the under-side of a stone, where it had sheltered itself with a partial covering of green frass, spun together with silk, having been also connected with the tuft of grass whereon the stone had lain.

By assiduously following up this success on all available opportunities, extending the area of research, and raising a large number of stones, much to the discomfiture of colonies of ants, various beetles, spiders, crustaceans and slugs, I was again rewarded by finding on the 20th of June a full grown example of the larva, under what proved to be a very lucky stone; though on turning it over, at first there seemed only a large black spider in view, which sprang forward in alarm to a small hole, and as it paused there a moment on the brink, a small spot of pale colour beneath its dark body arrested my attention, and this pale spot proved to be part of the back of the larva, which was soon safely extracted from its snug quarters between the matted grass.

After figuring and describing this larva, it was placed in a pot furnished with some of its native salt muddy soil, together with a small tuft of the grass and a stone, and it soon worked its way beneath; I subsequently found it had formed for itself a very slight loose cocoon of silk with a few particles of soil adhering, not under the stone, but close under the grass at side of the pot, and the moth, a fine dark greenish-glossed female, emerged on July 29th.

The young larva of the 3rd of June lived only a week, and was no more than barely three-quarters of an inch long, of stoutish figure; its head, plates, and small horny spots of shining red-brown colour, the real ground colour of the body being a rather shining flesh colour, palest and coolest on the thoracic segments, though not much of this showed on the back and sides, just merely a little around each spot, and in the transverse wrinkles when they opened with the movement of crawling; the intermediate parts clouded purplish-brown without gloss, the paler coloured skin more conspicuous between the head and plate on the next segment.

The full-grown larva measured one and five-eighths of an inch in length, and was stoutly proportioned, cylindricical, the segments plump, moderately well-defined and puckered on the sides with short wrinkles, the spiracular region forming a puffed ridge along the eleventh and twelfth; the ventral and anal legs short, thick and well beneath the body as in the true *Agrotides*, adapted more for burrowing than walking, though in all other respects of structure besides, its true affinity lay with *Xylophasia*, very apparent in the transverse horny ridges and spots on the thoracic segments, though all the spots were much smaller than with *Polyodon*, yet similar in shape and arrangement: the body was of a rather dirty pale flesh tint, having a faintly darker flesh-coloured dorsal vessel appearing through the skin, the head, the anterior and anal plates, and the anterior legs of glossy bright reddish-brown colour, the horny

spots also, but of a much paler tint, each bearing a fine hair ; the front margin of the anterior plate, pointed in the centre and curving away concavely, showed that whenever the head should be retracted the margin of the plate would accurately fit against the lobes on the crown of the head, and protect the soft flexible skin between them, for as in the younger larva so in the full-grown this interval of skin presented a noticeable character ; a flesh-coloured short dorsal division appeared on the hinder part of the plate, the spiracles black, the ventral and anal feet fringed with dark brown hooks.

The pupa (♀) measures a trifle more than seven-eighths of an inch in length, and a little over two-eighths in thickest diameter, the shape similar to that of *Polyodon*, the abdominal tip with a flattish prolongation terminating with two straight pointed spines ; the wing covers, leg and antenna cases rather roughened, and on the back of the abdomen a narrow band of punctate roughness lies across the front of each flexible segment ; the colour for some time is brick-red, but as it matures becomes purplish-brown with the tip pitchy-black, having generally little gloss.

As to localities, I am disposed to believe with Mr. Stevens that wherever its food-plants, *Poa maritima*, *distans*, and *Borreri* grow along sea banks, the margins of tidal rivers, salterns, muddy creeks, and salt water ditches, *abjecta* may there be found ; but be this as it may, I am now able to appreciate properly the hard work Mr. Stevens must have expended in his persevering researches, which were formerly so successful in the neighbourhood of Gravesend and at other similar places.—

WILLIAM BUCKLER, Emsworth : April 30th, 1879.

Description of the larva of Melliphora alvearia.—I have, on different occasions, been indebted to Mr. S. L. Mosley, of this town, for supplies of larvae of this species. He finds them, full grown, in an old bee hive, generally at the beginning of May. Length about five-eighths of an inch, and of moderate bulk in proportion ; head polished, it has the lobes rounded, and is slightly narrower than the second segment ; body cylindrieal, of almost uniform width throughout, but tapering a little towards the anal segment ; there is a polished plate on the hinder part of the second segment : skin soft and semi-translucent, the segmental divisions well defined. Ground colour, both dorsally and ventrally, greyish-white, through which the internal working of the muscles shows, of a purple shade ; a dark purplish pulsating vessel forms the dorsal line ; head dark brown ; the frontal plate of the same colour behind, but paler in front ; spiracles minute, very dark brown ; when the larva is at rest, the segmental divisions appear white, from the overlapping of the skin, but this is not observable when it is crawling. Those I had last year produced imagoes about the middle of July.—GEO. T. PORRITT, Highroyd House, Huddersfield : May 17th, 1879.

Pterophoridæ taken in the Valais, June and July, 1878.—*Agdistis paralias*, on a dry hill covered with *Ononis natrix* and *Colutea arborescens* at Sierre. *Platyptilia gonodactyla*, abundant on coltsfoot by Zermatt church. *P. Zetterstedti*, in fields beyond the church, also on the Riffelberg, and on the way to the Schwarzen. *P. tesseradactyla* (*Fischeri*), Riffelberg. *Amblyptilia cosmodactyla*, Riffelberg. I believe I saw *Oxyptilus hieracii* in the Visp Valley, but failed in catching it. *Mimaseoptilus coprodactylus*, common at Zermatt. *Pterophorus monodactylus*, Sierre. *Leioptilus osteodactylus*, very common amongst golden rod on the Riffelberg ; *Botys*

terrealis was also abundant at the same spot. *Aciptilia tetradactyla*, Zermatt; *A. pentadactyla*, Sierre.—ROBERT C. R. JORDAN, 105, Harborne Road, Edgbaston, Birmingham: May 3rd, 1879.

The Cuckoo feeding on Dragon-flies.—Among the large number of previously unpublished letters in Prof. Bell's edition of White's *Selborne* is one to his nephew Samuel Barker (see vol. ii, p. 113), that has especially interested me. It is dated September 6th, 1775, and refers to the habits and anatomy of the Cuckoo. The miscellaneous contents of the stomach of one of these birds included "small *Scarbæi*, *Ptini*, *Elatri*, *Aranææ*, *Libellulæ*, &c.," and Gilbert White adds:—"the last of which I have seen cuckows catching on the wing over Oakhanger Pond more than once." This statement was so novel to me that had it come from almost any other source I would scarcely have credited it. Dragon-flies suffer very little from the attacks of birds, and I did not suspect the Cuckoo as being among their few enemies. I called Prof. Newton's attention to the statement, and he very kindly informs me that the only confirmation of it that he remembers is in Bechstein's German work, "*Gemeinnützige Naturgeschichte Deutschlands*," ed. ii, vol. ii, p. 1128 (1805). Nothing is there said of the way in which they are captured, but Prof. Newton says that if caught at all they must be taken on the wing, as Cuckoos are clumsy in the use of their feet.

Perhaps some ornithological reader of this Magazine may be able to furnish further confirmatory information.—R. McLACHLAN, Lewisham: 25th March, 1879.

Occurrence of Colletes cunicularia near Southport.—On the 2nd inst., I met with a large colony of this bee on the sand hills to the north-east of Southport, that is, between Southport and Churchtown. The males were plentiful as well as the females, and may have appeared a fortnight ago, as I learn has been the case with the colony on the Cheshire sand hills. At this latter locality several new colonies are now developed.—BENJAMIN COOKE, Windsor Road, Southport: 6th May, 1879.

Synonymic notes on some Hemiptera.—Dr. Puton has had the goodness to send me the "Bulletin des Séances de la Société entomologique de France," No. 6, 1879, containing a note communicated by him to the Society on some synonymic criticisms of mine published in this Magazine (vol. xv, p. 235), on which subject I have now to add some further remarks.

1. *ISCHNORHYNCHUS resedæ* is accepted by Dr. Puton in place of *Kleidocerys didymus*.

2. *HETEROGASTER*.—Dejean's genus not having been characterized, the name was of no value, and I agree with Dr. Puton that Fieber should not have superseded it in favour of his *Phygadicus*, which must be suppressed.

3. *STYGNUS*.—While admitting that a generic name should not be employed twice in the same order, nor even among *Insects* generally, Dr. Puton maintains that *Stygnus*, Fieb., need not be superseded, because the prior use of the name was not in *Insecta* but in *Arachnida*, "which are not insects." It would follow, therefore, from this principle not only that any of the other generic names in *Arachnida* but also in the other divisions of the animal kingdom might be used in *Insecta*, and vice versa; and, further, that the same name might be used in every division. Fieber has shown elsewhere that he did not so understand the rule, and I do not think zoologists will agree

to this interpretation. To what end has Agassiz laboured to index genera if not for the correction of the errors of past time as well as to give warnings for the future? Prescriptive right cannot, at any rate, be pleaded for a genus that dates only from 1861.

4. *PACHYMERUS*.—Dr. Puton says that this generic name should be maintained because Latreille has applied it only to a *section* of the genus *Bruchus*. I referred this question to one of our best Coleopterists, who answers thus:—"Latreille's *Pachymerus* (1825) was described as a *genus*, and has been adopted by some. The name was certainly not disposable after 1825, and should not, therefore, supersede another more recent name, as has been attempted by some continental authors." I do not think I need add anything to show that *Pachymerus* cannot be revived in *Hemiptera*, as proposed.

5. *BEOSUS*, Am. et Serv.—Dr. Puton says, "With Stål I have altered the name *Ischnotarsus*, Fieb., into *Beosus*, A. et S., which has the priority. *Beosus quadratus*, A. et S., is not, as Fieber considered and Mr. Douglas appears to believe, *Lygaeus quadratus*, Fab., but *quadratus*, Panz., = *luscus*, Fab. The genus *Beosus*, Fieb., is not really distinct from the genus *Pachymerus*; but the genus *Beosus*, A. et S., Stål, Horv., Put., = *Ischnotarsus*, Fieb., is very distinct from it."

I know that *Lygaeus quadratus*, Fab., is not the same as *L. quadratus*, Panz., as is shown by the former species being placed in the genus *Calyptonotus* (= *Pachymerus*, Put.) in the "Catalogue of British Hemiptera,"* but the matter is complicated, and it is no wonder that many authors have erred. The descriptions of the genus *Beosus*, species *quadratus*, by Am. et Serv., certainly point to *L. luscus*, Fab., rather than to *L. quadratus*, Fab., yet they give as the exponents of their descriptions *Lygaeus quadratus*, Fab., Coqneb., Ill. t. ix, fig. 12, and *P. quadratus*, Schill., Beitr., 66, 4, t. 5, fig. 6; and it is singular that if they meant *P. luscus*, Fab., they did not refer either to Schilling's description and figure of it, *op. cit.*, t. 6, fig. 4, or to Panzer's *L. quadratus*, which also is *luscus*, F., and not *quadratus*, Fab., as given by Panzer. The result is therefore, properly, that, disregarding Amyot and Serville's citations, their genus must supplant *Dieuches*, A. Dohrn, = *Ischnotarsus*, Fieb.; and *Beosus*, Fieb., must merge into *Pachymerus*, Put. (= *Calyptonotus*, D. & S.) as Dr. Puton says.

6. *Scolopostethus decoratus*, Hahn, = *ericetorum*, Leth.—Dr. Puton says, "I persist in this synonymy with Messrs. Reuter and Horváth:"—I am sorry I cannot concur. Hahn says of *decoratus* that the antennæ are stouter than in *P. pictus*, which is true of *P. affinis*, Schill., to which I refer Hahn's species, but not of *ericetorum*; further, that "the basal joint at the end and the second at the base are reddish-yellow," and his figure interprets this to agree exactly with *affinis* but not with *ericetorum*. Hahn himself cites the species as *affinis*, Schill., but says, that because Schilling had described only the form with the membrane of the elytra wanting, he altered the name!—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham : 16th May, 1879.

Correction of error.—I regret to have (with the intention of adding a useful reference at the end of the Rev. A. E. Eaton's descriptions of *Ephemeridæ*, in Ent. Mo. Mag., vol. xv, p. 268) caused a confusion between these insects and the *Culicidæ* from the same district, referred to by that gentleman in the appendix to Capt. Elton's Journals, published by Murray. It was to the *Diptera* only that any reference or to figures should have been made; and Mr. Eaton informs me that the condition of the specimens of the *Ephemeridæ* precluded any figures of their genitalia being given.—E. C. RYE.

* The reference under *C. quadratus* to Am. et Serv., p. 13, must be expunged.—J. W. D.

Obituary.

A. Edouard Pictet.—The Swiss Journals announce the decease of this gentleman at the early age of 44, having survived his father (the well-known author on *Neuroptera* and *Palaeontology*) only seven years (*cf. Ent. Mo. Mag.*, viii, p. 294). As an entomologist he was principally known by his “*Synopsis des Névroptères d’Espagne*” (1865), a finely illustrated work, based upon the materials collected by him (in company with Herr Meyer-Dür) during a journey in Spain in 1859. He was formerly an officer in the Swiss army, and of late his time appears to have been almost fully occupied by the municipal and other duties that the esteem in which he was held in the city of Geneva imposed upon him, and latterly he had, we think, done but little entomological work; nevertheless, he was deeply interested in the recent explorations into the physical conditions of Lac Léman, in which he aided Forel, and in connection with which he visited London a few years ago to inspect the “*Loan Exhibition*,” at South Kensington. The name of Pictet is one of the most honoured in Geneva, and the family has furnished many eminent scientific men, including the subject of this notice and his father, besides Raoul Pictet the investigator of the liquefaction of gases, and also the illustrious Saussures.

ENTOMOLOGICAL SOCIETY OF LONDON, 2nd April, 1879.—J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the Chair.

Mr. McLachlan exhibited the cases of sixteen species of Brazilian Caddis-flies, and the insects bred from the larvæ that manufactured some of them, forwarded by Dr. Fritz Müller. They included three forms of *Helicopsyche*, with the insects bred from two; many of the black *Dentalium*-like cases formerly considered as shells, but which Vallot had described as *Phryganea grumicha*, the insects bred from which proved to belong to the *Leptoceridae*, but of a new genus, and of uncertain affinities; cases referred by Dr. F. Müller to the *Hydroptilidae*, upon the insects of which was founded the genus *Peltopsyche* (F. Müller), but differing from the usual habits of the family in having fixed cases; and other interesting forms. Extracts from Dr. Müller’s letters, concerning several of the forms, were read.

Mr. Stainton alluded to the saltatory habits of very young larvæ of *Mantis religiosa*, as observed in examples communicated to him in 1866 by the late Mr. J. T. Moggridge, and thought it was a case in which the relationship and affinities of animals are often more expressed in the embryonic than in the adult form.

Sir S. S. Saunders exhibited a stocking-like structure from the Fiji Islands, said to be the product of a spider. It was asserted that the natives induce the spiders to manufacture these articles by placing split bamboos arranged in the outline of bags in the places frequented by the spiders, and use the web so formed for the purpose of making a kind of cloth.

Notes were communicated by Mr. Slater on certain flowers that are systematically avoided by honey-seeking insects, citing more particularly the dahlia, passion flower, crown imperial, and oleander.

Miss Ormerod read “*Observations on the effects of low temperature upon larvæ, with especial reference to the past winter*,” in which she stated that no larvæ observed by her had suffered any material inconvenience from the late severe and continued frost. Mr. Stainton fully agreed with Miss Ormerod in her general conclusions, but alluded to some of the leaf-mining *Tineina*, such as *Lithocolletis mesaniella*, *Tischeria marginata*, *Nepticula aurella*, &c., the larvæ of which had suffered greatly, because the cold had killed the leaves in which they mined. Mr. McLachlan said it was not, as a rule, cold that killed larvæ, but wet.

Mr. Distant read a paper “*On new species of Hemiptera collected by the late Dr. Stoliczka during the Expedition to Kashgar in 1873-74*”; the species, as a whole, were European in character.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 7.

PART II.

Mesozoic Time.

[*On the Insecta of the Jurassic Period, and the animals and plants with which they were correlated.*]

Great Britain.

Lower Oolite.

(*Stonesfield Slate*).

The fossil insects obtained from the Stonesfield Slate have, with two exceptions, been referred to the *Coleoptera** and *Neuroptera*. The first-named Order is represented by the families *Buprestidæ*, *Tenebrionidæ*, *Curculionidæ*, *Prionidæ*, and *Coccinellidæ*; and the *Neuroptera* include a few *Libellulidæ*, and the wings of a large species, named by Dr. Buckland† *Hemerobioides giganteus*.

The most interesting fossil insect from this formation is the wing‡ of a large species which has been referred to the *Lepidoptera* by Mr. Butler,§ and named by him *Palæontina oolitica*. Mr. Butler's opinion as to the Order to which this fossil belongs is, I believe, confirmed by Prof. Westwood, Mr. Bates, and other well known entomologists; but Mr. Scudder refers the wing to an insect allied to *Cicada*. As this difference of opinion, as to the Order of which *Palæontina oolitica* was a representative, has been noticed at some length in an earlier paper,|| it is, probably, unnecessary to further allude to it.

Upper Oolite.¶

(*Purbecks*).

From the middle and lower divisions of the Purbeck beds in Dorsetshire, Wiltshire, and Buckinghamshire, fossil insects have been discovered in considerable numbers, and in some localities they have been found in such abundance that the beds containing them have, as in the Lias, been called the "Insect Limestone."

The majority of these fossils from the Dorsetshire Purbecks—

* Brodie's "Fossil Insects," and Giebel's "Fauna der Vorwelt," *antea cit.*

† Proc. Geol. Soc. Lond., vol. ii, p. 688. Dr. Hagen is of opinion that this fossil should be referred to the genus *Apochrysa*: "Entomologists' Annual," 1862, p. 8.

‡ A second fragment of a wing, supposed to be Lepidopterous, has also been obtained from the Stonesfield Slate, but it has not, I think, been figured or described.

§ "Lepidoptera Exotica," pp. 126—128, and the "Geol. Mag," vol. x.

|| See vol. xv of this Magazine (E. M. M.), p. 55.

¶ A few elytra of *Coleoptera* have been discovered in the Great Oolite and Forest Marble of the Lower Oolite, and in the Kimmeridge Clay of the Upper Oolite; but as they are very fragmentary and imperfect, and have not been identified with any known genera, they call for no special notice.

between 700 and 800 in number—were obtained by the Rev. P. B. Brodie, the Rev. Osmund Fisher, Mr. W. R. Brodie, and Mr. C. Willeox; and many of them were described by Prof. Westwood.*

The greater number of these fossils belong to the Orders *Coleoptera*, *Neuroptera*, *Orthoptera*, *Hemiptera*, and *Diptera*. Two specimens from this formation have been referred to the *Lepidoptera*,† but they are in so fragmentary a condition, that it is impossible to say, with any degree of certainty, to what Order they belong.

Two wings of a gigantic species of *Myrmica* are also recorded from the Dorsetshire Purbecks; but there seems considerable doubt‡ as to whether they were obtained from this formation.

Of the *Coleoptera* from the Dorsetshire Purbecks, some forty-five species have been identified, which are distributed amongst the following families:—*Hydrophilidae*, *Gyrinidae*, *Dyticidae*, *Curabidae*, *Harpalidae*, *Buprestidae*, *Elateridae*, *Tenebrionidae*, *Chrysomelidae*, *Coccinellidae*, *Prionidae*, *Lamiidae*, and *Circulionidae*.

The *Neuroptera* include species belonging to the families *Raphidiidae*, *Panorpidae*, *Sialidae*, *Phryganeidae*, and *Libellulidae*; and the *Orthoptera* are represented by *Gryllidae* and *Blattidae*.

Of the *Hemiptera* about eleven species have been identified, which have been referred to the families *Scutelleridae*, *Lygaeidae*, *Cicadidae*, and *Cercopidae*; and the *Diptera* are represented by the families *Bibionidae*, *Mycetophilidae*, *Tipulidae*, and *Cecidomyidae*.

A very large collection of fossil insects was obtained by the Rev. P. B. Brodie from the Purbeck strata of the Vale of Wardour, in Wiltshire, and the Vale of Aylesbury, in Buckinghamshire. About 239§ specimens from this collection were submitted to Prof. Westwood for examination; but the very fragmentary and imperfect condition of the majority of them rendered the determination of the species, and in many cases even of the genera and Orders to which they belonged, a matter of impossibility.

Upwards of sixty species, however, have been identified, which are distributed amongst the *Coleoptera*, *Neuroptera*, *Orthoptera*, *Hemiptera* and *Diptera*.

The *Coleoptera* include representatives of the families *Buprestidae*, *Carabidae*, *Hydrophilidae*, *Circulionidae*, *Chrysomelidae*, *Elateridae*, *Cantharidae*, *Tenebrionidae*, *Helophoridae*, and *Staphylinidae*.

* See Brodie's "Fossil Insects," *antea cit.*, and Quar. Journ. Geol. Soc. Lond., 1854, vol. x, pp. 378—396.

† See Mr. Scudder's observations on these supposed *Lepidoptera*, at p. 89 of the "Memoirs of the Amer. Assoc. for the advancement of Science;" Salem, Mass., 1875.

‡ Prof. Rupert Jones, F.R.S., has informed me that these ant wings were not obtained from "Purbeck" strata, but from the Tertiary leaf beds of Creech, Dorset.

§ Prof. Westwood figured upwards of seventy of these fossils in Brodie's "Fossil Insects." See Westwood's "Introductory Observations" to the work last mentioned.

The *Neuroptera* are represented by *Panorpidae* (*Bittacus*, *Panorpa*, and *Orthophlebia*), *Sialidae*, *Libellulidae* (*Æschna* and *Libellula*), and *Termitidae*; and the *Orthoptera* by a few *Gryllidae*, and several species of *Blattidae*.

Of the *Hemiptera* about fourteen species have been determined, which have been referred to the families *Tingidae*, *Lygaeidae*, *Gerridae*, *Hydrometridae*, *Cicadidae*, *Flatidae* (*Ricania*), *Cixiidae* (*Delphax*, *Asiraca*, and *Cixius*), *Cercopidae*, and *Aphididae*.

Remains of the *Diptera* are more numerous than in any earlier formations, no less than thirteen species having been determined, which have been referred to the following families:—*Muscidae*, *Tipulidae*, *Empididae*, *Bibionidae* (*Bibio* and *Simulidium*), *Mycetophilidae*, *Chironomidae*, and *Culicidae*.

Prof. Westwood* states that, with a few exceptions, there is a very general conformity between the insects from the Dorsetshire Purbecks, and those from the Purbecks of Wilts and Bucks. There must, however, have been a considerable difference in the mode of deposition of the strata of the two districts; in no other way can we account for the remarkable contrast presented by the *state of preservation* of the insects from the Wiltshire Purbecks with that of those from Dorsetshire. The remains obtained from the former are generally in a fair state of preservation, while those from Dorsetshire consist nearly always of mere fragments of wings, elytra, and bodies.

Continental Europe.

Upper Oolite.

(*Solenhofen Slate*).

The only formation of this division of the Jurassic Period, on the Continent, in which fossil insects have been obtained in any numbers, is the well known Solenhofen Slate of Bavaria, celebrated for the great number and variety of the fossils discovered in it.

Several hundreds of fossil insects have been obtained from this slate, many of which are preserved in the Academy of Munich, and in the Teyler Museum at Haarlem.

For our knowledge of these fossils we are indebted principally to Prof. Germar,† Count Münster,‡ Dr. Giebel,§ Dr. Hagen,|| Herr H. Weyenbergh, Junr.,¶ and Dr. Winkler,** who have described or

* Quar. Journ. Geol. Soc., vol. x, p. 392, 1854.

† "Nova Acta," Acad. Nat. Cur., T. xix, pp. 189—222. 1839.

‡ "Beiträge zu Geog. und Petrefactenkund," T. v. 1841.

§ "Fauna der Vorwelt," vol. ii, *antea cit.*

|| "Palaeontographica," vol. x, pp. 96—145. 1861—1863: and vol. xv, pp. 57—96. 1865—1868.

¶ "Archives du Musée Teyler," vol. ii, pp. 247—294. 1869; and vol. iii, pp. 234—240.

** "Catalogue Systématique de la Collection Paléontologique du Musée Teyler." (Deuxième Supplément). Haarlem: 1876.

enumerated about 114 species, distributed amongst all the existing Orders, as follows:—*Coleoptera*, 29 species; *Neuroptera*, 46 species; *Orthoptera*, 11 species; *Hemiptera*, 16 species; *Diptera*, 5 species; *Hymenoptera*, 5 species; and *Lepidoptera*, 2 species.

The majority of the *Coleoptera* belong to existing genera, distributed amongst the following families, viz.: *Scarabaeidæ*, *Carabidæ*, *Hydrophilidæ*, *Gyrinidæ*, *Silphidæ*, *Scaphidiidæ*, *Trogositidæ*, *Histeridæ*, *Meloidæ*, *Buprestidæ*, *Elateridæ*, *Tenebrionidæ*, *Cucujionidæ*, *Chrysomelidæ*, *Cassididæ*, and *Coccinellidæ*; there are also several species belonging to extinct genera.

The *Neuroptera* are represented by *Termitidæ* (*Termes*); *Ephemeredidæ* (*Ephemera*), *Hemerobiidæ* (*Hemerobius*, *Chrysopa*, *Apochrysa*, and *Nymphes*), *Sialidæ* (*Corydalis*), *Myrmeleontidæ* (*Myrmeleon*), and *Libellulidæ*. The great majority of the fossil *Neuroptera** from Solenhofen belong to the family last named (*Libellulidæ*), which is represented by about 10 genera, including the following: *Isophlebia*, *Stenophlebia*, *Heterophlebia*, *Euphæa*, *Agrion*, *Anax*, *Petalia*, *Petalura*, and *Libellula*. Many of the species belonging to the genera *Heterophlebia*, *Petalia*, and *Petalura*, are of gigantic size; two of them having an expanse of wings of $7\frac{1}{2}$ —8 inches, with bodies of $3\frac{3}{4}$ —4 inches in length.

The *Orthoptera* include the following, viz.: *Forficulidæ*, (*Forficulæ*), *Gryllidæ* (*Gryllites* and *Acheta*), *Locustidæ* (*Locusta* and *Phaneroptera*), and *Blattidæ* (*Blattaria*).

The *Hemiptera* are represented by *Notonectidæ* (*Corixa*), *Nepidæ* (*Nepa*, *Naucoris*, and *Belostoma*), *Cicalidæ* (*Cicada*), *Flatidæ* (*Ricania*), *Gerridæ* (*Velia*), *Lystridæ* (*Lystra*), and *Reduviidæ* (*Pygolampis* and *Propygolampis*).

The five species of *Diptera* are respectively referred to five families, viz.: *Asilidæ* (*Asilicus*), *Muscidæ* (*Musca*), *Tipulidæ* (*Tipularia*), *Empidæ* (*Empidia*), and *Syrphidæ* (*Chilosia*).

The *Hymenoptera* include three species referred to the genus *Apiaria*, of the family *Apidæ*, and one species doubtfully referred to the genus *Bombus*, of the same family.

The *Lepidoptera* are represented by two species—*Sphinx Snelleni* and *Pseudosirex Darwini*—the former of which has been described and figured by Herr Weyenbergh in the “Archives du Musée Teyler.”† Assuming the figure to be accurate the insect must be in a very fair

* Dr. Hagen states that, out of 450 specimens of fossil insects in the Munich Collection, 150 belong to the *Neuroptera*, and that 136 of these are *Libellulidæ*. See the “Entomologist’s Annual,” 1862, p. 5.

† Vol. ii, p. 261, pl. xxxiv.

state of preservation, and is apparently about the size of *convolvuli*. *Sphinx Snelleni* is especially interesting as being—if we except *Palaeontina oolitica*—the most ancient fossil Lepidopterous insect known. I have not seen the figure of the second species, *Pseudosirex Darwini*, and cannot, therefore, offer any suggestion as to the probability of the insect being Lepidopterous.

Having, in the two parts of this paper, enumerated the principal families and genera of the *Insecta* of the Jurassic Period, it remains for me to refer briefly to the leading types of animals and plants with which they were correlated.

The *Arthropoda* are represented by *Crustacea*—including *Ostracoda*, and many forms of *Decapoda*, which last had now become the dominant Order of the class—by *Arachnida*,* and probably by *Myriopoda*;† though I am not aware that any traces of the last-named class have been recorded.

Of the *Mollusca*, the *Brachiopoda*, although common, are less abundant than in some of the Palaeozoic Rocks. The *Lamellibranchiata* and *Gasteropoda* are also numerously represented; and the *Cephalopoda* are extremely abundant throughout the Period, and include some of the most characteristic fossils.

The *Vertebrata* are represented by all the existing classes. The dominant class of the Period—the *Reptilia*—comprises a great variety of species, some of which are allied to forms now in existence, and others to extinct types. Existing forms are represented by *Chelonia*, *Lacertilia*, and *Crocodilia*; and extinct forms by *Plesiosauria*, *Pterosauria*, *Ichthyosauria*, and *Deinosauria*.

The birds are represented by one species—the celebrated *Archæopteryx macrura*,‡ of the Solnhofen Slate—which, with the exception of the traces of supposed bird foot-prints in the Triassic rocks of the Connecticut Valley, furnishes the earliest evidence of the existence of this class.

The *Mammalia* are represented by several small Marsupials, the majority of which appear to have been insectivorous.

The land-flora of the Period consisted chiefly of Ferns, Cycads, and Conifers; some remains of Endogenous plants have also been discovered, but no Angiosperms appear to have been yet in existence.

Surbiton Hill, S.W.: 30th May, 1879.

* "Catalogue Systématique de la Collection Paléontologique du Musée Teyler," p. 83. 1876.

† "The Ancient Life-History of the Earth," by Prof. H. Alleyne Nicholson, p. 233. 1877.

‡ Two or more specimens of this species have been discovered, but only one of them has, I believe, yet been described.

NOTES ON THE *ADELIINAE* WITH DESCRIPTIONS OF NEW SPECIES.

BY FREDERICK BATES.

CARDIOTHORAX, Motsch.

Thoracophorus, Hope, *Atrypholus*, Pascoe, *Otrintus*, Pascoe.

For convenience, the species of *Cardiothorax* may be tabulated as follows. I do not put it forward as altogether a natural grouping of the species, which cannot be attempted with anything like certainty until the sexes of each species are known.

Of those species indicated by an * only the ♀ is known to me; their position is, therefore, only analogically assumed.

- A. Apex of prothorax more or less broadly, and usually arenately, emarginate: foliaceous sides not broadly reflexed.
- B. Species more or less nitid; elytra striated, or sulcated.
- C. Hind femora armed in the ♂.
- D. Basal half of hind femora emarginate within, dentate in the middle.
- a. Prothorax not coarctate at the base; hind angles rounded; sides channelled, not foliaceous: elytra finely striated; shoulders narrow, oblique, not reflected by the epipleural fold 1. C. BEIRRI, Germ.
- aa. Prothorax coarctate at base; hind angle acute, outwardly directed; sides foliaceous: elytra sulcated; shoulders rounded, reflected by the epipleural fold.
 - b. Species smaller ($8\frac{1}{4}$ lines); colour black; elytral intervals unequal 2. C. ARMIPES, n. sp.
 - bb. Species larger ($9\frac{1}{2}$ lines); colour bronzed-black; elytral intervals equal 3. C. OPACICOLLIS, MaeLeay.
- DD. All the femora shortly emarginate within at the apex; the upper end of the emargination dentate in the intermediate pair; produced into a sub-cylindrical lobe, or long blunt tooth, in the posterior pair: posterior femora and tibiae strongly compressed: prothorax not coarctate at the base; sides moderately foliaceous: colour dark green with violet reflections 4. C. FEMORATUS, n. sp.
- CC. Hind femora unarmed in the ♂.
- E. Hind angles of prothorax not produced nor prominent.

F. Base of prothorax triangulately emarginate.

G. Anterior femora with a tooth near the apex, within, in the ♂.

H. Prothorax widest before the middle.

- c. Femoral tooth broad, obtuse : anterior tibiae bowed, spinose on the inner edge 5. *C. PITHECIUS*, Pase.
- cc. Femoral tooth narrower, sub-acute : anterior tibiae bowed, but not spinose within 6. *C. ERRANS*, Pase.
- HH. Prothorax widest at the middle 7. *C. VALGIPES*, n. sp.
- GG. Anterior femora not toothed in the ♂.

- d. Prothorax smaller, widest before the middle : anterior tibiae triangulately expanded from their middle to the apex, in the ♂?
colour golden-brassy, with purplish reflections 9. *C. POLITICOLLIS*, n. sp.
- dd. Prothorax ample, strongly transverse, widest at the middle : colour black with a greenish tinge .. * 10. *C. BREVICOLLIS*, Redtenb.

FF. Base of prothorax sinuately emarginate, or truncate.

- I. Elytra more or less elongate-ovate ; sides of prothorax distinctly foliaceous.
J. Prothorax not widest before the middle, lateral edges thin, equal throughout.

- e. ♂. basal half of anterior femora emarginate within, a large blunt tooth near the apex : anterior tibiae bowed and sinuous:
the posterior straight : legs very long : colour black 11. *C. LONGIPES*, n. sp.
- ee. ♂. femoral tooth sub-obsolete : anterior tibiae sinuous but not bowed : the posterior bent inwards and towards each other :
legs moderate : colour black 12. *C. CURVIPES*, n. sp.
- JJ. Prothorax widest before the middle, lateral edges thickening posteriorly : colour brilliant bronzed-brown.* 13. *C. CHALENTIS*, n. sp.
- II. Elytra narrow, cylindric : sides of prothorax channelled but not foliaceous, the edges unequally thickened..14. *C. CRASSICORNIS*, n. sp.†

- EE. Hind angles of prothorax distinctly prominent.
K. Epipleura of elytra as strongly striated, &c., as the back.
L. Posterior tibiae in ♂ not incrassated, nor expanded.

- M. Apex of prothorax arenately emarginate, and entirely bordered ; posterior tibiae in ♂ slightly bent inwards, and
asperous down their entire inner face.

[†] This species more naturally associates itself to the first three species of the next section, having the same form, colour, sexual characters, &c., but the hind angles of the prothorax are not prominent.

[July,

N. Elytra narrow, elongate, sub-cylindric; sides of prothorax scarcely foliaceous; coarctate at base; hind angles usually large, acute, directed outwards; base sub-sinuate, truncated between the angles: colour more or less brassy-black.

O. Prothorax narrower, sides not rounded at the middle.

f. Prothorax without trace of impressed line between the disc and expanded margin, discal impressions subobsolete, hind angles smaller: $6\frac{1}{2}$ to 7 lines 15. C. CONNEexus, Haag.

ff. Prothorax distinctly but irregularly impressed, or sulcated, between the disc and expanded margin; discal impressions usually very strongly marked, hind angles larger: 7 to 9 lines 16. C. ENCEPHALUS, Pasc.

OO. Prothorax broader, sides distinctly rounded at the middle: 10 lines 17. C. CAPERATUS, Pasc.

NN. Elytra oblong ovate; sides of prothorax foliaceous, base triangulately emarginate between the angles: colour black, sometimes very slightly bronzed: $6\frac{1}{2}$ to $7\frac{1}{2}$ lines * 18. C. SIMULANS, Haag.

NNN. Elytra with angles: colour black; sides of prothorax foliaceous, base triangulately emarginate between the angles: colour black, sometimes very slightly bronzed: $6\frac{1}{2}$ to 7 lines ? 19. C. MASTERSI, W. MacLeay.

MM. Apex of prothorax distinctly angularly emarginate, the thickened border obsolete in the middle, side edges strongly thickened; base sinuous: colour shining black; size and habit of *C. simulans* * 20. C. ANGULATUS, n. sp.

LL. Posterior tibiae in ♂ incrassated, or expanded, strongly compressed.

P. ♂. Posterior tibiae flexuously incurved; the inner face longitudinally concave, and somewhat closely granulose: apex of epistoma prominent, and a little elevated in the middle: colour black 21. C. CASTELNAUDI, Pasc.

PP. ♂. Posterior tibiae a little flexuous but not incurved, the inner face faintly rugulose granulose: outer face distinctly longitudinally concave: anterior margin of epistoma sub-angularly notched in the middle: elytral striæ distinctly crenulated: colour black, slightly bronzed on the elytra 22. C. GRANDIS, n. sp.

PPP. ♂. Posterior tibiae not at all flexuous.

Q. Prothorax strongly transverse, elytra without depression behind the scutellum.

R. Foliacous sides of prothorax separated from disc by a deeply impressed, curved sulcation.

R. Foliacous sides of prothorax concolorous 23. C. WALCKENÆRI, Hope.

g. Elytra and prothorax discolorous 24. C. ÆNUCOLLIS, Pasc.

gg. Elytra and prothorax discolorous 25. C. ACUTANGULUS, n. sp.

RR. Foliaceous sides of prothorax not marked off from disc by a sulcation 26. C. CORDICOLLIS, Pasc.

QQ. Prothorax scarcely transverse, cordiform: elytra with a long triangulate depression behind the scutellum.

KK. Epipleure of elytra much less strongly striated, &c., than the back, sometimes smooth.

S. Hind angles of prothorax acute and distinctly outwardly directed.

T. Apex of prothorax entirely margined.

h. ♂. Anterior tibiae incrassated and expanded, strongly sinuous at outer edge : hind tibiae a little bowed : colour entirely brilliant greenish-bronzed, with slight golden reflections: 8 to 9 lines,

hh. ♂? Anterior tibiae but little incrassated, outer edge moderately sinuous : hind tibiae slightly flexuous : colour bronzed with purplish reflections, prothorax and sutre tinged with pure green : 7 lines 27. *C. Howitti*, Pasc.

TT. Apex of prothorax margined only at each side, not extending beyond the width of the lateral foliation : colour — elytra bright brassy-green, clearer on the sides and epipleure, head and prothorax deep black : 6½ lines 28. *C. captiosus*, n. sp.

SS. Hind angles of prothorax prolonged backwards into a short lobiform process: colour shining dark greenish-black with slight purplish reflections on the sides and epipleure 30. *C. distinctus*, n. sp.

BB. Species opaque : elytra sharply costate, with two lines of punctured striae between 31. *C. egerius*, Pasc.

AA. Apex of prothorax deeply emarginate ; foliaceous sides broadly reflexed.

U. Species a little shining ; femora moderately robust, claviform.

V. Prothorax with a deep uninterrupted sulcation between the foliaceous margins and the disc, lateral edges finely granulated 32. *C. grenulicollis*, n. sp.

VV. Prothorax not deeply sulcated between disc and foliaceous margins ; lateral edges entire.

i. Elytral intervals equal and regularly convex 33. *C. humeralis*, n. sp.

ii. Elytral intervals unequal and alternately convex 34. *C. Haagi*, n. sp.

UU. Species quite opaque ; femora slender, sub-linear.

WW. Sides of prothorax with a deep excision near the hind angle ; elytra with distinct epipleure.

35. *C. quadridentatus*, C. O. Waterhouse.

WW. Sides of prothorax entire ; elytra without epipleure.

j. Elytra more convex, more coarsely irregularly punctate striate, the intervals irregularly costate, more or less flexuous : 7½ to 8 lines 36. *C. aratus*, Pasc.

jj. Elytra depressed, more finely and regularly punctate striate, &c. : 9 lines.

37. *C. Macleayi*, Pasc.
Licinoides, Redtenb.

A BRIEF LIFE-HISTORY OF *CANTHARIS VESICATORIA*.

BY J. LICHTENSTEIN.

I have the pleasure of informing you that I have at last been successful in breeding *Lytta (Cantharis) vesicatoria*.

I have already informed your readers of the numerous trials I have been making for 20 years to follow the curious stages of development of this common insect. I took the female *in copula*, and saw her lay her eggs ; they hatched in my tubes, and by giving to the young larvae (*triungulina*) honey of *Ceratina chalcites*, with the bee's egg or maggot over it, I saw how it first devoured the animal food, then changed its skin and mandibles to eat the honey. After two more moults, the larva buries in the earth, and there changes to a pupa or pseudonymph, much like a Dipterous pupa. It remains under that form the whole winter through. On the 15th of April a new change took place ; the skin of the pupa was thrown off, and there appeared another larva, white and smooth (with six rudimentary legs), which developed slowly in its little cellule under the earth. The last day of April another change of skin occurred, and the true nymph, in the usual form of a Coleopterous nymph, made its appearance : this morning, the little green-coated Spanish fly has come out of the soil, and is now eating leaves of ash. The whole evolution has been effected in a year. Full description and drawings will be given in the Ann. Soc. Ent. France, but, meanwhile, I think the knowledge of the fact will interest you.

La Lironde, near Montpellier :
23rd May, 1879.

NOTICE OF THE DISCOVERY OF THE LARVA OF *ACROLEPIA PERLEPIDELLA*.

BY C. G. BARRETT.

For some time I have been greatly interested in the endeavour by my friend, Mr. W. H. Grigg, of Bristol, to find the larva of *Acrolepia perlepidella*, and in his complete success ; and he now very kindly allows me to make public his discovery.

Early in March last, Mr. Grigg went to a spot in which he had, three years before, taken several specimens of the moth, and there searched *every visible* low-growing plant, but without finding any trace of larvæ. He then cut several sods of the few plants that were growing at the time, and placed them in a warm greenhouse, and after the lapse of three weeks, was rewarded by finding mines, in which

larvæ were feeding, in leaves of several plants of *Inula Conyza* (Ploughman's spikenard). Having thus cleverly obtained a clue, he proceeded to search the *Inula* growing in the open air, but it was not till April 19th that any mines were observable there, and these, from the smallness of the plants and the close growth of their hairy leaves, might easily have been overlooked. However, by close and long searching, sufficient were found in a sheltered spot to enable Mr. Grigg to send me a supply, and from that time we both watched them with great and increasing interest till, on May 28th, the identity of the larva was decided by the emergence of two specimens of *Acrolepis perlepidella* in Mr. Grigg's greenhouse, and, three days later, by the appearance of one of mine, kept in an ordinary temperature.

The larva, when nearly full-grown, is one-fourth of an inch in length, cylindrical, but tapering a little behind, and having deeply divided segments. Faint yellowish or greenish, with the large dark green intestinal canal very visible through the transparent dorsal region. Head deeply lobed at the back, the lobes being visible *through* the transparent, almost colourless, plate on the second segment. Colour of the head pale brown, with darker red-brown jaws, and a brown margin to the triangular forehead. Anterior legs faintly brownish, abdominal legs very minute.

Mining the lower leaves of young plants of *Inula Conyza* in April and the beginning of May, completely hollowing them out until they become mere brown bladders mottled with scattered excrement. Apparently feeding up entirely in a single leaf, Mr. Grigg's experience and my own being that a moth emerges for every leaf that is mined. Probably, the larva never leaves the mine, as none were observed crawling about, and the cocoon is always made inside the mine, and generally at the lowest part of it in the base of the foot-stalk. This makes it very difficult to find the pupa, and in my plants, which I kept growing in a seed-pan, the mined leaves decayed so quickly, that I was quite unable to detect the mode of pupation. Mr. Grigg, however, succeeded better, and also found one cocoon attached to the inside of the skin of the under-side of the leaf, so as to be visible through it. It is a rather broad flat cocoon, of tough white silk, and bears no resemblance whatever to the pretty network cocoons of *A. granitella* and *pygmæana*; the larva also differs from them in being spun up within the mine. Pupa brown, not protruded from the cocoon on emergence.

The moths emerged from the end of May to the middle of June, always coming out between 7 and 10 a.m., 7.30 to 8 a.m. being ap-

parently the favourite time. They are very sluggish, particularly the females, and sit still on leaves until touched, and then only dart down to hide themselves. Curiously enough, they seem to sit by preference on any other leaf rather than that of *Inula*, a habit which tends greatly to mislead in the search for the larva.

Pembroke: June 13th, 1879.

[The discovery of the larval habits of *Aerolepia perlepidella* is of extreme interest, as no one had previously even suspected the correct food plant; several of the genus are attached to Compositæ—thus, *A. cariosella* occurs on *Gnaphalium arenarium*, *A. arnicella* on *Arnica montana*, *A. granitella* on *Inula Helenium* and *dysenterica*, and *A. solidaginis* (which may perhaps be only a southern form of *granitella*) on *Solidago virgaurea* and on *Inula Conyza* (*Conyza squarrosa*), on which last-named plant I met with it at Mentone in March, 1867. *A. arnicella* makes, like *A. perlepidella*, a firm dense cocoon, and, like it, changes within the leaf; but I believe it always mines into a fresh leaf a space just big enough to hold its cocoon, never changing, like *A. perlepidella*, within the leaf in which it has fed up.—H. T. S.]

Pimpla instigator.—Mr. W. H. Harwood, of Colchester, kindly forwarded me some infested pupæ of *Selenia lunaria*, which have revealed very fine specimens of *Pimpla instigator*, F. The larvæ turned to pupæ about April 20th, hatching from the 5th to the 25th of May. Out of from thirty to forty specimens not one has proved a male. This is a somewhat extraordinary occurrence, as those I have caught on the wing have mostly been females. I am retaining a dozen pupæ of *lunaria*, to see if the females (as suggested by Dr. Vollenhoven) will hatch further on: *lunaria* (Mr. Harwood informs me) was feeding in a canvas-covered enclosure, and the ichneumons seemed to have obtained access through the holes of the canvas, and performed their mission in a most deadly manner. I have bred one very interesting variety with yellow stripes across the body. Vollenhoven truly describes *instigator* as a polyphagous insect; I have bred or observed it out of twelve different larvæ. It occurred very commonly on *O. potatoria*.—S. D. BAIRSTOW, Woodland Mount, Huddersfield: 10th June, 1879.

Isonychia ferruginea, *Albarda* (1878), = *I. ignota*, *Walker* (1853).—It was through a mistake on my part that this species was re-named. Walker's type is rather darker than ordinary specimens, and was too imperfect for exact description; and, in addition to this, its habitat was unknown. The species consequently could only be identified by examining the original example. At first inspection, the differences in colour appeared to preclude the identity of the Dutch, French, and German form with Walker's insect (which I conjectured to be indigenous to N. America); but having re-compared them under a more favourable light than before, I perceive the differences to be immaterial.—A. E. EATON, 51, Park Road, Bromley, Kent.—16th June, 1879.

On the habits of Ecphora lambdella.—In July, 1877, I met with several specimens of *Ecphora lambdella* under the cliffs, near Tenby, and was interested to find that they were attached to furze bushes (*Ulex europeus*), and particularly to the dead furze. Early in the following spring, therefore, I broke up and examined the dry branches and twigs and the rotten stems of the dead furze bushes, finding in the larger branches plenty of larvae of *Dasydera sulphurella*, made conspicuous by the attached bunches of pellets of frass held together by a slight web of silk. But in the smaller branches and in the dry twigs were other larvae, very long and slender, proportionately the longest larvae that I ever saw, with a curious habit of curling their posterior segments downwards when taken out of their burrows. These were dirty whitish, with a grey tinge, caused by the colour of the intestinal canal showing through the semi-transparent skin, spotless, but with minute colourless bristles. Head blackish-brown, dorsal plate pale yellow-brown, anal plate yellowish. When full grown the head becomes of a brighter brown. Between the segments of the body the skin lies in a distinct dull whitish fold. The dorsal plate is singularly formed, having a sharp angle on the middle of its anterior margin, pointing towards the head.

In dead branches and twigs of *Ulex europeus*, apparently preferring the smaller branches, eating passages under the bark, and leaving them crammed with excrement (none of which is extruded), and apparently burrowing backwards and forwards along the same portion of branch. Found well-grown on March 2nd, having probably fed all the winter, and continuing to feed till late in May or even to June. Pupa long and thin, yellowish-brown, in a slight silken cocoon within the burrow. The first specimen of *Ecphora lambdella* emerged on June 20th, and a large bundle of furze sticks produced only a dozen specimens.

I think that no description of this larva has before been published; but I hear from Lord Walsingham, that many specimens of the moth were reared by his sister, the Hon. Beatrice de Grey, four or five years ago, from larvae found by her in dead furze sticks at Leiston, in Suffolk.—C. G. BARRETT, Pembroke : June 13th, 1879.

The network cocoon of Chrysocorys festaliella.—On May 31st, 1878, I found three small larvae, hardly more than a quarter of an inch long, on the under-side of a leaf of bramble. They were exceedingly sluggish, rather flattened, very pale green with a bright green patch on the back of each segment, and thickly covered with stiff transparent bristles. Head and plates shining green. They all fed up on the same leaf, and each spun, in the hollow of the under-side of it, a most exquisite cocoon, composed of a network of large meshes of whitish silk, in which they changed to pale yellow pupæ with brown wing cases. The moths emerged on June 30th.—ID.

[A notice on this subject, by Mr. Healy, appeared in this Magazine, vol. iv, p. 183.—EDS.]

Nepticula basiguttella bred.—During the last week I have bred six specimens of *N. basiguttella*, from mines found last November at Madingley, near here, and also at Sandy, in Bedfordshire. I was collecting the mines of *Nepticula quinquella*, and so, being rather late in the season, found about one tenanted mine of *N. basiguttella* for half-a-dozen empty ones. I hope another season to breed them in larger numbers, as the mines appeared to be tolerably common, though from their colour very difficult to be detected. Mr. Sang wrote to me last autumn that he had once found empty mines of *Nepticula basiguttella* at West Wickham Wood.—W. WARREN, 51, Bridge Street, Cambridge : June 16th, 1879.

NOTES ON THE GENUS *PROSOPIS*, AND ON AN ADDITIONAL SPECIES
(*P. CONFUSA*, Nyl.) TO THE LIST OF BRITISH HYMENOPTERA.

BY EDWARD SAUNDERS, F.L.S.

Prosopis belongs to the Section of the *Anthophila* which has the tongue obtuse and more or less bifid at the apex, and which is called *Obtusilingues*. We have only two genera in England belonging to this Section—*Colletes*, which has *three sub-marginal cells to the wings, and the thorax densely hairy*; and *Prosopis*, which has only *two sub-marginal cells, and the thorax almost naked*. There is no difficulty, therefore, at arriving at the genus; but to determine the species, is a much harder matter. I hope the following remarks may be useful in pointing out some of the characters (of native species) to be relied upon.

DIV. I.—♂, face black, excavated and shining above the insertion of the antennæ }
♀, face with two short spines } 1. *cornuta*.

DIV. II.—♂, face white. ♀, face simple.

SECT. I.—1st segment of the body with no lateral white pubescence at the apex,..... } 2. *dilatata*.
..... } 3. *communis*.

SECT. II.—1st segment of the body at the apex with a narrow line of silvery pubescence at each side } 4. *punctulatissima*.
..... } 5. *signata*.
..... } 6. *hyalinata*.
..... } 7. *confusa*.
..... } 8. *brevicornis*.
..... } 9. *varipes*.

The two species of Section I are easily recognised: *dilatata*, Kirby, has the scape of the antennæ in the ♂ flattened, dilated, and white exteriorly, and the spots on the face of the ♀ nearly round, and placed in the middle, just below the insertion of the antennæ; *communis*, Nyl., has the scape of the ♂ not flattened and dilated, and the spots on the face of the ♀ lateral, and more or less triangular. The species contained in Section II are more difficult, but may be distinguished thus—

A. Larger species; ♂ with the extreme base only of the basal joint of the hind tarsi pale, ♀ with the 1st segment of the abdomen largely and somewhat closely punctured.

This sub-division contains only two species, *punctulatissima* and *signata*.

1. Face longer in both sexes. ♂ with the white colour of the face extending high above the insertion of the antennæ at the sides. Mandibles with a white

line. ♀ with two long narrow spots along the margins of the eyes, extending from above the antennæ almost to the base of the mandibles...
punctulatissima, Sm.

2. Face shorter in both sexes. ♂ with the white colour of the face not extending above the insertion of the antennæ. Mandibles black. ♀ with a white spot on the margin of the eyes, sometimes wanting *signata*, Nyl.

N.B.—The ♂ described by F. Smith in the 2nd ed. of his Brit. Hymenopt. Apidæ is the ♂ of *confusa*; I have specimens named by himself.

- AA. Smaller species; ♂ with the whole or nearly the whole of the posterior and intermediate basal joints of the tarsi yellow, ♀ with the 1st segment of the body very finely or irregularly punctured.

- B. Scape of the antennæ in the ♂ more or less swollen. Spots of the face in the ♀ sub-triangular or linear, lateral, and parallel in direction to the inner margins of the eyes.

- C. Antennæ longer. Scape of ♂ less swollen, face hairy, or mandibles with a pale line. ♀, thorax with two yellow spots on the anterior margin. Vertex of head not incrassate.

- D. ♂, face hairy. 1st segment of body shining, very largely and remotely punctured. Mandibles black.

♀, flagellum pale beneath *hyalinata*, Sm.

- DD. ♂, face not hairy. 1st segment of body dull, punctuation fine. Mandibles and scape of antennæ with a pale yellow line.

♀, flagellum entirely dark *confusa*, Nyl.

- CC. Antennæ shorter. Scape of ♂ very largely swollen, face not hairy. Mandibles black. ♀, thorax without spots in front. Vertex of head incrassate...
brevicornis, Nyl., = *perforator*, Sm.

- BB. Scape of antennæ in ♂ not thickened, its sides sub-parallel. Basal segment of abdomen dull, largely and closely punctured. ♀, face round, spots of the face sub-oval and placed diagonally *pictipes*, Nyl., = *varipes*, Sm.

All the species enumerated above are, I believe, perfectly distinct. Smith, in his "British Hymenoptera," describes three other species; of these, *rupestris* seems to me to be only a variety of *communis*; the other two, *variegata* and *bifasciata*,* may be British, but I think their claim to a place in our list is at present very doubtful, and I have therefore omitted them.

Holmesdale, Upper Tooting:

10th June, 1879.

* These were included in the British Lists on the authority of Leachian examples in the British Museum. The now notorious question as to the native origin of many "Leachian" insects has come prominently before me with regard to another Order. I thoroughly believe, that in all cases, these supposed Devonshire insects were really from North Italy.—R. McLAOHAN.

Note on Phlaeophagus spadix, Herbst.—This beetle has already been recorded in this Magazine (Vol. viii, p. 85) as occurring somewhat commonly in old piles on the beach at Harwich, so that on my arrival here in the "Hawk" on May 30th, I fully expected to meet with it, though I must say that I was not prepared to find it in such numbers that it may even be regarded as a somewhat destructive insect.

The Lower Esplanade immediately to the south of Dovercourt Spa is surrounded by a bank of earth planted with tamarisk and other bushes, and faced, at the bottom, with a skirting of fir planks to the height of about two feet. These planks, on their outer surface, present no appearance of being eaten or bored; but where one of them happens to be detached, so that the back can be seen, it is found to be reduced, in some cases, to less than half its original thickness by the ravages of *Phlaeophagus spadix*: the perfect beetle, and its fat white larva, may be picked out in numbers from the damp, rotten, wood-mould, in company with a white Heteromorous larva, presumably that of *Ischnomera melanura*. The beetle may also be seen crawling lazily over the surface of the planks, being perhaps more numerous towards evening; it is a very sluggish, inactive creature.

Further along the beach, it is difficult to find a pile of any age which does not exhibit, in its fretted and drilled appearance, the ravages of the *Phlaeophagus*, which appears not at all particular as to what sort of wood it attacks, as long as it is exposed to at least an occasional dash of salt water; indeed, I do not think I have met with a specimen more than twenty yards from high water mark. Stray examples occur in holes in the sand, on the beach.

Should any Coleopterist be in want of *Phlaeophagus spadix*, I shall be happy to forward him a few unset specimens, if he will address to me as follows: H. M. S. "Hawk," 1, New Street, Spring Gardens, S.W.—JAMES J. WALKER, R.N., H. M. S. "Hawk," Harwich: 14th June, 1879.

Notes on Italian Butterflies.—I extract the following observations, made by myself, on the Rhopalocerous fauna of Italy, from my last year's journal. *P. Podalirius*, Turin, vii—viii!!! *P. Machaon*, Isola di Capri, vii!! Wings more ample than my English examples; an English pupa I once took with me to Toulouse and back produced this form. I saw at Turin an autumnal specimen of *Machaon* with a deep yellow tint. *A. crataegi*, Castellammare, v!!!; Foggia, v!!!; Venice, v, worn specimens in the streets; Tarin. Wings ampler and fore-wings more rounded than my Hampshire examples (δ alar exp. 2" 10", φ 3"), with the basal portion of the veins often unblackened. *P. rapae*, Turin. *P. Daplidice*, Turin, vii—viii!!! *A. cardamines*, Isola di Capri, v!!! *A. sinapis*, Turin, vi—vii!! The markings more or less obsolete, rendering the specimens nearly pure white in some cases. *C. Paleno*, Turin, vi—vii! *C. Edusa*, Isola di Capri, v!!; Turin!! Wings ampler than my English examples; but specimens smaller than some I have obtained from Luchon, in the Pyrenees, which attain δ alar exp. 2" 6", φ 2" 8". *G. rhamni*, Turin. *M. didyma*, Turin, vii—viii!! What appears a var. of the φ ; has the straw colour on the inferior surface of hind-wings replaced by white. *M. Athalia*, Turin. Central fulvous band on fore-wings broader than in my English examples. *A. Dia*, Turin. *A. Lathonia*, Turin, vii! *A. Paphia*, Turin, vii—viii! *G. C-album*, Turin, vii!!! *V. polychloros*, Turin, vii. *V. Antiopa*, Turin, vii—viii!!; Castellamarre? *P. Atalanta*, Castellammare. *P. cardui*, Baja!!!; Isola di Capri!!!; Castellamare!!!; Turin!! *L.*

Sybilla, Turin !! *N. populi* ?, Turin. *A. Ilia*, var. *Clytie*, Turin, viii !!! *L. Ægeria*. Those from the north of Italy resemble our Hampshire examples, but the spots are orange and not yellow. A specimen from Spezia has the wings ampler and spots larger; approaching examples from Toulouse, which have the spots so enlarged as to replace the brown as a ground colour; both these are vernal vars. taken in iv and v^b, respectively. I have native specimens from the West Highlands with the spots white. *H. Janira*, at Turin, large and pale, resembling specimens from the highlands of Scotland. *C. Pamphilus*, Turin. *L. Celtis*, Turin, vi, one specimen. *N. Lucina*, Turin, vii !!! My examples of an autumn brood are much larger (δ alar exp. 1' 8''), and have more pointed wings than spring individuals from the New Forest, Hampshire. The ground colour is richer, and the spots fulvous, not orange. *C. Hippothoe*, Turin, viie ! *C. phlaeas* !!!, Turin, viii. *P. Telicanus*, Turin. *P. Tiresias*, Turin, viii. *P. Icarus* (or *Alexis*), Isola di Capri. *P. Amandus*, Turin, vii. *P. argiolus*, Turin, vi. Rather larger than British examples. *P. Alsus*, Turin, vii. *P. malvaæ*, Turin, vii—viii !!! *P. malvarum*, Turin, vii—viii !!! *P. Thaumas*, ♀ ? *P. sylvanus* ?—A. H. SWINTON, Guildford : June, 1879.

A great flight of Butterflies.—The "Times" of the 13th June, publishes a communication from its correspondent at Geneva to the following effect: "A strange occurrence is reported from Wetzikon, Canton Zürich. On Saturday, the commune was invaded by an immense swarm of Butterflies, a kilomètre (five-eighths of an English mile) wide, and so long, that the procession took two hours to pass. They were principally of the kind known in Switzerland as 'Distelfalter,' which feed on nettles and thistles. They flew from two to ten mètres above the ground, and went off in a north-westerly direction."

[We imagine this communication refers to *Cynthia cardui*, hibernated examples of which appear to be unusually common here. In the same journal of the 19th June, there are several analogous notices of the occurrence of unusual swarms of butterflies in different parts of France, Spain, &c., and apparently relating to species other than that mentioned in the above extract. Allowing for a certain amount of exaggeration in the newspaper correspondents' reports, it is still evident that some exceptional causes producing these entomological phenomena must have existed, and we shall be glad of further information.—EDS.]

Description of the larva of Crambus selasellus.—While larva-hunting along the coast last year, on the 17th of May, I found one of a *Crambus* I did not then know, and brought it home to rear, to figure and describe.

It was in a green frass-covered tube or gallery, partly attached to a stone lying on a damp place, among small mixed growths of *Poa maritima*, *Spartina stricta*, and *Hordeum maritimum*; at the beginning of June I came upon another like it, though this was close to a stone amongst a short growth of *Poa maritima* solely.

These two larvæ soon fed up and converted the end of each gallery into a cocoon, and the moths emerged on July 13th and 22nd; they were kindly named for me by my friend Mr. C. G. Barrett, who affirmed *selasellus* was known to haunt rank and coarse grasses in other situations far inland, I can, therefore, only regard the two larvae thus found under somewhat exceptional conditions to have been the offspring of stragglers from a neighbouring marsh.

The full-fed larva is seven-eighths of an inch in length and stout in proportion, tapering very little near the anal extremity; the head black and glossy, and a glossy blackish-brown plate dorsally divided with a pale line is on the second segment, the large shining spots of dark warm brown are darkest on the back, lighter brown and smaller on the sides and belly, each spot having a fine dark hair, the shape and arrangement of the spots quite as usual with many of the genus, the anal plate lightish brown, the rest of the skin of the body is of a warm brown colour, melting gradually into rather lighter, olivaceous, or ochreous-brown on the sides, the belly, and the hinder segments, smooth but dull, yet showing distinctly through it a faintly darker dorsal vessel and the pale tracheal thread besides other portions of the interior, the spiracles round and black, each surrounded with a halo of pale ochreous.—WM. BUCKLER, Emsworth: June 12th, 1879.

Note on Gerris thoracica.—In the “Természetrájzi Füzetek,” 1878, Dr. G. v. Horváth has given a synopsis of the Hungarian *Hebridæ*, *Teliidæ*, *Hydrobatidæ*, and *Hydrometridæ*, in all fourteen species, all of them well known European forms; but he distinguishes *Gerris thoracica*, Schum., Flor, Fieb., Sahlb., as distinct from *Hydrometra thoracica*, H.-Schäff., Doug. & Scott, giving this latter the name of *plebeius*. Dr. Horváth properly lays the greatest stress as a specific character on the form of the sixth segment of the abdomen of the ♂ in *Gerris*, as seen from the under-side. In *G. thoracica*, H.-Schäff., D. & S., the lower edge of the sixth segment beneath is emarginate, with a further deep rounded excision in the middle; while in *G. thoracica*, Schum., as interpreted by Dr. Horváth, it has only a single deep rounded emargination, extending from side to side of the segment. A figure of each is given, and I do not doubt for a moment that, with such a crucial character pertaining to each, there are two distinct species, now first ably discriminated; but it does not appear to me, from the description of *G. thoracica* by Schummel (there is no figure) that his species is represented by Horváth's *Limnotrechus thoracicus*. Schummel (Ploteres, p. 47), unfortunately, says nothing pertaining to the under-side of the sixth segment of the abdomen of the ♂, but “Oberseite des Hinterleibes . . . Hinterrande des sechsten Hinterleibsglied schwächer ausgerandet als bei den vorigen Arten” (*lacustris*), and this character, as respects the upper-side, is very slight, and has no special importance. The antennæ are said to be “merklich heller als bei der vorigen Art (*lacustris*), hellbraun,” which is true of our *thoracica*, but not of Horváth's.

Flor's *thoracica* (Rhyn. Liv., i, 739) “Letztes abdominal Segment bei den ♂ unten am Hinterrande mit einem regelmässigen rundlichen Ausschnitt” appears by these words to be Horváth's *plebeius*, yet Flor cites H.-Schäffer's figure which does not accord.

Fieber's *thoracica* (Eur. Hem., p. 108) has “Bauchendschiene tief schmal, oben bogig, ausgeschnitten,” and this character agrees with H.-Schäffer's figure (Wanz., t. 299, fig. Z). Further, Fieber saw examples of our *thoracica*, and identified them as his species.

Sahlberg's *thoracica* (Notis. Fenn., xiv, 253)—“Mas: segmento ultimo ventrali postice sat profunde rotundato-emarginato,” may possibly be held to pass for Hor-

váth's *thoracicus*, yet the antennæ are said to be "maxime ex parte flavis," which may do for our *thoracica*, but scarcely for Horváth's *thoracicus*—"antennis flavis, articulo quarto toto dimidioque apicali articuli tertii nigris; and Fieber and Dougl. and Scott, as well as Flor, are cited for Schummel's *thoracica*.

Schummel says he had six ♂ and twenty-one ♀ examples of his *thoracica*, which was a rather common species in Silesia, and I know not if Dr. Horváth has had access to any of them; he only says of his species that it is considerably distributed in Mid-Europe, yet he had seen only one ♂ from Hungary. The result of reference to the descriptions cited seems to me to be that only Flor's (and perhaps Sahlberg's) species appears to coincide with Horváth's *thoracicus*; that the *thoracica* of Schummel, Fieber, H.-Schäffer, and Douglas & Scott are the same; and that Horváth's, Flor's (and perhaps Sahlberg's) *thoracica* is the species to be re-named.

Horváth has adopted the genera into which Stål divided *Gerris*, Fab. (*Hydrometra*, Auct.)—*Limnotrechus*, *Hygrotrechus*, and *Limnoporus* (*quantum valeant!*)—but he has rightly used *Hydrometra*, Latr., instead of *Limnobates*, Burm. On the extraordinary confusion which has existed in the application of the names *Gerris* and *Hydrometra*, see the remarks of Pascoe and Douglas & Scott in the Ann. and Mag. of Nat. Hist., 1868; Dallas in the Zool. Record, v, 393 (1869); and Douglas in Ent. Mo. Mag., xii, 224 (1876).—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: 2nd June, 1879.

The genus Aleurodes.—Since my note on this subject (vol. xiv, p. 230), I could not report anything satisfactory about British species, having been disabled during last summer and thereby precluded from making much personal investigation. In June a friend wrote that he had found plenty of celandine growing near Box Hill, Surrey, but saw not a trace of *A. proletella*, and this was all I learned of this species. Another friend, who had previously told me that he doubted if there were so many species as reputed, in July caught one individual, which flew into his room, and sent it to me, but it never arrived. He at once visited his cabbages, having, in a former year, seen *Aleurodes* abundant thereon, but now none were to be found, and his absence from home afterwards prevented any resort to his "kail-yard." Search among my own cabbages gave a similar result, and so ended my hopes of getting *A. brassicæ* *in situ*. But in August, on the other side of my garden, I took several examples of a perfectly white species, whose custom of an afternoon was to fly over a strawberry-bed, and sometimes I saw one on a strawberry plant, but neither then nor previously could I detect any trace of a larva thereon. This species cannot be *A. fragariae*, which Walker says has one spot on each wing, nor *A. brassicæ*, which has two spots on each wing. On 31st July, in a lane between gardens at Lee, there was flying in considerable numbers a spotless white species, apparently the same as the last mentioned, but I failed to trace them to any particular plant. On October 13th, on the aforesaid strawberries and flying over them, I obtained some examples of white *Aleurodes* with a faintly dark spot on each upper wing, apparently of a species different to that I had previously found at the same place, and failing the knowledge of the larvae (which, however, I had diligently sought), the question occurred—Are these the progeny of the pure white brood I had seen in August? Lastly, on October 2nd, I saw a similar spotted-winged species abundant in Darenth Wood, on all kinds of plants, but I could get no hint of their food plant. Are both these *A. fragariae*?

The object of this record, mostly of negations, is to elicit information of a practical nature, with respect particularly to the larvæ and food-plants of *Aleurodes*, for it seems hopeless to be able to arrive at the facts of the natural-history of the species, and thus to determine accurately how many there are, and if there be any variation of the adult form in a succession of broods—if such there be—withont a better knowledge of the preparatory states than at present exists.

I should be very glad indeed to obtain, from any one who may have the opportunity to look for them during the ensuing summer and autumn, the larvæ of any species of which the various food-plants were noted by me (*l. c.*), or failing these, or in addition thereto, any examples of the perfect insects that may occur, and any particulars which may lead to a knowledge, or give a hint, of their natural-history. In my former notice I omitted to refer to a note respecting *A. phillyreae*, communicated to the Entomological Society on 2nd October, 1848, by Mr. W. Thompson, of Belfast (Trans. Ent. Soc., v, proceed., xlvi), and I now conclude therewith:—

“Having remarked from a little distance the very lucid and even black appearance of a fine large plant of *Phillyrea latifolia*, I went to ascertain the cause, and found hosts of this beautiful creature on the under-side of the leaves, to which only the perfect insect, as well as in its other stages, was attached, just after the manner of *Aphides*. If you have not seen this species, you can imagine the beautiful sight afforded on my shaking the plant, when hundreds of minute moths (as it were), not exceeding a line and a half in length, and of a snowy whiteness, hovered over the gloomy *Phillyrea*. I visited the plant yesterday, and found the *Aleurodes* just as I had seen it a month before. The *Phillyrea*, however, was the worse, a few of the leaves being killed, and others tending towards decay. Not a leaf, excepting the very few young ones put forth, but is affected, in hue at least. The *Phillyrea* is in the midst of shrubs of various kinds, none of which, nor any other plant of the same species in the ground, is attacked.”—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: 5th May, 1879.

A Dipterous parasite new to England.—A few days ago, I sent to Dr. R. H. Meade a Dipterous parasite I had bred from a larva of *Acronycta alni* taken at Wakefield. Mr. Meade replied as follows:—“I am much obliged to you for the fly. It is a specimen of *Exorista hortulana*, Meigen, a species not recorded as having occurred before in England, nor found by Zetterstedt in Scandinavia. It bears considerable general resemblance to *Exorista vulgaris*, but is quite distinct.”—GEO. T. PORRITT, Highroyd House, Huddersfield: June 3rd, 1879.

Economic Entomology.—At the meeting of the Bath and West of England Agricultural Society, held at Exeter, we exhibited a series of cases illustrating the injuries to garden and field crops, pasture lands, timber trees, and grains, resulting from the attacks of destructive British insects.

The contents of the cases are intended to show the importance of the study of entomology to the farmer, gardener, and forester. The collection was commenced in the autumn of last year, and time and opportunity have not permitted its full development. It must, therefore, be regarded as only a beginning towards carrying out the idea of a collection of economic entomology which shall illustrate the injuries resulting from the attacks of destructive insects in Britain, shewing the transformations of each species, the natural checks which exist to their increase, in

the shape of parasites and other insects which prey upon them, and the artificial remedies which may be adopted to arrest their ravages. It is also intended to extend the collection to insects which are either directly or indirectly beneficial to man, and the productions of the more useful species. The collection is exhibited in its present state in the hope that attention may be directed to the subject, and that those who have the opportunity may be induced to observe the habits of insects which injuriously affect their crops and plantations. It is also hoped that farmers, gardeners, timber and grain merchants, &c., will assist in increasing and perfecting the collection which is intended to be permanently placed in the Devon and Exeter Albert Memorial Museum. The arrangement adopted is different from that in the Bethnal Green Museum collection of economic entomology, where each order of insects is grouped separately. In this, each case is devoted to the insects injurious to one plant or groups of allied plants.

The illustrative vignettes have been executed by Miss G. Ormerod and the Misses Floud. They are in some instances original drawings from the living object, and in others have been adapted from various sources, especially Curtis's Farm Insects, and the early volumes of the Gardeners' Chronicle. The models are the work of Miss E. A. Ormerod. The larvæ were prepared by Mr. R. L. Davis of Waltham Cross, and others. The whole collection was arranged by Mr. D'Urban. Specimens of insects that are notably injurious or beneficial, and also small specimens (such as could be sent by post) of portions of the plants or timber injured by them, or of their useful products, will be gratefully received and acknowledged by E. A. ORMEROD, Dunster Lodge, Spring Grove, Isleworth, near London ; or by W. S. M. D'URBAN, Curator, Albert Memorial Museum, Exeter.—Exeter : June, 1879.

On the preservation of Trichopterous insects.--During the past five years I have had to examine many thousands of European *Trichoptera*, including the types of nearly all the described species. Much time has been lost, owing to the fact that a vast majority of these specimens were in an unexpanded condition. No Trichopterous insects can be properly studied in this condition. They should be prepared precisely as if they were *Lepidoptera*. It is easy for an Entomologist to expand species caught in his immediate vicinity, or upon short excursions; but *en voyage* there is more difficulty, and in the majority of cases the preparation of captures for the purposes of study must be deferred till some future time. With the larger species this is not very difficult, though it does not always result in the production of "cabinet" specimens. With the smaller it is very different. Notwithstanding the greatest care in relaxing, it commonly arises that the wings will not separate from each other, nor from the abdomen. I have recently, therefore, adopted a plan that, to a large extent, gets over the difficulty. Immediately after pinning the insect, I blow upon it gently from behind, separating the wings from each other and from the abdomen, and allow it to dry in that position. Specimens thus treated are usually immediately fit for study, and mostly require no further preparation; or if it be desired to "set" them, they are in a much better condition for relaxing. This subject is one of the greatest importance, for most of the incomplete and unrecognisable descriptions given by authors, have resulted from their having been drawn up from unexpanded materials.

The plan just explained will apply equally to *Psocidæ*, small *Hemerobiidæ*, &c., and perhaps also to *Micro-Lepidoptera*, *Psyllidæ*, small *Hymenoptera*, and a host of minute insects generally. Experience has proved to me that its value cannot be too highly estimated, and I am glad to know it is being adopted by at least one friend to whom I verbally suggested it.—R. McLACHLAN, Lewisham : June, 1879.

Obituary.

Colonel Goureau.—On the 6th February last, this veteran French Entomologist died at his country seat at Santigny, in the department of Yonne.

Eight years ago he wrote in one of his letters, that having arrived at *extreme old age*, he had given up his residence at Paris, and I fancy he must have attained the age of 90 or thereabouts.

Colonel Goureau was a simple-minded, true lover of Nature. He amassed every year a number of observations on the habits and transformations of insects; many of these he published in the "Annales" of the French Entomological Society, others have found a place in his treatises on "Insectes Nuisibles," published in 1861, 1863, 1865, 1867, and 1869, which I believe all originally appeared in the "Bulletin de la Société des Sciences historiques et naturelles de l'Yonne." His note books, written with extreme neatness, are illustrated with numerous marginal sketches, and these should yet furnish a vast fund of information to any Entomologist who is himself sufficiently advanced to appreciate their value. It is not unlikely that a key may there be found to many a problem which has long perplexed us. It is to be hoped that these note books will not be lost sight of, but that some one of his *confrères* will do what is needful to rescue them from oblivion.—H. T. S.

Dr. Hermann Loew, the well-known Dipterologist, died in Halle, April 21st, after having been, three years ago, incapacitated for all scientific work by a paralytic stroke. He was born in Weissenfels, July 7th, 1807, studied in Halle, became, in 1850, Director of the "Realschule," in Meseritz, after having been, for some time previously, "Oberlehrer" in Posen. He was pensioned in 1868, and lived since then in Guben, Prussia. In 1848 he was elected member of the Frankfurt Parliament, and, after his retirement, he represented the province of Sorau-Guben in the Prussian Landtag.

Loew was undoubtedly the first authority in Diptery, since Meigen. The industry he displayed in that field, if considered in connection with his various official callings, is truly marvellous. His principal collection was bought by the Museum in Berlin; the collection of North American *Diptera* has been acquired by the Museum of Comparative Zoology in Cambridge, Mass.

In the foregoing notice we have largely made use of that which appeared in the "Entomologische Nachrichten," for June 1st, 1879.

ENTOMOLOGICAL SOCIETY OF LONDON.—7th May, 1879. J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the Chair.

Prof. N. Joly, of Toulouse, was elected a Foreign Member.

Mr. Elwes exhibited a fine collection of Butterflies from Asia Minor, comprising the greater number of those known to inhabit that district, and entered into an analytical examination of its Butterfly fauna, from which the following deductions were drawn. Of 196 species known from Asia Minor, 26 were peculiar to it, about half of which had representatives in European forms; 18 were peculiar to Asia Minor and countries to the east and north-east of north of it, such as South Russia, North Persia, &c.; 40 were common to Asia Minor and south or south-eastern

Europe ; 61 common to Asia Minor and Europe generally ; 51 were found over all the Palearctic region.

Dr. Wallace exhibited a collection of (chiefly) Butterflies made by his son in Colombia.

Mr. Distant exhibited the large water-bug *Hydrocytius columbiæ*, Spinola, which is common to Africa, Madagascar, South America, &c., with reference to some remarks in a letter from Mr. G. Thomson, of the Calabar district, who said that it clings so hard to stones, that on being lifted out of the water, it will sometimes bring with it a stone as large as a hen's egg.

Dr. Wallace, in reply to questions as to the extent to which his ideas as to promoting sericulture in this country had succeeded, stated, that in consequence of the difficulty of inducing manufacturers to adapt their machinery to the working of silk produced by the Ailanthus silkworm, and other large species, in Europe, he thought that, so far as England is concerned, the industry might resolve itself into the production of "grain" (eggs) of *Bombyx mori* for exportation to the south of Europe, in competition with Japan more especially, in which latter country the demand for "grain" had been so great that the strain had deteriorated, and it was now necessary that the South European stock be strengthened by introduction of "new blood."

Sir John Lubbock sent for exhibition specimens illustrating the economy of three South Australian species of *Bombycidæ*, viz., a *Gastropacha*, *Opsirrhina fervens*, Walker, and *Anapaea Oxleyi*, Newman ?, forwarded to him by Mr. G. Francis, of Adelaide. All feed on *Eucalypti*, and the larva of the former makes a tough cocoon of green silk ; that of the *Opsirrhina* is made of white silk ; the *Anapaea* was produced from larvae that differed much in colour according to sex, and which possessed considerable urticating powers.

Mr. McLachlan read extracts from a letter received from his nephew, Mr. W. J. Wilson, Assistant Engineer on the Anapshahr branch of the Ganges Canal, respecting the appearance, in April, of an exceptional flight of locusts, which deposited their eggs, and the young larvae were causing immense damage to the crops of the villagers. The well-known plan of digging trenches had been applied as a means of destroying the larvae, but the fatalistic ideas of the natives, and their indifference in matters of this kind, rendered attempts to help them of very little avail.

Mr. Meldola exhibited a Brazilian Trichopterous insect of the family *Leptoceridæ* received from Dr. Fritz Müller, remarkable for the possession of extremely well-defined branchial filaments on each side of most of the abdominal segments. Dr. Müller was not disposed to agree with Dr. Palmén as to the universality of the persistence of these filaments in the imago of those species that possess them in the larval or pupal condition. Mr. McLachlan alluded to the existence of presumably branchial filaments in the imago of certain British genera not especially alluded to by Palmén, such as *Diplectrona*, *Plectrocnemia*, *Polycentropus*, &c. Palmén had greatly extended the observations of Newport, Gerstäcker, and others, on the persistence of branchiæ in the imago of insects, illustrating the theory that the branchial system of the larva and the stigmatic system of the imago have no genetic connection, since both branchiæ and stigmata may exist side by side in the imago.

Dr. Fritz Müller communicated a paper on the cases of Brazilian caddis-flies.

Mr. Wood-Mason read Morphological notes bearing on the Origin of Insects.

4th June, 1879. H. W. BATES, Esq., F.L.S., &c., Vice-President, in the Chair.

The following were elected : Mr. J. Walhouse, F.R.A.S., of 9, Randolph Crescent, Maida Vale, an Ordinary Member ; Senor A. A. de Carvalho Monteiro, of 72, Rua do Alcarion, Lisbon, as Foreign Member ; and Mr. C. H. Goodman, of Lesness Heath, as Subscriber.

Amongst the donations to the Library were Vol. i of Edwards's "Butterflies of North America," specially coloured for the Society, and presented by the author ; and Doubleday, Hewitson and Westwood's "Genera of Diurnal Lepidoptera," presented by Mr. Dunning on the occasion of the 30th Anniversary of his election as Member, and for which a special vote of thanks was carried by acclamation.

Mr. McLachlan called attention to a notice by Prof. F. A. Forel, published in the Procés-verbaux de la Société Vandoise des Sciences Naturelles (5th Dec., 1877), on the sculptured markings on cretaceous pebbles in Lac Léman, and exhibited two plaster casts of sculptured blocks, one of Jurassic limestone, the other of white chalk. These sculptured markings were at one time thought to be due to the action of Mollusks or Algæ, but Prof. Forel was of opinion that they were really caused by Trichopterous larvæ, some of which he forwarded, and which were possibly those of the genus *Philopotamus*.

Mr. Meldola suggested that they might arise from the action of the carbonic acid exhaled by the larvæ.

Sir S. S. Saunders communicated notes by M. J. Lichtenstein respecting the transformations of *Cantharis vesicatoria*. (A condensed account, by M. Lichtenstein, appears in our present No.).

Mr. Meldola read a translation of a paper by Dr. Fritz Müller on " *Ituna* and *Thyridia*, a remarkable case of mimicry in Butterflies," published in "Kosmos" for May, 1879. The author regarded it as a case of *acquired* resemblance, and that it might belong to the category of those in which distasteful species are about equally common, so that each step taken by either in more nearly approaching the other, is of common advantage to both. Mr. Jenner Weir was of opinion that Dr. Müller had, in his remarks, placed too much importance upon the supposed inexperience of young birds in detecting what insects were good for food, and what were not. In his experiments with birds and larvæ he had found that the former never attempted to touch the distasteful larvæ, hence acting under the influences of knowledge acquired by heredity.

Mr. Bates said the subject was one of intense interest, and those cases in which species apparently protected by offensive secretions mimic others protected in a like manner, were very difficult of explanation, and he did not think that Dr. Müller had cleared away all the stumbling blocks. He alluded especially to the manner in which gaily coloured mimicking butterflies and moths in Tropical South America all change their hues and markings together at every few hundred miles.

Mr. J. S. Baly communicated a paper "On the differential characters of certain closely-allied *Chrysomelidae*."

Prof. Westwood communicated "A decade of new *Cetoniidae*," and a paper on "Some unusual monstrous insects."

Mr. Distant read "Contributions to a knowledge of the Hemipterous Fauna of Madagascar."

THE RECENT ABUNDANCE OF *VANESSA CARDUI*.

BY R. McLACHLAN, F.R.S., &c.

The extraordinary abundance of *V. cardui* over a large portion of Europe (and even in England) this year, in what in an ordinary season we are wont to consider the months of spring and early summer, has been of such a nature as to merit more than passing notice, and I have therefore put together such information regarding it as has come before me. It should be premised, however, that the following notes must of necessity be very imperfect, and it will be necessary to wait until at least the close of the year before any tolerably complete record can be compiled.

The first information I had of the insect having appeared in any notable quantities, was by a verbal communication from the Rev. H. Harpur Crewe, who, with another botanist, had made an expedition to Spain and the Balearic Isles early in the year. I did not, at the time, attach any great importance to what he then said, which amounted to a few words, the purport of which was that they saw no insects excepting *V. cardui*, which was in abundance. Subsequent events induced me to obtain more precise particulars from Mr. Crewe. He says the insect swarmed in countless numbers in the neighbourhood of Valencia and Barcelona from April 26th to 30th inclusive. A similar phenomenon was observed in the Island of Minorca from May 1st to 3rd; and again in travelling by railway from Barcelona to Paris on the return journey. I am not aware that notice was taken of any particular direction in the flight.

By this time the insect had become common in England; but the first published notice here, of its appearance in any specially extraordinary numbers on the continent, was that which appeared in the "Times" of the 13th June, and which was reprinted in this Magazine (*ante p. 41*). Since then the French and German entomological periodicals, the newspapers, and every possible medium for the record of unusual natural phenomena, have constantly contained notices on the subject.

It would be utterly impossible to reproduce even a portion of these records as published; but a summary may not be uninstructive. In "Le Naturaliste" for July 1st, there is an extended account. We read that at Sèvres near Paris, on the 15th June, all day long, great swarms appeared flying from S.S.E. towards N.N.W., the wind being S.S.W. At Strasbourg, from the 3rd to the 9th June, a similar occurrence was observed, the insect flying rapidly in innumerable

quantities toward the N., and even in rainy weather. At Bischheim, on the 7th June, and also at Kehl, on the same day, myriads flew in the afternoon, at the former place from the S.W., at the latter from the S.E., so that it is considered the columns were not identical. At Angers, a similar thing was observed on the 10th June, the direction being from E. to W., against the wind, which was not of much force. It was estimated that the number passing along a single street in one hour was from 40,000 to 50,000. From Montpellier, Albi, and other places in the South, analogous cases are recorded. Near Geneva, the swarm is said to have obscured the sun for several minutes. At Rennes, on the 10th June, incalculable numbers flew from S. to N. with great rapidity; at 2 p.m. on that day the wind changed, and the direction of flight was altered toward the W. Sometimes 20 to 30 passed in a minute, continuing for some time at the same rate. Some parallel notices occur in the "Feuille des Jeunes Naturalistes" for July 1st, and in the "Bulletins" of the French Entomological Society.

From the "Entomologische Nachrichten" of July 15th, we learn as follows: in Württemburg, from the 1st to 8th June, an incessant migration from S. and W. towards N.E. and E. was remarked. At Wetzikon, Canton Zürich, on the 7th June, an immense swarm moved from S.W. to N.E., principally from 3 to 5 p.m.; their flight was persistently in one direction, only changing temporarily to avoid houses and trees. At Wettsweil, on the same day, from 2 to 5 p.m., a swarm flew from W. to E., and it is calculated there were 1000 in the space of 10 mètres, and that at least 11,000 flew past the observer. The editor adds that no such swarms had occurred in the N. of Germany, but information had been received from Steyer, in Upper Austria, that on the 11th June, surprising numbers flew from S.W. to N.E., ceaselessly; between 1 and 2 p.m., 90 to 110 per minute were counted in a breadth of about 100 paces, and the swarm is estimated at above, rather than below, 1,000,000.

At the meeting of the Italian Entomological Society, 8th June, many cases of swarms of the butterfly were mentioned, especially from Veneria, Treviso, Rome, Perugia, Florence, Leghorn, &c., from April to June.

From Belgium I learn in a letter from Baron De Selys-Longchamps, that the only common insect has been *T. cardui*, which appeared in June in great numbers, in worn condition, but not in columns.

Other notices mention numerous swarms in Italy, Spain, the neighbourhood of Marseilles, Fontainebleau, Worms, &c.

To turn again to our own islands, the insect has been generally abundant, at any rate in the south of England, but I do not know that at any place has it been observed in columns, nor that any particular direction of flight has been recorded. Mr. Buckler (*in litt.*) truly observes that "*V. cardui* is master of the situation," and he remarks that they flew with him regardless of the rain, though one individual did show signs of wishing to share with him the shelter of a stable in which he had taken refuge. I saw an utterly worn individual, flying in a wild manner, so late as the 19th of this month (July). So far as I can learn, the species was tolerably common last autumn, but not in a degree to account for its abundance this year.

There can, I think, be little doubt that all the swarms consisted of individuals that had hibernated; there can, also, be little doubt they were migratory, and that the columns had become dispersed before remnants of them reached our shores, and other parts of the N. of Europe. It is by no means the first time that records of the migration of *V. cardui* have been published. One such, in the harbour of Corfu, is noticed in this Magazine (vol. ix, p. 149) by Dr. Buchanan White, on the authority of Colonel Drummond Hay. But never before have the swarms been so general, and of such an extent. That their flight was more or less from S. to N. appears certain. Whence came they? This we probably never shall know, nor why, in a season like this, they should fly from climes that certainly should be more genial, to experience the cold and cheerless spring and summer (so-called) of 1879 in the inhospitable north. Were they all bred last autumn?; or is it possible the insect may be able to rest quiescent in the perfect state over a series of years, until the accumulated numbers simultaneously wake up? If this be anything more than a rash conjecture, why has THIS season of all others induced a termination of their Rip-van-Winkle-like slumbers?

The whole subject is surrounded with difficulties; more so than was that of the great abundance of *Colias Edusa* in these islands in 1877, because that phenomenon *only concerned these islands* (the species not having been noticed in any exceptional numbers on the Continent); and I think it has been proved that with it the pupa-state can be prolonged over several years: at any rate, I know of pupæ now living (or, at least, they were alive a month or two ago) the produce of eggs laid by the butterflies of 1877, and which hatched in due course.

NATURAL HISTORY OF *DIANTHÆCIA BARRETTI*.

BY WILLIAM BUCKLER.

For the exposition of the habits of this rare species, which, so far as at present known, seems confined to a part of the Irish coast, I am greatly obliged to Mr. E. G. Meek, who kindly sent me nine eggs, laid by a captured female, four of them on part of a flower calyx of *Silene maritima*, to which they adhered, and five loose.

I received the eggs in July, 1878, when nothing seemed to be known of the larval food-plant for certain, though I then heard from a kind friend of great experience that *Statice armeria* might be a likely plant to try, as well as that on which eggs had been laid, and which was naturally also suggested by the insect's generic name of *Dianthæcia*.

Seven of the eggs were hatched in the evening of July 10th, the other two next morning, and the little larvæ were quite remarkable for their activity and robustness as soon as they were out of the shells, marching vigorously over small sprays of the two plants above-mentioned provided for them.

During the next day three of the larvæ were eating out little sinuous channels in leaves of the *Silene*, surrounding themselves with frass, and by the third day had worked their way into the stems at the axils of the leaves, where they had also thrown out little heaps of frass; similar indications showed that one individual had entered a *seed capsule* from within the flower ealyx ; the others were still to be seen roaming about at intervals until it occurred to me to try them with a small piece of the root of the plant, as well also of that of the *Statice*, when they all soon after disappeared.

On the fourth day, while inspecting the piece of root of *S. maritima*, I detected two small holes in it with heaps of minute pale cream coloured frass adhering to them ; and on the seventh day I examined the axil of a stem and leaf where I found a larva had mined its way downwards and was lying a quarter of an inch below in the stem, waiting apparently for its first moult, but my stripping away half the stem, to expose it, proved fatal, for it soon after died.

About this time I began to realize the intentions of the infant larvæ, and could but lament the jeopardy my experiment had placed them in, on finding the bits of plants were losing their freshness, and the impossibility of rescuing the tiny creatures from their perilous positions, for each attempt made proved fatal in a short time to those in the stems ; soon, too, the bit of root began to turn mouldy, and a

fresh piece was placed beside it, and on the eleventh day I had the satisfaction to see a heap of frass thrown out of it—a proof of one still alive and within the fresh piece.

In the meantime I had satisfied myself that neither flowers, leaves, nor root of *S. armeria* had been attacked, and therefore had potted two plants of *Silene maritima*, having good roots and close together in the pot, and there, between those roots just beneath the surface of earth, I wedged in tightly the bit of root, containing the sole surviving larva, on July 23rd.

On September 13th, I turned out the contents of the pot, by inverting it, to search for the larva, but no search was needful, for the soil had been more sandy at the bottom of the pot than elsewhere, and now formed the top of a cone, and this slipping away the larva at once rolled into view ; it had evidently done feeding, and a great quantity of pale frass, quite fresh, filled up a large cavity in the shoulder of the thickest root ; if it made any chamber or gallery the falling away of the light earth had quite destroyed it.

When the larva was placed in a small pot with some of the earth it did not burrow underneath, but, after much wandering about, eventually settled down under a fragment of root, and there changed to a pupa on September 17th ; the moth, a male, emerged on the evening of June 27th, 1879.

The egg in shape is round, somewhat flattened, and with a slight depression beneath, the surface very finely ribbed and reticulated ; the colour very pale greenish-buff, and on July 6th, when first in my possession, showed a faintly darker speck at the top, and by the 9th of the month the embryo was seen through the shell as a dark spot on one side, and this next day was increased in size and in depth, of a leaden hue, while the rest of the shell was tinged with brownish-grey, when the hatching soon began.

The young larva at first is of a very pale rather greenish-drab colour, with blackish head and narrow blackish plate on the second segment. After the first moult, when the larva has fairly become an internal feeder, its head is shining reddish-brown, and the narrow shining plate on the second segment is of similar colour but a little paler, the rest of the body tinged with livid reddish-grey, the skin rather shining and semi-transparent, through which a dark internal vessel is visible, the anterior legs reddish-brown.

The full-fed larva measures about one inch and a quarter in length, stoutest at the third and fourth segments, the second tapering a little to the smaller and rather narrow head, with lobes deeply defined at

back of the crown, tapering also from the tenth to the anal extremity, the ventral and anal legs short and well beneath the body, the segments very lightly and finely wrinkled towards the well cut divisions on the back, the sides much dimpled : the colour of the head is reddish-fawn and shining, the lobes outlined on the face with blackish-brown, defining well the triangular division and the upper lip, and below this the mouth itself ; the body is of a light fawn inclining to flesh colour, a narrow scale-like plate, of glossy pale yellowish-fawn colour, is on the second segment, with an interval of the paler skin towards the head, a similar plate is on the anal flap, and a dorsal vessel of brownish-grey shows faintly through the skin ; the rather small tubercular dots are fawn colour, each with a short bristle, spiracles black, anterior legs pale fawn colour, the ventral and anal legs with a fringe of dark brown hooks.

The pupa is three-quarters of an inch long, the head and shoulders rounded off, the wing-covers wrapped close to the body, and the antennæ and legs enclosed in a *blunt rounded projection* at their ending, a *little free from the body*, from thence the abdominal rings are deeply cut and taper gradually to the tip, furnished with two small spines ; its colour is dark red-brown until about a week or so before the emergence of the moth, when by degrees paler patches of yellowish-brown appear on the wing-covers ; the smooth abdominal divisions are dull, but all the rest of the surface glossy, although the other parts of the abdomen and thorax are finely punctate.

I have to revert now to that only larva, which, whether by mistake or not, ate its way into a seed capsule, whose appearance in the second stage of its larval life, is described in the foregoing. When about to open the capsule I expected to find the larva dead, as the little heap of minute whitish frass made on its first entering had not been accumulating and still remained blocking the small hole, and was hard and dry. But the larva, greatly to my surprise, was alive, had moulted once, had grown and prepared for a second moult, while the unripe seeds were nearly all devoured and converted into frass, perfectly black. On carefully exposing the larva to take note of its altered condition, work of only a few minutes, yet, in that short time, it became more and more languid, as I judged from the exposure to air, and I hastened to place it inside a fresh calyx with seed capsule, forgetting at the moment it was unable to use its mandibles, from the head having been too far drawn back from the head-piece in front, in anticipation of moulting, but it soon became inert, and died.

Looking back at the results of my experiment with the eggs of

Barretti I seem first to have established the fact that it is not a *Dianthæcia*, although it certainly has some affinity to that genus, as shown in the solitary instance of one infant larva out of nine making its way into a seed capsule and there sustaining itself on the unripe seeds ; and again more particularly is this shown in the form of the pupa. Next, that from the behaviour of the other eight larvæ they proved clearly enough that their normal habit is to enter the stems of the plant, and through them by degrees arrive at the root, where they feed and mature ; a habit well confirmed by the structure and appearance of the larva itself, which, not only when full-fed, but even in its earlier age between the first and second moult, agreed so well with Guenée's description of that of *Luperina luteago* (*vide* "Noctuélites," tome 1, p. 181), that although some disparity of size and colouring exists in the perfect insects, as most obligingly shown to me by Mr. E. Birchall, yet I am constrained by the evidence, to believe *Barretti* to be an isolated and melanic variety of *luteago*.*

Emsworth : July 7th, 1879.

FURTHER OBSERVATIONS ON THE PUPATION OF THE NYMPHALIDÆ.

BY J. A. OSBORNE, M.D.

Having obtained a large supply of the caterpillars of *Vanessa urticæ* in the middle of June, and seen them pupating by the dozen for the last two or three days, I have been able to get some further insight into the nature and formation of the suspensory ligament, which performs so important a function in the pupation of these butterflies. That there *is* a ligament in the last stage of exclusion formed under the natural conditions and essential to the function, I think the observations of Mr. W. H. Edwards, of Coalburg, W. Va., as detailed in the March number of this Magazine, leave no longer any room for doubt. The opinion given by Dr. Chapman (vol. xv, p. 136) on one of the specimens forwarded to him, is also quite correct. I recollect perfectly the preparation of *P. brassicæ* of which he speaks, and in the light of recent experience, I now know that the ligament had not then been formed ; but, within these last few days, I have repeatedly seen it in process of formation, beginning with the stage in which the specimen of *brassicæ* was, when I arrested the progress of its exclusion. As I am writing, a caterpillar (and now a second, and a third) lying in a tray before me, has begun its exclusion. I place it, back downwards, in a shallow groove cut in the end of a bottle cork. As soon

* When last in London, Dr. Staudinger stated to me that, in his opinion, *D. Barretti* is a form of *D. luteago*.—R. McL.

as the larva-skin has cleared the wings of the chrysalis, I secure the latter in its position by two small pins in the groove between two of the abdominal segments, and then draw down the skin gently over the tail and pin it to the side of the cork. If too much traction has not been used, and if the operation is not too long delayed, I find that the everted skin is held back at the anal horns, and also perhaps laterally at the last two spiracles. The latter adhesion soon gives way; and, as the drawing efforts of the chrysalis go on, or if further traction is made on the larva-skin, the outer coat of it will be seen to part freely from the transparent inner coat, and be drawn out from between the two folds of the latter, which by degrees coalesce and assume the form of the ligament. This inner coat of the caterpillar-skin is elastic, very distensible, and of a semi-plastic consistence, and readily runs into the ligamentary form under the influence of tension alone.

Of course the eversion and retraction of the larva-skin is an artificial interference, without which it may be doubted whether the separation of the coats would take place. Certainly, the greater the traction the more of the lining coat will be drawn out, and the longer will be the resulting ligament; but the artificial traction does not act more on the one coat than the other with the tendency to separate them. Rather, in the natural circumstances, where the weight of the pupa is exercising tension on the inner coat alone, while the upward thrust of the insect is acting chiefly on the outer, would the conditions be favourable to the separation of the coats, and the drawing out of the inner one into a ligament. At all events, there seems to have been no artificial traction used in the cases described by Mr. Edwards; and, at all events, this adhesion of the lining membrane of the caterpillar skin to the anterior horns of the anal ridges, remains as the efficient cause of the suspension of the chrysalis while its tail is being removed from the old skin and till its hooks are fastened in the silk.

In *urtice* the two crescentic whitish ridges embracing the anal area terminate anteriorly in horns, which project over the segments immediately in front. These horns have on the inner side a black knob, terminating a black line, which runs along the under inner side of each ridge, separated from the rest of the horn (the outer whitish knob) by what seems a small groove. Now, it is finally to these black knobs alone that the ligament is attached, and when the tension is great and prolonged, the corners of the ligament are pouched out by them into hooks or shallow pockets. But the adhesion of the pupa to the ligament is not a merely mechanical one (as if it were only slung by the insertion of these projecting knobs in the pouches of the

ligament), for the old skin, when only held by the ligament, may be drawn towards the head of the chrysalis, and still the adhesion is good. It is a curious circumstance, and one which Mr. Edwards notices also in a letter of the 2nd June,* that this adhesion only takes place at pupation, and even towards the end of it; and if the skin is drawn down earlier, it will peel off without any attachment to the horns, which will not perhaps have been yet fully developed. What the exact nature of this attachment is I am unable to say. The examination of this region in earlier stages seems to yield the result that the black knob is the earlier developed, and to hint at the hypothesis, that the subsequent growth of the white knob may include or nip in a portion of the lining coat of the larva skin in such a way, that it is afterwards held fast.† But the whole history of this question shows how futile is all theorizing that is not supported by accurate and extensive observation. I have seen the ligament, after being drawn out, at first covering the external white knobs and forming a deflexed fold on each side, and then suddenly slipping off these white knobs with the disappearance of the deflexed folds or their absorption into the main body of the ligament, which is still held fast and strained in the groove between the knobs.

It is to this point, I think, that future attention ought to be directed, and I have hastened to communicate these results, however imperfect, in order that time may still be afforded this season for future investigation. I have indicated above my most recent mode of procedure. Good results will also be obtained by dropping the insect into alcohol or boiling water towards the end of pupation. I detach the caterpillars when spun up and quiescent, and spread them out on the table before me. Of those pupating in my absence, many will be found with the larva-skin still attached by the ligamentary adhesion, and so will be still available for examination. I should mention, that in letters received from Mr. Edwards in the beginning of June, observations of his on the pupation of *Danais Archippus* are communicated, which at first led him to the same view of the nature of the ligament in that insect, namely, that it is "nothing but a part of the skin itself which catches on the knobs, and being elastic, is stretched by the weight and struggles of the chrysalis till it takes a triangular

* He says: "It is useless, I think, to examine for this membrane until the latter end of the suspending period. One thing is certain, that till late in that stage these knobs do not show themselves, but are soft and white; but become hard (chitinous) just when they are needed." Mr. E. is speaking here of *D. Archippus*.

† Speaking of *D. Archippus* in a letter of May 30th, Mr. Edwards says: "The knobs, as I say, are at first considerably elongated, or rather stand on end of a long neck; but, as the chrysalis contracts and the segments swell out, all the neck is buried and only the knob protrudes."

flat shape." But in a later observation, he is of opinion that "there certainly was a membrane." I believe the fact of the *double coat* of the caterpillar-skin, and that it is the inner alone which enters into the structure of the so-called ligament, will reconcile these varying appearances at different times in the course of pupation; and whilst I concur fully in an opinion which he expresses in his first letter, that the *special organ* is "these knobs with their pointed beaks," I do not think the form of attachment is the simple mechanical one of hook and eye.

Milford, Letterkenny :
1st July, 1879.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 8.

Mesozoic Time.

[*On the Insecta of the Cretaceous Period, and the animals and plants with which they were correlated.*]

The Cretaceous Period, which brings us to the conclusion of the Mesozoic Age—the second of those great Epochs into which Geological Time has been divided, is remarkable for the number of genera of reptiles which disappear at its close, and for the first appearance of some of the existing types of plants.

As so large a portion of the Cretaceous Rocks is of marine origin, and was deposited in deep water, remains of the insect life of the Period are necessarily very rare; but in the Wealden formation of the south-east of England, which is of freshwater origin, a few insects have been discovered, and traces of them have also been met with in other sections of the Cretaceous series on the continent of Europe.

Great Britain.

Lower Cretaceous or Neocomian.

(*Wealden*).

The principal collection of fossil insects from the Wealden was made by Messrs. W. R. & H. Binfield,* at a place called the "Govers," near St. Leonards-on-Sea. This collection† included wings and elytra of *Coleoptera*, and wings, or parts of wings, of *Neuroptera* and *Diptera*.

A few elytra of *Coleoptera* have also been found in the Wealden marlstone, between Tonbridge and Maidstone; and some traces of in-

* Quar. Journ. Geol. Soc., vol. x, p. 171.

† These insects have not, I believe, ever been named or described.

sects were discovered, by the late Edward Forbes,* in the Wealden of the Isle of Wight. A few doubtful fragments were also obtained by Mr. W. R. Brodie in the Wealden of Pimfield Bay, Swanage.

Continental Europe.

Upper Cretaceous.

(*Gault*).

In April, 1876, M. Charles Brongniart† called the attention of the Entomological Society of France to a piece of fossil wood, obtained from the Gault of Lottinghem, Pas-de-Calais, containing numerous perforations.

M. Brongniart was of opinion that these perforations were made by a species of beetle, belonging to the genus *Hylesinus*, of the family *Scolytidae* (*Xylophaga*).

(*Greensand*).

Remains of perforated wood have also been discovered in the Greensands of Saxony, which are considered by Dr. Geinitz‡ to be evidence of the existence of Longicorn beetles at this Period.

(*Chalk Marl and White Chalk*).

From certain beds of sand in the neighbourhood of Aix-la-Chapelle—which, according to Lyell,§ are of the same age as the White Chalk and Chalk Marl—about ten species of *Coleoptera* have been obtained, all of which have been referred to the *Curculionidae* and *Carabidae*.

Prof. Pictet|| also alludes to the discovery of a few elytra of *Coleoptera* in the Chalk Marl in the neighbourhood of Rouen.

With the exceptions above mentioned I am not aware that any remains or traces of the Insect fauna of the Cretaceous Period have been discovered, either in the United Kingdom or on the continent of Europe.

The other *Arthropoda* of the Period are represented by *Crustacea*, chiefly Maerulous and Brachyurous *Decapoda* (lobsters and crabs), and probably also by *Arachnida* and *Myriopoda*, though no traces of them have been recorded.

The *Mollusca* include the Orders *Polyzoa*, *Brachiopoda*—the number of genera and species of which last Order has sensibly declined—*Lamellibranchiata*, *Gasteropoda*, and *Cephalopoda*.

Of the *Vertebrata*, the fishes are represented by Ganoids and Placoids, and also by the earliest known specimens of the modern

* Quar. Journ. Geol. Soc., vol. x, p. 378. 1854.

† See Ann. Soc. Ent. de France. 1876. p. 217.

‡ Dr. Geinitz is of opinion that these beetles belonged to the *Cerambycidae*.

§ Elements of Geology, 6th edit., p. 331.

|| Traité élémentaire de Paléontologie, vol. iv.

Order of the *Telostei* or osseous fishes, which includes the majority of existing forms.

No remains of the *Amphibia* have been discovered; but the *Reptilia* are represented by a great number both of existing and extinct forms, the latter including the *Iguanodon* and *Teleosaurus*, as well as *Plesiosaurus* and *Ichthyosaurus*, and several species of *Pterodactyls*.

Very few traces of the birds of the period have been preserved in the Cretaceous strata of Europe; but in North America their remains§ have been discovered not uncommonly.

As the *Mammalia* had existed in the preceding Period they were probably represented by numerous species, no traces of which have, however, yet been detected.

The plant life of the earlier portion of the Cretaceous Period closely resembled that of the Jurassic in the predominance of ferns, cycads, and conifers; but before the close of the Period there appears to have been a rapid development of new forms—including a number of true Angiosperms, and various Monocotyledons—closely allied to existing types.

Plâs Geraint, Llangollen:
July, 1879.

DESCRIPTIONS OF SOME NEW *HISTERIDÆ* (*COLEOPTERA*) IN
GENERA HITHERTO REPRESENTED BY SINGLE SPECIES.

BY GEORGE LEWIS.

SPATHOCHUS MERIDIANUS, *n. sp.*

Ovalis, convexus, rufo-brunneus, nitidus. Elytris striis 1—4 et suturali integris, 2 posterioribus basi arcuatim punctatis, 5 parum abbreviato. Propygidio pygidioque sparse punctatis. Long. $1\frac{3}{4}$ lines.

Hab. : Zanzibar.

This species is more convex than *S. Coyei*, Mars., with the thorax less dilated at the sides, but in the punctuation generally it closely follows Marseul's species. My specimen was captured by M. Raffray.

MONOPLIUS PINGUIS, *n. sp.*

Sub-orbicularis, suprà valde convexus, nigro-cupreus, strigosim dense punctatus. Elytris seriebus septem punctorum lăvium, nitidorum, striis nullis. Long. 4 lines \times 3.

Hab. : Cape of Good Hope.

The curious strigose punctuation of this species agrees with that in *M. inflatus*, but is rather larger; the rows of smooth spaces on the elytra resemble in a remarkable manner the markings of *Chrysomela subænea*, Mots. The type of this species is in our national collection.

§ Several birds have been discovered by Prof. Marsh from New Jersey and Kansas.

PHOXONOTUS FRYI, n. sp.

Ovalis, sat convexus, piceo-nitidus, dense punctulatus, pronoto angusto, marginato, tuberculis 4 basalibus. Elytris sutura elevata, serie undâ tuberculorum, lineis 3 (1 sub-integra), striis 2—4 dorsalibus crenatis, 2^{do} 3^{ti}que integris. Long. 2 $\frac{1}{4}$ lines.

Hab.: South America.

I have a specimen of this genus from Peru, which is evidently *P. tuberculatus*, Mars.; the present species is less convex, with the dorsal striae sharply defined, and with only one row of tubercles. There are three or four specimens of this insect in Mr. Fry's collection (after whom I have the pleasure to name it), all taken in the Rio Janeiro district.

TERETRIOSOMA FESTIVUM, n. sp.

Sub-cylindricum, viridi-cyanum, metallicum, undique dense punctatum, antennarum clavâ rufâ, fronte sub-depressa, in medio lævi. Elytris tuberculo sub-humerali lævi pedibusque rufo-brunneis, tibiis anticis 6-, intermediis 5-, posticis 4-spinosis. Long. 1 $\frac{3}{4}$ line × $\frac{3}{4}$.

Hab.: Parana.

The beautiful colour of this species reminds one strongly of the genus *Pachychærus*; it is somewhat more graduate in form than *T. facetum*, and is a most interesting addition to the genus.

TERETRIOSOMA FACETUM, n. sp.

Sub-cylindricum, nigrum, nitidum, undique sat dense et fortiter punctulatum, fronte convexa, pedibus piceis, antennarum clavâ rufâ. Elytris transversim basi angustissimis, lævibus, tibiis anticis 6-, intermediis 5-, posticis 4-denticulatis. Long. 1 $\frac{3}{4}$ line × $\frac{3}{4}$.

Hab.: Canada.

This important acquisition to the North American fauna is broader and more robust than *T. chalybæum*, Horn, and the denticulations of the tibiae are very clear and distinct. The double pygidium has the dividing angles obtuse, and not so clearly defined as in *T. chalybæum* or *festivum*.

Folkestone: June, 1879.

DESCRIPTIONS OF SOME NEW SPECIES OF HEMIPTERA-HOMOPTERA FROM CENTRAL AMERICA.

BY W. L. DISTANT, SEC. ENT. SOC.

[The species here described will, with others, be figured in the work now preparing by Messrs. Godman and Salvin, entitled, "Biologia Americæ Centralis."]

SPHENORHINA COSTARICENSIS.

Head and pronotum metallic-green, scutellum blackish. Abdomen above pitchy, lateral borders luteous, with the outer edge and segmental incisures carmine;

anal appendage luteous. Tegmina bronzy-black, very thickly and finely punctured, with the margins of the apical third and seven large spots sanguineous. The latter situated—three on costa, first near base, second one-third from base, and third one-third from apex, three parallel to these, first and basal on, and other two near, inner margin, seventh spot situated on disc. Wings pale fuscous, with a sanguineous basal patch, and the nervures blackish. Under-side of the body and legs black. Face obscure, metallic-green, with the central ridge reddish, eyes dull luteous. The head above is deeply channelled and excavated, with a central prominent longitudinal ridge. The pronotal angles are slightly prominent, the disc somewhat gibbous; the pronotum is lightly punctured and rugulose, with two irregular foveæ, situated on each side near the anterior border. Hind tibiæ armed with two spines.

Long. ex tegm., 14 mill. Exp. tegm., 37 mill.

Cache, Costa Rica (H. Rogers).

SPHENORHINA CONSPICUA.

Black, scutellum with the margins carmine. Tegmina red, with the apical fourth black, thickly and finely punctured. Wings pale fuscous, narrowly reddish at base. Abdomen above and below pitchy-red, coxae and femora dull reddish, tibiæ and tarsi pitchy. The head has a large hollow fovea on each side at inner margin of eyes. The pronotum is faintly punctate, with a very large fovea on each side at anterior lateral borders. Long. ex tegm., 7 mill. Exp. tegm., 19 mill.

Cache, Costa Rica (H. Rogers).

VAR. A. Tegmina with a small, very obscure fuscous spot on disc. Abdomen above and below, and legs, sanguineous. Apices of tibiæ and tarsi pitchy.

TETTIGONIA ALBOMACULATA.

Head and pronotum black, the last somewhat obscurely spotted with white on disc. Head with two small obscure whitish spots situated a little apart on centre of hind margin, on each side of which the margin up to the eyes is narrowly obscure whitish. Eyes luteous, with pitchy markings. Tegmina carmine-red, with a number of very distinct white spots, which form a transverse fascia near apex of clavus, and the remainder arranged irregularly on disc (number not constant). Wings obscure violet. Abdomen above red, annulated with bluish-black. Under-side of body and legs carmine-red, tarsi pitchy. Face black, globose, obscurely transversely striated on lateral borders, centre flattened, impunctate. The head is rather broader than long, and has a transverse impression a little before the eyes. Long. 8 mill.

R. Susie, Costa Rica (H. Rogers). Irazu, 6-7000 ft. (H. Rogers).

TETTIGONIA SCUTELLATA.

Head, pronotum, and scutellum pale orange-yellow. Head with a black spot near apex, pronotum with two black spots on disc, and scutellum with two central black spots very close together, and narrowly divided. Tegmina pale carmine, with the basal angle (on which is a black spot), costal margin, and apical-fourth pale orange-yellow. Wings very pale fuscous. Abdomen above reddish-orange. Under-side of body and legs pale orange-yellow, tips of tarsi pitchy. Eyes black; face orange-yellow, with a black spot on the anterior central portion. Ocelli pitchy. Head nearly as long as broad, pronotum and scutellum sub-equal in length.

Long. 9 mill.

Irazu, 6-7000 ft. (H. Rogers). R. Susie, Costa Rica (H. Rogers).

TETTIGONIA COSTARICENSES.

Blue-black; pronotum, excepting anterior discal border and a wide pro-sternal band, yellow, the last extending across apical-third of face, where it is produced in a point on disc. Abdomen above blue-black. Eyes luteous. Head about as long as broad, gradually narrowed and pointed in front. Face transversely striated with a faint central longitudinal ridge. Long. 10 mill.

R. Susie, Costa Rica (H. Rogers). Irazu, 6-7000 ft. (H. Rogers).

VAR. Face wholly black.

The decided coloration of this species will prevent its being confused with any other described form.

TETTIGONIA RUFOFASCIATA.

Head and pronotum orange-yellow. Head with a large irregularly shaped black spot, situated between and in front of the ocelli; pronotum with two rounded black spots situated somewhat apart and near anterior border. Scutellum pitchy-red. Tegmina testaceous, with the basal angles and costal margins orange-yellow, and three transverse carmine fasciæ, the first near base partly divided by scutellum, the second about two-thirds from base, regularly and much widened on disc, third small and sub-apical. Abdomen above purplish-red, with the base and apex orange-yellow, and the segmental margin pale yellow. Wings dark fuscous. Face bright orange-red; under-side of body and legs pale luteous; tarsi streaked with fuscous. Head almost as long as broad, pointed in front, hollowed between ocelli. Face transversely striated on lateral borders, central portion smooth, with an oblong obscure fovea.

Long. 11 mill.

Cache, Costa Rica (H. Rogers).

1, Selston Villas, East Dulwich, S.E. :
30th May, 1879.

DESCRIPTION OF A NEW SPECIES OF *STRONGYLOGASTER* FROM SCOTLAND.

BY P. CAMERON.

The genus *Strongylogaster* of Dahlbom is divided into two groups, distinguished by the structure of the lanceolate cellule; one section having in it an oblique cross nervure, which is absent in the other (and larger) section. So far as I can learn, only two species have been described of the first group, and both appear to be rare in collections. Both agree in having the abdomen banded with red, but they differ *inter alia* in the coloration of the legs. *S. filicis*, Klug, has these appendages for the greater part black, while *S. subjectus*, Eversmann, has them for the greater part red. As Eversmann's description of *S. subjectus* (Bull. Mosc., xx, p. 44, 1847) may not be readily obtainable, I think it may be useful to give it here.

"*Niger, abdominis segmentis 3—5 pedibusque rufis: trochanteribus flavis, linea postica tibiarum anteriorum basique femorum nigris; alis limpidis, radio stigmatis nigrae (Fem.). Long. 4—4½ lin.*

"*Pedes anteriores posticis pallidiores, rufo-flavescentes, tibiis fere albis. Cepi in prov. Casan. Maio et Junio.**

I am able to give a description of a third species, having an oblique cross nervure in the lanceolate cellule, a species too which is very distinct from the others, differing widely from them in the coloration of the abdomen and legs.

It was taken during an excursion which I made with Dr. Sharp to Crickshope Linn, near Thornhill, on the 14th of June. Neither the locality nor the day was favourable for collecting purposes; but, fortunately, when we were at the foot of the waterfall the sun shone brightly, bringing out insects, and it was by sweeping the ferns on the steep sides of the bank close to the water that my specimens were obtained. I propose to call it

STRONGYLOGASTER SHARPI, sp. n.

Black; the elypterus, palpi, tegulae, edge of pronotum, the apex of the last abdominal segment above, and legs, yellowish-white; the apex of the posterior tibiae and the posterior tarsi fuscous. Wings hyaline; the costa pale, and the stigma dark fuscous. The elypterus is broadly incised, the labrum fuscous, the mesonotum and head are slightly opaque, faintly punctured, the pleurae, sternum, and abdomen more shining and impunctate. The dorsum of abdomen is keeled in the middle; its apex is obtuse and truncated; the saw does not project. The wing cellules are broader than in the other species, compared to the length; the marginal nervure is curved, and received before the middle of the third sub-marginal cellule. The antennae are shorter than the thorax and abdomen, and of the usual form. The coxae, trochanters and knees are paler than the rest of the legs. Length, 2½, alar exp. 5½ lines.

It is the smallest of the European species, being half a line shorter than *S. delicatulus*. I have only seen the ♀.

31, Willowbank Crescent, Glasgow :

22nd June, 1879.

* *Subjectus* is omitted from Kirchner's Catalogus Hymenopterorum Europeae along with many others described by Eversmann in the same paper. From a note in the Zool. Rec. for 1870, these omissions have, I understand, been pointed out by Ballion in Bull. Mose., t. 42, pp. 441—448. Still it may not be amiss to note them here. They are: *Nenatus cinereus*, Kl., MS., *N. fruticum*, Evers., *N. griseus*, Kl., MS. (= *caprea*, Pz., sec. Zad.), *N. exoletus*, Kl., MS., *N. continuus*, Evers. (= *caprea*, Pz.), *N. diaphanus*, Evers., *N. contractus*, Evers., *N. umbripennis*, Evers., *N. squallidus*, Evers. (= *fultax*, Lep.), *Dineura flavola*, Evers., *Dolerus funosus*, Kl., Mus. Berl. (there is a *D. funosus*, Steph., and a *D. funosus*, Zad.), *D. femoratus*, Kl., Mus. Berl., *D. magnicornis*, Evers., *D. tenebrosus*, Evers., *Emphytus fenestratus*, Evers., *Em. caligatus*, Evers., *Em. parallelus*, Evers., *Em. (Harpiphorus) radialis*, *Em. infuscatus*, *Dineura f. umbrosa*, Kl., M. B. (placed near to *Bennocampa*, but having two cellules in posterior wings), *Eriocampa dolosa*, Evers., *Macrophya dentata*, Evers., *Taxonus opacocaudatus*, Evers., *Tenthredo hybrida*, Evers., *T. poecila*, Mus. Berl., *T. tulipennis*, Evers., *Tarpa flabellata*, Mus. Berl., *Cephus major*, Evers., *C. fumipennis*, Evers.

In the Appendix, Eversmann inserts under *Tenthredo* the *T. impressa*, Klug, while it is also placed in the body of the work in its proper place under *Pacilosoma*. The *Tenthredo anomala*, Evers., = *Taxonus agrorum*, Fall. (*nitida*, Kl.)—P. C.

Dipterygia pinastri near Alverstoke.—As I do not see Hampshire mentioned by either Stanton, Newman, or Morris, as a locality for *D. pinastri*, you may think it worth while to make known that I have, during the last few days, taken eleven specimens of this moth within a short distance of Alverstoke Church.

Last Friday night I took a single specimen of *Hecatera serena* flying over some water hemlock, and also some *Axylia putris*, a moth I have not seen for many years, it being absent in Staffordshire, where I have hitherto collected. *Anticlea rubidata*, another stranger to me, has been abundant. The weather, however, has been as much against entomological captures as possible.

I announced to you last year the capture here during the autumn of 1877, of three specimens of *Ennomos alniaria* by a young friend of mine, two of which are now in my collection. I cannot hear of any being taken last autumn. I diligently searched the gas lamps up to the middle of October, when I went North for some time, without success, the weather being anything but favourable for moths being attracted to light.—E. F. HEATH, Brooklands, Bury Road, Gosport: 4th July, 1879.

Description of the larva of Nephopteryx angustella.—On the 22nd of October last, I received a box of larvae of this species from Mr. J. P. Barrett, of Peckham. He had collected them about a fortnight before from the red seed-berries of the spindle; and at that time they were very small, though there were evident traces of an earlier brood in some of the berries, apparently of full-fed larvae. They were plentiful wherever a bush could be found with berries on it, but in exposed situations there were very few bushes. Those found grew rapidly, and when I received them many were apparently full-fed.

Length, about half an inch, or a little over, and of moderate bulk in proportion; head highly polished, has the lobes rounded, is slightly narrower than the second, and clearly narrower than the third segment. Body cylindrical and nearly uniform, tapering a little posteriorly: frontal plate polished, the anal one not so conspicuous: segments tolerably well-defined; the skin soft, and sparingly clothed with very short hairs. There are two forms. Var. I has the ground colour dull dingy green; head brown, marked with still darker brown: a dark green pulsating vessel forms the dorsal stripe; on each side, and on each segment, between the dorsal stripe and spiracular region, is a large rust-coloured mark,—in some specimens a double mark, as it is divided transversely in the middle: there is also a less conspicuous series of rust-coloured marks on the spiracular region. The frontal plate corresponds with the ground colour, but has a smoky mark in the centre behind, divided by the dorsal stripe, which is there distinctly paler; on each side this plate is a rather large intensely black spot: anal plate darker than the ground colour: spiracles black, they are very minute, except those on the second and third segments, which are larger. Ventral surface uniformly pale green. Var. II has the ground colour ochreous-yellow; head wainscot-brown, the mandibles darker; dorsal stripe brown, and the large marks between it and the spiracular region rather bright reddish-purple: frontal plate wainscot-brown, divided by a pale mark as in Var. I, and on each side of it is also the large intensely black spot: spiracles black. Ventral surface uniformly very pale greyish-yellow.

When first hatched, the young larva evidently eats its way into the seed-berry,

and feeds on the inside, and even the full-grown one is entirely hid in the interior, though its presence is readily detected by a neat circular hole in the side of the berry, and through which the frass is extruded. Some of the larvæ came outside to pupate, but I am not sure that all did. The first moth emerged the 27th of June last.—GEO. T. PORRITT, Highroyd House, Huddersfield: *July 10th, 1879.*

Occurrence of Lita solanella, Bsd., in Australia.—The discovery of this species, hitherto, so far as known to me, only found in Algeria, is equally interesting and alarming. I have never seen Algerian specimens, but from the general habits and characters, do not doubt the identity of the Australian form with the African. Although I first found the imago, I did not identify it until my attention was called to the destruction caused by the larva, which swarmed in some potato-fields. It feeds in the substance of the potato-tuber, often fifty together; corruption rapidly sets in, and the tuber is rendered worthless. It does not appear that much attention was attracted by the insect here, until I published its history, the ravages on the crop being attributed to disease. As far as my observations extend, it occurs generally throughout Victoria and New South Wales; the imago is often seen at light in towns. The dry climate probably suits its subterranean habits to admiration, and in at least one authenticated case I knew that four-fifths of the crop of a field were destroyed.

It would be interesting to investigate the source whence this species has so lately appeared. Probably the fact that its nearest ally seems to be the Spanish *L. epithymella*, Stgr., indicates Algeria as its birth-place; in which case it must have fed naturally on some other species of *Solanum*, and attached itself to the potato on its introduction. No Australian insect known to me belongs at all to its immediate group, and it has decidedly a European facies. It is rather remarkable that it should not have yet made itself known in Europe itself, as it has a better base of operations than the Colorado beetle; from its range here, the restricting cause cannot be temperature, but may possibly depend on the rainfall.—E. MEYRICK, 243, Macquarie Street, Sydney, N. S. W.: *May 12th, 1879.*

Note on the Insect-fauna of Guatemala.—[The following extracts from a letter just received from Mr. G. C. Champion, may interest our readers.—E. C. R.]

“I arrived in this country in due course, and, after being detained a month in the capital, at last got away into the country, and am now stopping on a large sugar estate at the foot or on the slope of the Voleano Fuego (4100 ft. elev.), in the house of Senor Dou Juan Rodriguez, an old Coleopterist, about 40 miles from the city. I have collected a good deal in the adjoining forest and elsewhere, but whether owing from the elevation or the dry season, I am rather disappointed with the fauna. I can hardly realize yet that I am collecting in the tropics, finding as I do, *Harpalus*, *Acupalpus*, *Metabletus*, *Anchomenus*, *Bembidium*, *Philhydrus*, *Limnebius*, *Ochthebius*, *Anacæna*, *Chætarthria*, *Cercyon*, *Cryptopleurum*, *Hydroporus*, *Gyrius*, *Laccophilus*, *Fulagria*, *Aleochara*, *Tachysa*, *Mycetoporus*, *Quedius*, *Philonthus*, *Suuia*, *Lithocharis*, *Paderus*, *Stenus*, *Homalium*, *Homalota*, *Oxypoda*, *Oxytelus*, *Lathrobium*, *Couurus*, *Hypocyptus*, *Gyrophæna*, *Oligota*, *Xantholinus*, *Bryaxis*, *Euplectus*, *Trichopteryx*, *Ptenidium*, *Rhizophagus*, *Olibrus*, *Scaphisoma*, *Scaphidium*, *Litargus*, *Typhæa*, *Mycetophagus*, *Cryptophagus*, *Atomaria*, *Epistemus* (for a wonder, no *Meligethes* as yet), *Anaspis*, *Apion*, *Tychius*, *Thyamis*, *Scymnus*, &c., &c. Some of these genera

are represented by absolutely smaller and apparently more difficult species than in England. With these I have found some few nice *Colydiidæ*, *Cucujidæ*, *Staphylinidæ*, *Histeridæ*, *Lebiidæ*, *Cassididæ*, *Coccinellidæ*, *Lycidæ*, *Cleridæ*, *Anthribidæ* (many species of *Tropideres*, all very small, however), *Tenebrionidæ*, *Passalidæ*, &c., but extremely few Longicorns or *Buprestidæ*.

"I think Mr. Bates will be rather pleased with some of these small *Lebiæ*; I get them principally in the afternoon by beating. I am obliged to mount a few of each of all the smaller species, or the accumulation would be too great; this, with collecting, takes up all my time. There are very few *Lepidoptera* and less *Neuroptera* to be seen yet, though there are many *Hemiptera*. *Orthoptera* are mostly immature: next month I am told insects will be abundant.

"I have not been alone in Guatemala: there is a French botanist—M. Blanqueaux—out here collecting Orchids, &c., for people in Europe; I have seen a good deal of him, and been out with him collecting more than once, he is now stopping in this house at Capetillo.

"I have worked on the slope of Fuego up to 6500 ft.: here I got a few nice beetles, a black *Dendrophagus*, a *Pediacus*, a nice *Teretrius* (very long and filiform), a *Temnochila*, a queer genus of *Heteromera* (very like a parallel *Tachypus*), a *Læmophloeus*, two *Anchomeni*, a *Lebia*, another queer Heteromerous beetle allied to *Zopherus*, a *Paromalus*, &c. With these, under bark of oak (*Quercus*, sp.), were more scorpions than I cared for.

"In the *Staphylinidæ* I am surprised at the number of species allied to *Lithocharis*; I have taken a large number.

"My ignorance of Spanish makes it hard work, there is not a soul here who can speak English.—GEO. C. CHAMPION, Capetillo, Alotenango, Guatemala, Central America: May 6th, 1879."

Saperda scalaris in Derbyshire.—On July 11th I beat a fine specimen of *Saperda scalaris* off an alder in Bretby Wood, Derbyshire. This species was taken by Mr. Crotch near Cambridge, and is mentioned by Stephens (Illustrations, vol. iv, p. 239) as not rare in the neighbourhood of Cockermouth; but, as far as I know, this is the first record of its occurrence in the heart of the Midlands.—W. W. FOWLER, Repton, Burton-on-Trent: July, 1879.

Capture of Bembidium adustum.—I have much pleasure in announcing the capture of the rare *Bembidium adustum*, Schaum (*rupestre*, Daws.), by myself, in some plenty, in the neighbourhood of Tewkesbury. The species is confirmed by some of my Entomological friends, and Mr. Rye, to whom I sent specimens, says: "They are, as you surmise, the *B. rupestre* of Dawson, which stands as *adustum*, "Schaum, in the lists of those who (like myself) believe it to be a good species."—W. G. BLATCH, Albert Villa, Green Lane, Smallheath, near Birmingham: 22nd July, 1879.

Note on Gerris thoracica.—In the July number of this Magazine (p. 42 *aute*), Mr. Douglas has a note concerning the above-mentioned species and its synonymy, and the question discussed may be cleared up by the following exposition.

The *thoracica* of Flor (Rh. LIVL., i, p. 739), which has "Letztes abdominal Segment bei den ♂ unten am Hinterrande mit einem regelmässigen rundlichen Ausschnitt," is the same as the *thoracica* of Horváth (Termész. Füzet., 1878), characterised "segmento sexto ventrali maris postice rotundato-emarginato." This is also confirmed by the descriptions of the antennæ, given by these authors. Flor

says, " ihr letztes Glied und die Spitze des vorletzten schwarz ;" Horváth, " articulo quarto toto dimidioque apicali articuli tertii nigris." This species, however, is not the *thoracica*, auctorum, but the *aspera*, Fieber (I possess specimens from Dr. Horváth), whereas the *thoracica* of Herrich-Schäffer, Fieber, Douglas and Scott, Stål and Sahlberg, are all the same species. The description of the antennæ, given by Schummel (Ploteres, p. 47), also confirms the idea that these authors have rightly understood his views of the species.

The question, is, however, complicated by the description by Herr Sahlberg, in Not. Fenn., xiv, p. 253 ; for while his diagnosis of *thoracica* refers to the species of Schummel, Herrich-Schäffer, etc., his description of the ♂ is only copied from Dr. Flor's above-cited work. Sahlberg has never seen a ♂ of the true *thoracica*, which is very scarce in Finland (in the Finnish collections there exists, I think, only one specimen, found by me), and he, supposing the *thoracica* of Flor to be the same as his own (and Fieber's) species, has simply transcribed the description of the ♂ from the Livonian entomologist ; the diagnosis is made from and accords with female specimens of the true *thoracica*.

Perhaps the question of the synonymy of this species may be properly closed by the following extract from Dr. Horváth's letter of the 16th March last in answer to, and in confirmation of, suggestions by me in a letter to him, and I trust that he will pardon the publication therof: " Was *Limnotrechus thoracicus*, m., und *plebeius*, m., betrifft, so muss ich es leider gestehen, dass ich bei der Unterscheidung dieser zwei Arten durch Flor's (und theilweise auch Sahlberg's) Beschreibung irre geführt worden bin. Meinen einzigen *thoracicus*, m., ♂, hat auch Herr Dr. Puton untersucht und gefunden, dass derselbe nur *aspera*, Fieb., ist. Die Synonymie dieser zwei Arten wäre demnach eine folgende : 1, *thoracicus*, aut. (excl. Flor, Horv.), = *plebeius*, Horv. ; 2, *aspera*, Fieb., Stål, Sahlb., = *thoracicus*, Flor, Horv.—Schummel's Beschreibung von *Gerris thoracica* ist ziemlich allgemein gehalten und sagt über das 6te Bauchsegment nur so viel : ' Sechstes Hinterleibsglied schwächer ausgerandet als bei den vorigen Arten ' (d. h. *lacustris*, *gibbifera*, *lateralis*, *odontogaster*).* Die 1te Art ist bei uns sehr gemein, während die 2te Art höchst selten ist ; es ist bisher aus Ungarn nur ein einziges, in meiner Sammlung befindliches exemplar (♂) bekannt. Es ist merkwürdig, dass in Finnland gerade das Gegeutheil vorzukommen scheint." —O. M. REUTER, Åbo, Finland : 8th July, 1879.

[This note by Dr. Reuter is of much interest, not only as confirmatory of my own opinion, but as elucidating Sahlberg's *thoracica* and identifying Flor's and Horváth's *thoracica* with Fieber's *aspera*.—J. W. D.†].

Aëpophilus Bonnairei, a remarkable new Hemipterous insect.—At the meeting of the Entomological Society of France on the 14th May last, Dr. Signoret exhibited examples of a new Hemipterous insect of such anomalous character that he cannot determine its affinities, and the description and account of it are so interesting that I reproduce them from the " Bulletin de la Soc. ent. de France," No. 9, 1879. The generic name is derived from the community of the habitat of the Hemipteron with *Aëpus Robini*, a beetle that lives on the shore below high-water mark, and as this

* This character refers to the " Oberseite des Hinterleibes," not to the ventral segments.—O. M. R.

† Since this article was in type, I have received from Dr. Horváth a letter to the same effect.—J. W. D.

occurs both in the south and north of Britain and in Ireland, I think it quite possible that the new Hemipteron of the Bay of Biscay may also be found within our geographical limits. The connection between the two insects, however, is not shown, and there may be nothing more than identity of habitat.

"*AËPOPHILUS* (g. n.)—Body twice as long as broad, covered throughout with fine silky pubescence. Head short, angularly rounded in front. Antenniferous tubercles on the upper side of the head. Antennæ of four joints. Rostrum of four joints. Eyes small, very globose, not facetted. No ocelli. Prothorax transverse, slightly margined in front and on the sides. Scutellum very short, rounded at the apex. Elytra short, composed of two triangular scales (squames), the exterior side longest, and ending on the sides of the abdomen, leaving a deep excision (*échancrure*) between them. Legs moderate, thighs slightly thickened, tibiæ a little thicker at the apex, the posterior longest. Tarsi triarticulate, first joint very short, third longest, second one-third part shorter; at the end of the third joint two strong claws. Abdomen oval, convex above and below, the genitalia in one sex being on the upper-side, and in the other on the under-side (the question of sex is difficult to determine, yet I am inclined to view the male organ as situate below and the female above)."

"*A. Bonnairei* (type).—Length, 3 mill., breadth, 1½ mill. Brownish-yellow, more or less reddish; head, abdomen, and claws black-brown; antennæ, rostrum, and legs reddish-yellow. Head conic, gently rounded and sparsely punctured, scarcely broader than long. Prothorax a little shorter than the head, slightly concave in front, posterior margin nearly straight, sides slightly convex. Elytra variable in colour, reddish or brownish-yellow, sometimes clearer at the margin, at other times on the disc."

"This species was found in September last, by Baron Bonnaire, in the island de Ré (Bay of Biscay), under stones deeply embedded in mud at low water, and in company with *Aëpus Robini*."—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham; 7th July, 1879.

Review.

SCIENTIFIC LECTURES, by SIR JOHN LUBBOCK, Bart., M.P., V.P.R.S., &c.; 8vo, pp. 187. London : Macmillan & Co., 1879.

In this handsome little volume Sir J. Lubbock has put together a *résumé* of papers on lectures by him read before various scientific societies. It consists of six lectures, with only the first four of which we have to deal (the others being archaeological). In the first, the author treats upon the mutual relations of flowers and insects, explaining in a clear and concise manner that which is known to every agriculturist and horticulturist (albeit the reasons are often *not* known to them), viz.: the utter impossibility for certain plants to become fertilized without insect-agency, and also on the benefits of cross-fertilization in plants which, though capable of self-fertilization, perfect more seeds and become more vigorous under the influence of crossing by insects, a subject so forcibly put before us by Mr. Darwin; the value of the remarks is much enhanced by excellent explanatory wood-cuts. The second lecture—"On Plants and Insects"—is more general in its nature, treating upon a variety of subjects. That which will attract most attention amongst British Entomologists is the consideration of the colouring of caterpillars, and its object. The general aim is to prove that in most caterpillars the colouring is protective, and that in those cases where it is not, other attributes serve the same purpose. The author justifies his remarks by a reference to the larvæ of the British butterflies and larger moths, and though some of our energetic students of larvæ might be able to suggest unexplained exceptions, the result arrived at appears correct on the whole. At any

rate, all entomologists, to whatever school they may belong, will heartily agree with the author when he says : "there is at least sufficient to justify the conclusion that "there is not a hair or a line, not a spot or a colour, for which there is no reason, "which has not a purpose, or a meaning in the economy of nature." This is illustrated by wood-cuts, and a coloured frontispiece of the larva of *Chærocampa porellus* in its various stages. Lectures 3 and 4 are "On the Habits of Ants," condensed from the well-known papers read before the Linnean Society, and published in its journal.

It is quite beyond our power, in the small space disposable, to enter into an analysis of these remarkable and original observations. It must suffice to say that Sir J. Lubbock, in a series of patient and scrupulously accurate investigations, has thrown a flood of light upon the natural history of ants. He has cleared up much that seemed enigmatical, and even if, in some cases, he has somewhat lessened our respect for the moral and intellectual faculties formerly attributed to these insects, he has shown them in other lights not less interesting, and has not in any way reduced our admiration for these marvellous social arthropods.

The book has been got up in a style that leaves nothing to be desired, and it is needless to say that the language is elegant, simple, and concise, rendering the author's meaning clear to even those who do not possess the merest rudiments of scientific acquirements. We might take exception to the frequent occurrence of "*Formica sanguineas*" and "*F. fuscæ*," which we venture to think would have been better rendered as "*F. sanguinea*" and "*fusca*," without in any way detracting from the clearness of the terms, or if the latter appeared too learned for a popular book, and it were intended to use the former as adapted English words, it would have been better not to have italicised them.

ENTOMOLOGICAL SOCIETY OF LONDON.—*2nd July, 1879.* SIR J. LUBBOCK, Bart., M.P., V.P.R.S., &c., President, in the Chair.

Mr. V. R. Perkins, of 54, Gloucester Street, South Belgravia, was elected a Member.

Mr. S. Stevens exhibited living specimens of *Tillus unifasciatus* and *Teretrius picipes* from the locality at Norwood where he had previously captured these species.

Mr. McLachlan made a further communication respecting the sculptured pebbles from Lac Léman. He had received from Prof. Forel a water-worn limestone pebble not showing decided traces of sculpturing, but having on the surface channels formed by Trichopterous larvae; also specimens of the larvae and perfect insects, which proved to be *Tinodes lurida*, Curt.

Mr. Distant exhibited a specimen of *Papilio Hystaspes*, Felder, taken by Mr. R. E. Cole at sea, thirty miles from Singapore, and nine miles from the nearest land.

Mr. W. Cole exhibited a remarkable variety of *Pyrameis cardui*, taken at Buckhurst Hill, Essex, in June of this year.

The Secretary exhibited, on behalf of Lord Walsingham, examples of the curious Dipterous insect, *Bittacomorpha clavipes*, F., taken by the latter at Pitt River, California.

Sir S. S. Saunders communicated further notes from M. Lichtenstein respecting the habits of *Cantharis vesicatoria*. The bee, from the nests of which he bred the insect, was *Ceratina chalcites* as stated, which builds its nests in the dry twigs of Elder (*Sambucus nigra*); but M. Lichtenstein had made use of this bee as being convenient for his purpose, and he thought that in a state of nature, the *Cantharis* probably infests the nests of the earth-burrowing bees, such as *Andrena*, *Halictus*, &c.

NOTES ON THE ADELIINÆ, WITH DESCRIPTIONS OF NEW SPECIES.

BY FREDK. BATES.

(Continued from page 33).

CARDIOTHORAX ARMIPES, *sp. n.*

♂. Elongate, sub-parallel, black, but little shining: head and prothorax not visibly punctured; the usual impressions on the former strongly marked, foveated between the eyes: prothorax a little longer than wide, finely and sub-equally margined throughout, apex arcuately emarginate, base sub-triangulately emarginate; hind angles prominent, acute, outwardly directed: sides moderately rounded, slightly sinuately so behind the middle; more contracted basally than apically; foliaceous margins flat, marked off from the disc by an irregular furrow, and at their widest part equal to one-fifth the width of the entire disc; this latter strongly sulcated down the median line; parallel to and at a little distance from this are placed three foveæ on each side, the first largest and rounded, the others smaller and oblong: scutellum smooth, triangular, pointed behind: elytra broader at base than base of prothorax, depressed behind the scutellum; shoulders sub-angulately rounded, channelled within; on each elytron nine well-marked longitudinal furrows, the intervals convex, of unequal width, 6 and 8 distinctly narrowest: legs, tarsi, and basal joints of antennæ deep shining black: front tibiæ slightly curved, the middle and hind straight: hind femora strongly dentate in middle of inner margin: under-side smooth, shining black.

Long. $7\frac{3}{4}$ lines.

♀. A little smaller ($7\frac{1}{4}$ lines), less parallel, the foveæ at each side the median line of prothorax sub-obsolete: legs more slender, the intermediate and posterior shorter; hind thighs unarmed; and tarsi ferruginous.

Rockhampton.

CARDIOTHORAX OPACICOLLIS, MacLeay.

A single ♂ example of this species in the collection of Dr. Haag differs from the preceding in being larger (9 lines); the colour decidedly bronzed-black; the sides of prothorax more sinuately rounded and more strongly bordered: the elytral sulcations are scarcely so strong or so wide, the intervals a little less convex and all of equal width: the basal joints of antennæ are not of so decided a black colour; the tarsi are ferruginous; the anterior tibiæ are a little flexuous, but are not curved: the hind femora are armed as in the preceding.

CARDIOTHORAX FEMORATUS, *sp. n.*

♂. Much smaller and of quite a different *habit* to the two preceding. Elongate-ovate, of a beautiful dark green with violet reflections: head and prothorax impunctate; the stirrup-shaped impression on the former obsolete behind; not foveated between the eyes: prothorax transverse, finely bordered throughout, moderately convex, front angles acute but not prominent; base sinuately emarginate, hind angles obtuse, not prominent; sides regularly rounded, not coarctate at base, as wide across the middle as the elytra; slightly more contracted basally than apically; foliaceous

margins flat, widest in the middle (where they nearly equal one-fourth the entire width of the disc), narrowest behind; disc smooth; median line finely but deeply impressed: scutellum smooth, somewhat curvilinearly triangular, but not pointed behind: clytra not depressed behind the scutellum; shoulders rounded, not channeled within; regularly and finely sulcated (obsoletely so on the epipleurae); intervals sub-equal, scarcely convex, except at the apex: legs (especially the posterior) strongly compressed and armed as stated in the preceding table: under-side shining black; femora dark green; tibiae slightly rufescent, the four anterior a little bowed, the hind somewhat contorted; tarsi ferruginous; antennae black. Long. $6\frac{1}{2}$ lines.

Wide Bay.

♀. Unknown.

CARDIOTHORAX PITHECIUS, Pascoe.

The form of the prothorax is somewhat variable in this species: it is, however, almost constantly widest before the middle, distinctly more contracted behind than in front, the anterior contraction being curved, the posterior nearly straight; and the entire surface not visibly punctured: the elytral sulcations are represented on the epipleurae by faint punctured lines.

The ♂ is more elongate and slender than the ♀, the elytra somewhat flattened at the base; the front femora are armed with a broad blunt tooth; the anterior tibiae are very strongly bowed and furnished on the inner edge with five or six short blunt spines.

CARDIOTHORAX VALGIPES, sp. n.

♂. Smaller and more slender than *C. pithecius*, Pasc., and of a more decided black colour: prothorax more convex, sides more rounded anteriorly, more strongly contracted posteriorly: clytra more faintly striated, obsoletely so at sides, apex, and on the epipleurae: the tooth to the anterior femora is narrower and more acute: the front tibiae are as strongly bowed, but are not spinose within. Long. $6\frac{1}{2}$ lines.

New Holland.

♀. Unknown.

CARDIOTHORAX FRATERNALIS, sp. n.

♂. Unknown.

♀. Very near to *pithecius*, Pasc., but a little stouter; the prothorax less convex, broader, regularly rounded at the sides, widest at the middle, but little more contracted posteriorly than anteriorly, disc distinctly foveolated at each side the median line. Long. $7\frac{1}{2}$ lines.

Queensland.

Until both sexes of this species, and also of *C. errans*, Pasc., are known, I consider them of doubtful specific value.

CARDIOTHORAX POLITICOLLIS, sp. n.

♂. Similar in habit to *C. pithecius*, Pasc. Colour shining golden-brassy with (especially on the elytra) purplish reflections: head and prothorax finely but distinctly punctured; the former with two small but distinct foveæ between the eyes: the latter convex, well margined throughout, sides moderately rounded, broadest before the middle, much more strongly narrowed behind than in front: foliaceous margins as in *C. pithecius*, the front angles more acute and prominent than in that species; disc smooth; median line very finely impressed: scutellum rounded behind: elytra rather finely striated, the striae distinctly punctured; the intervals flat, visibly punctured: under-side, legs, and antennæ black; tarsi pitchy: anterior femora simple: anterior tibiæ straight, compressed, and strongly expanded outwardly.

Long. $6\frac{3}{4}$ lines.

Upper Hunter River, New South Wales.

♀. Unknown.

CARDIOTHORAX LONGIPES, sp. n.

♂. Elongate-elliptic, black or dark copper-brown; somewhat nitid: head and prothorax not visibly punctured; the former usually smooth between the eyes; the latter moderately convex, finely and evenly bordered throughout, sides moderately rounded, widest behind the middle, more contracted at base than at apex; foliaceous margins moderate, equal to about one-fifth the entire width of the disc; this latter foveat at each side the median line (which is lightly impressed) nearer the base, and more obscurely so nearer the apex; base sinuately emarginate, hind angles more obtuse than the front angles: scutellum triangular, black, smooth, shining: elytra elliptic, shoulders very oblique; regularly sulcated, nearly as strongly so on the epipleuræ as on the back; intervals equal, a little convex, not visibly punctured: under-side and legs shining black; tarsi ferruginous; antennæ more or less pitchy-brown; legs very long; anterior femora armed with a large tooth near the apex, within; front tibiæ bowed and sinuous; intermediate and hind tibiæ nearly straight.

Long. $8\frac{1}{4}$ lines.

Richmond River, Queensland.

♀. Unknown to me.

CARDIOTHORAX CURVIPES, sp. n.

♂. A little broader and more robust than the preceding, the colour deep shining black; the prothorax widest at the middle, the posterior contraction a little sinuate, so that the hind angles appear more distinct, the foliaceous margins a little wider; the discal foveæ subobsolete; the median line a little more distinctly impressed: the shoulders of the elytra are much less obliquely rounded: the legs (especially the femora) are much shorter; the tooth to the front femora subobsolete; the anterior tibiæ are somewhat sinuous, but not bowed; the intermediate are recurved near the apex; and the posterior are bent inwards and towards each other: the colour of the under-side, legs, &c., as in the preceding.

Long. $8\frac{1}{2}$ lines.

♀. Broader and more robust; all the tibiæ nearly straight.

New South Wales.

CARDIOTHORAX CHALCEUS, sp. n.

Similar in *habit* to *C. Howitti*, Pascoe, but smaller, the hind angles of prothorax not produced nor prominent; the elytra more convex, the sides and epipleurae more gradually rounded and more strongly sculptured, and the front tibiae neither incrassated nor strongly compressed.

♂. Unknown to me.

♀. Brilliant bronzed-brown: head strongly foveated between the eyes; prothorax very minutely punctulate, but little convex, widest before the middle, very finely bordered at base and apex, sub-obsolete so at the middle of the latter; sides strongly bordered, this border thickening posteriorly; foliaceous margins in their widest part equal to one-fourth the width of the entire disc; this latter irregularly foveate at each side the median line (which is faintly impressed), and on the middle near the base, these foveæ being marked by several irregular impressed points; base sub-sinuately emarginate: elytra depressed behind the scutellum, shoulders rounded, regularly sulcated, intervals slightly unequal, 5 and 7 slightly broadest; under-side and legs shining black, tarsi rufescant, antennæ fuscous: femora unarmed; tibiae straight.

Long. 8 lines.

Queensland.

CARDIOTHORAX CRASSICORNIS, sp. n.

♂. Elongate, narrow, cylindric; black or bronzed-black: head and prothorax minutely punctulate; the usual impressions on the former strongly marked, more or less strongly foveated between the eyes: prothorax quadrate; sides sub-parallel at the middle, more strongly, abruptly, and obliquely contracted at base than at apex, unequally bordered, being thickest anteriorly, broadly channelled; apex rather deeply emarginate, front angles acute and prominent; base sinnately truncate, hind angles obtuse, not prominent; base and apex entirely bordered; disc rather convex, unifoveate at each side the median line (which is finely but deeply impressed), or not: elytra rather finely sulcated; the intervals equal, smooth, and flat, the epipleurae being nearly as strongly sculptured as the back: under-side and legs shining black; tarsi reddish-pitchy; antennæ fuscous, and strongly thickened; hind tibiae slightly bent inwards and asperous down their entire inner face.

♀. Hind tibiae straight.

Long. $6\frac{3}{4}$ to $7\frac{3}{4}$ lines.

Queensland.

Very near to *C. connexus*, Haag, but larger, the prothorax squarer, the hind angles not prominent; the antennæ stouter, &c.

CARDIOTHORAX ENCEPHALUS, Pascoe.

This species is larger than *connexus*, Haag, the impressions on the prothorax are constantly much stronger, the expanded sides are broader, especially at the apex, the edges more uniformly thickened, and the hind angles much larger; the hind tibiae in the ♂ are relatively longer and more bent.

CARDIOTHORAX CAPERATUS, Pascoe.

Larger than *encephalus*, Pasc., and proportionately broader; the prothorax is relatively shorter and wider, distinctly more rounded at the sides, and more abruptly curvedly contracted at the base; the tarsi are also relatively much stouter.

CARDIOTHORAX ANGULATUS, *sp. n.*

Very near to *C. simulans*, Haag; it differs in having the prothorax wider, more deeply, and distinctly angularly, emarginate in front, the sides more strongly rounded, the margins much more strongly thickened, the apical margin obsolete at the middle; the discal markings more numerous and much more deeply impressed.

Long. $7\frac{1}{2}$ lines.

North Australia.

CARDIOTHORAX GRANDIS, *sp. n.*

♂. Besides the characters mentioned in the preceding table as distinguishing this species from *C. Castelnaudi*, Pasc., the elytra are very distinctly bronzed-black, and more or less nitid: the intervals distinctly crenulated, more costiform, and alternately very narrow.

The ♀ in both species has the hind tibiæ straight, or nearly so; and the form less parallel.

Long. $9\frac{3}{4}$ to $10\frac{1}{4}$ lines.

New South Wales.

CARDIOTHORAX WALKENÆRI, Hope (*Adelium Kirbyi*, Sol, and possibly *A. dilaticolle*, Guérin).

This species is somewhat variable as to form and size; the prothorax is always ample, strongly rounded at the sides, the well developed foliaceous margins separated from the disc by a strongly marked crescent-shaped sulcation; the hind angles dentiform: the elytral costæ are sometimes punctured, the punctures crenulating the sides of the intervals. In what I take to be the ♂ the intermediate and posterior tibiæ are compressed, the latter very strongly so, but are not perceptibly flexuous.

CARDIOTHORAX ÆRICOLLIS, Pascoe.

Is most probably only a variety of the preceding, having a more shining surface, and the prothorax a little bronzed.

(*To be continued.*)

DESCRIPTIONS OF NEW SPECIES OF *HISTERIDÆ*.

BY GEORGE LEWIS.

PLÆSIUS LEVIS, n. sp.

Oblongus, postice parum convexus, niger, nitidus; frontis stria punctata (punctis interruptis); pronoti striae integræ, internâ lateralî valide impressâ obliquâ interstitio antice multo latiore; elytrorum striis, 1 integra, 2 et 3 brevibus, punctatis; propygidio in medio subtiliter punctato; prosterno antice grosse punctato; mesosterni linea marginali basali profunde impressâ.

Long. 6 lines.

Hab.: Sadia, Assam.

This species is easily recognised by the broader margin of the thorax, and the deeply impressed stria at the base of the mesosternum.

PLÆSIUS MOUHOTI, n. sp.

Ovalis, parum convexus, niger, nitidus; frontis stria punctiformi, in medio retrorsum acuminata; pronoti stria integra lateribus grosse punctatis; elytrorum striis 1 et 2 integris, 3 et 4 brevibus postice sparse punctatis; prosterno antice profunde punctato.

Long. 7 lines.

Hab.: Laos.

Separated at once from all others by the punctuation of the thorax.

PLÆSIUS PLANULUS, n. sp.

Oblongus, niger, nitidus; fronte stria fere obsoleta; pronoto stria marginali antice interrupta; elytris striis, 1 late interrupta, 2 postica dimidiata, 3 apicalibus; prosterno lævi.

Long. 6 $\frac{3}{4}$ lines.

Hab.: Nicobar Islands.

Closely allied to *Javanus*—the broader thorax, more parallel elytra, and impunctate prosternum will distinguish it.

MACROSTERNUS MARSEULI, n. sp.

Late ovatus, complanatus, nigro-piceus, nitidus; fronte plana, stria nulla. Pronoti lateribus subtiliter punctulatis, stria marginali antice interrupta; elytrorum striis 1 et 2 integris, 3 late interrupta, 4 apicali; propygidio subtiliter, pygydium anterius sat fortiter, punctatus; mesosterno latissimo, laterale marginato, antice bisinuato.

Long. 1 $\frac{1}{2}$ line.

Hab.: Angola.

The mesosternum is more straightened at the sides than in *Lafertei*, which gives it the appearance of even greater breadth. Both the pro- and mesosternum show fine punctures under a strong glass.

APOBLETES ANGOLENSIS, n. sp.

Oblongo ovalis, complanatus, nigro-piceus, nitidus; fronte subdepressa, plana; pronoti stria externâ laterali antice abbreviata, internâ valde obliqua; elytrorum striis tantum 1—3 dorsalibus, integris; propygidio grosse punctato, in medio lăvi; mesosterno marginato, basi uni-sinuato. Long. $2\frac{1}{2}$ lines.

Hab.: Angola.

I have preserved a manuscript name of the late Mr. Andrew Murray; the oblique lateral margin of the thorax will serve to separate it from *foliaceus*, and beneath the latter has the mesosternum bisinuate and immarginate.

PACHYCHREUS ARABICUS, n. sp.

Ovalis, parum convexus, nigro-piceus, nitidus; antennis pedibusque rufopiceis; frontis stria integrâ; pronoti lateribus fortius, in medio subtiliter, punctatis, stria marginali interruptâ; elytrorum striis 1—3 dorsalibus integris, 4—5 suturalique abbreviatis; tibiis anticis 6-, intermediis 5-, posticis 4-dentatis. Long. $1\frac{3}{4}$ lines.

Hab.: Arabia.

This species is allied to *P. cyanescens*, but it is more parallel, less convex, and the coloration altogether different. My type was taken by Dr. Millengen at Jeddah, and I am indebted to Dr. Sharp's kindness for the possession of it.

PACHYCHRÆUS RAFFRAYI, n. sp.

Oblongus, cylindricus, viridi-cyanescens, nitidus, punctulatus; antennis (clava rufa) pedibusque nigro-piceis; frontis stria integra; pronoto fortius punctato, stria marginali antice interrupta; elytrorum striis 1—5 dorsalibus suturalique integris; propygidio pygidioque fortius punctatis. Long. 3 lines.

Hab.: Abyssinia.

I have several specimens, taken by M. Raffray, of this very distinct species, and it comes nearest to *P. viridis*.

PACHYCHRÆUS CYLINDRICUS, n. sp.

Cylindricus, sub-elongatus, cupreus, nitidus, punctulatus; antennis pedibusque nigro-piceis, clava rufa; fronte depresso, stria integra; pronoti stria marginali antice interrupta; elytrorum striis 1—5 dorsalibus suturalique integris. Long. $1\frac{1}{2}$ lines.

Hab.: Abyssinia.

This is another of M. Raffray's interesting captures: it has the general form of one of the cylindrical *Platysoma*: all the dorsal striae break more or less into punctures towards the apex of the elytra.

EPIERUS SYLVANUS, n. sp.

Ovalis, sub-convexus, niger, nitidus; antennis pedibusque obscuro-piceis; fronte sub-depressa, plana; pronoto punctulato, striâ integrâ; elytris subtilissime punctulatis, striis dorsalibus integris 4—5 scutellum versus arenatis; propygidio pygidioque punctatis; mesosterno bisinuato, stria marginali completa; transversa seriatim crenata.

Long. $\frac{3}{4}$ line.

Hab.: New Zealand.

The transverse stria of the mesosternum is a good distinguishing character of this insect. The trivial name has been suggested by the captor, Capt. Thos. Broun, to whom I am much indebted for examples.

TERETRIUS BRUNNEUS, n. sp.

Cylindricus, sub-elongatus, brunneo-nitidus, undique sat dense punctulatus; pronoti striâ laterali integrâ; elytrorum striâ obliquâ brevissimâ, basi suturaque piceis, lăvibus; tibiis anticis 6-, intermediis 5-, posticis apice, denticulatis.

Long. $\frac{4}{5}$ line.

Hab.: El Hahaz, Arabia.

Narrower than any species on the list, and the coloration will easily distinguish it.

ONTHOPHILUS ORDINARIUS, n. sp.

Suborbiculatus, supra gibbosus, niger, sub-opacus, punctatus, antennis pedibusque ferrugineo-piceis, clavâ rufa; fronte triangulariter sub-carinata; pronoto margine laterali elevato, costis 6 abbreviatis, 4 exteris in disco, 2 mediis anticis; elytrorum striis 1, 3, 5, sub-elevatis, 2 et 4 suturalique obsoletis, insterstitiis bi-seriatim punctatis; propygidio punctato, carinato, in medio sub-elevato.

Long. $1\frac{1}{3}$ lines.

Hab.: Irkutsk, South Siberia.

The convexity and general outline of the above ally it to *alternatus*, but it wants the sculpture and deep furrows of that insect, the striae are not more conspicuous than in *O. exaratus*.

ONTHOPHILUS OSTREATUS, n. sp.

Ovalis, supra depressiusculus, niger-nitidus, antennis pedibusque piceis; pronoto sat profunde punctato, margine elevato, 6-costulato, costis duabus medianis interruptis; elytrorum suturâ humeroque elevatis, costis 6 alternatim paulo elevationibus, insterstitiis biseriatis crenatis; propygidio 3-carinato pygidio inaequali.

Long. 2 lines.

Hab.: China (? Hong Kong).

This species is the largest hitherto noted, the punctuation is rather

coarser than *sulcatus*, but the pattern of the striæ follows *exaratus*. The thorax is narrowed in front, from an angle about the middle, which is the case with the common American species.

ALETES FLAVITARSIS, n. sp.

Ovalis, convexus, piceus, nitidus, lœvigatus; antennis pedibusque brunneis, tarsis flavis.

Hab. : Honolulu.

This species is rather smaller than *politus*, Lec., with the prosternum nearly as wide in front as long, arched at sides, base two-thirds only of the length. The mesosternum is smooth, and has a few shallow impressions scattered down the middle (visible with a good glass), and the line separating it from the metasternum is clear and defined.

Folkestone : *August, 1879.*

AUDITION OF THE CICADIDÆ.

BY A. H. SWINTON.

Various parts of an insect, antennæ, palpi, and fore tarsi, represent the sense of touch: but in the case of the antennæ, since these organs are present and highly complex where their abbreviation or immobility militates against exercise of such function, it is not surprising that audition and smell should be attributed to them. Thus Straus-Dürckheim notices the nerve-branches that penetrate them; and Newport (Trans. Ent. Soc., vol. ii, pp. 229—248, 1838) their tracheal offshoots; both considering them auditory. Erichson (Disser. de fabr. et usu anten. Berlin, 1847) observed pores variously disposed in their integument, and closed by a thin membrane; which Vogt (Zoolog. Briefe, Frankfüt a. M., 1851) described as hairy: they consider them olfactory. Then Lespès (Ann. des Scien. Nat., 1858) mentions otolithes in connection, which Claparède (Ann. des Scien. Nat., 1858), states to be tubes. Lastly, Dr. Hicks (Trans. Lin. Soc., vol. xxii, p. 147) describes the pores as including a fluid and severally closed by a membrane, sometimes thin, sometimes thickened and raised to a hair-like eminence; while a nerve, entering the antennæ, sends a branch that ramifies on their inner side.

As regards experimental proof, authorities are likewise divided. Those who consider the antennæ auditory organs, direct attention to their movement when the insect appears to be disturbed by sound; those who maintain they are olfactory, to their employment by certain

species in searching for nectar, carrion, or other organic alimentary substance, or when feeding or ovipositing. While then there is nothing alleged to disprove high olfactory adaptation in the antennæ, we might, with Cuvier, in certain cases (*Diptera?*) discover such a power in the spiracular adits, or, with Burmeister and Huber, more doubtfully trace it in the oral parts: yet, when we turn to other portions of the trunk accredited with sensibility to sound, we certainly find organs more adapted for audition.

Treviranus (1809) discovered white spots at the antennal base, which Burmeister and others consider to be rudimentary eyes (*stemmata*); these appear to be the organs Comparetti held to be auditory. Clarke (1838) also found auditory structures at the antennal base, which later investigators have not confirmed. The more important organs at the abdominal base of the *Acridiidæ* and their homologues on the fore tibiæ of the *Locustidæ* I have already alluded to (Ent. Mo. Mag., vol. xiv, pp. 121—126). Several papers have appeared in German periodicals confirming the general descriptive lines laid down by Müller and Siebold (1855, Leydig, Archiv. für Anat.; 1866, Hensen, Zeits. für wiss. Zool.; 1874, Vitus Gruber, Mittheil. des naturwiss. Vereines für Steiermark; 1875, Oscar Schmidt, Archiv. für Mikro. Anat.; 1876, Vitus Gruber, Denkschrift. der Kaiserlich. Akad. der Wissens.), and treating of specific modifications of the organs, their development during metamorphosis, the structure of their tissues, and homogeneity of the Acrideous tympanum with the integument. Vitus Gruber (Denkschr., pp. 284—293) argues that the tibial modifications of the *Gryllidæ* and *Locustidæ* are absent in mute species, indirectly showing that it is here chiefly small abdominal membranes are found; these he does not regard as auditory, nevertheless, adopting in lieu a somewhat quaint theory of Dr. Landois (Zeits. für wiss. Zool., b. xx). In my paper above-mentioned I stated that I detected the structural elements of the Orthopterous organs in *Lepidoptera*, and hazarded a conjecture that the "mirrors" of the *Cicadidæ* were auditory. These last, since the days of Réaumur (Mém., v, 178), have been neglected, being considered to be "sound magnifiers," and the "membranes" of the *Acridiidæ* were once similarly accredited (De Geer, Mém., iii, p. 429). I will now, therefore, attempt a description of their structure and nervous connections.

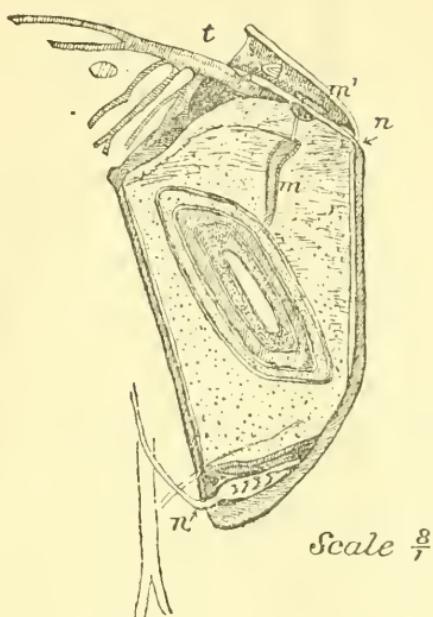
The mirrors of the *Cicadidæ* (membranæ tympanicæ), generally, consist of a membrane surrounded with an outwardly hollow chitinous frame. Among the males this approximates in form a harp-shaped triangle, situated at an angle with the median plane, so that the apex

is posterior and directed inward, and the inner straight side, which is indurated and blackened, borders inferiorly the tymbal motor-muscles, having an inclination of about 40° to the normal vertical. The surface of the enclosed membrane makes some 30° with the horizontal median line, thus being inclined downward; it is also slightly directed outward. In the females this chitinous frame (Trommelring) is a narrower curvilinear triangle transversely situated. The area occupied by the membrane is about one-sixth of a square inch in the males of *C. plebeia* but in the females it barely measures one-half. Among the males of a common Australian *Cicada* it attains $2\frac{1}{2}'''$ square. It has been stated to be composed of a layer of elongate hexagonal or lenticular cells, analogous to those of the tymbal but more delicate (Carlet, An. des Scien. Zool., t. v, vi ser., p. 12).

As in the tympana of the *Acriidiidæ* and *Lepidoptera* a portion of the membrane is attenuated: there this part is posterior (hinteres Tympanumfeld), here in the males it is nearly central, rhomboidal, with the principal axis approaching the vertical close up; in the females it is cordate, situated more inwardly or nearer the apex of the frame. As in *Lepidoptera* its superficies is conspicuous by its prismatic hues. A yellow disc is surrounded by a band of lake-crimson, concentric with exterior lines of purple, blue, green, yellow, and lake; which are most perfect in the male. The remainder of the membrane is of a neutral tint, which appears in measure due to a fine mesh of filaments that may be seen extending over the sides of the frame. The membrane is also finely undulated as in *Acriidiidæ*, and here I think we may trace the origin of the interferential spot, with some allied sound potency; as Oscar Schmidt has already remarked.

Toward the outer angle of the "mirror" is a brown and chitinous styliform discoloration, translucent, thickened at its edges by a serrated line of tubercles, attenuated, slightly angulated, with its point tangential to the iridescent spot, and its opposite extremity directed towards another callosity (m'), similarly tuberculated, triangular, and situated on the edge of the membrane of the "mirror" near the angle. The two chitinous pieces nevertheless are not in contact, but by transmitted light appear connected by a slight (nervous) thread. They are not specifically constant in number or shape, for in *C. orni* (♀) there are two styliform pieces inclined at an angle: one traverses the iridescent spot, the other separates it from the opaquer portion of the membrane. Generally these chitinous pieces harmonize with those in the corresponding membranes (Trommelfellkörpchen) of the *Acriidiidæ* and *Lepidoptera*.

The nervous system, consisting of double chords, frequently coalescing in the thorax, presents different aspects in the various species.



EXPLANATION OF FIGURE.

- m, m'* Chitinous pieces.
- n-n* Acoustic nerve.
- t* Trachea.

dominal spiracle. This chord is situated at the edge of the membrane (*C. haematoxides*), or is free (*C. plebeia*) ; and passes over or surrounds the callosity (*m'*). But in the female *Cicadæ* the arrangement is different, and the ganglion does not lie within the frame. Of the recognised parts of insect auditory organs I reserve specialisation of Müller's ganglion, which should be represented by the portion of the acoustic nerve lying on the callosity (*m'*).

Guildford : February 22nd, 1879.

DESCRIPTION OF A NEW SPECIES OF TRIOZA.

BY J. LICHTENSTEIN.

TRIOZA ATRIPLICIS.

♂. Head, pro- and meso-notum black, shining. Elytra clear, transparent, nerves fine, radial cell lanceolate, terminating in the costal margin at a little more than its own length from the apex; costal margin convex, forming a continuous curve from base to apex. Sternum and legs white.

Abdomen bright green, *genitalia* bright green, genital plate broad at the base, which is about equal to the height, posterior margin convex, recurving just before reaching the apex, which is narrow, processes about twice as high as broad at the base, inner margin rounded off at the apex, which is narrowly black.

Head—crown black, about one-half broader between the eyes than the length down the centre; posterior margin concave; face-lobes black, triangular, shorter than the crown, apex acute, inner margin slightly convex, divergence moderate, not so great as the base of either. *Antennæ* white, 1st joint black, 2nd brownish, and from about the 6th to 10th black.

Thorax—*pro-* and *meso-notum* black, shining, scutellum of the latter with a yellowish-white transverse band at the base. *Elytra* clear, transparent, length about $2\frac{3}{4}$ times that of the breadth, nerves fine, pale at the base, somewhat darker towards and at the apex; costal margin convex, forming a continuous curve from base to apex, the latter somewhat acute; dorsal margin slightly convex, before the apex of the clavus a short, more or less distinct, narrow, fuscous streak; radial cell lanceolate, terminating in the costal margin at a little more than its own length from the apex, radial portion of the costal margin measured on the latter very little shorter than the basal costal cell portion measured in a similar manner; upper arm of the cubitus throughout its length almost parallel with the costal margin; distance between the apices of the nerves of the 1st marginal cell about equal to that between those of the cubital piece of the marginal nerve. *Sternum* white. *Legs* white; *tibiae*: fringe at the apex of the 3rd pair black; *tarsi*: 2nd joint more or less dark brown; *claws* black.

Abdomen bright green, *genitalia* bright green, genital plate broad at the base, which is about equal to the height, posterior margin convex, recurving just before reaching the apex, which is narrow, processes about twice as high as broad at the base, inner margin rounded off at the apex, which is narrowly black.

Length, $1\frac{1}{4}$ line.

Newly perfected examples are almost entirely pale.

This insect is attached to *Atriplex patula*, and, in its earlier stages, does considerable damage to the plants by its attacks upon the leaves, which it deforms at the margins longitudinally, causing them to thicken and recurve, whereby a chamber is formed in which it lives. The *larvæ* are pale, with a very slight greenish tint. *Head* convex in front. *Eyes* purplish-red, apex of the *antennæ* black; the whole insect has a thick fringe of shining white hairs, longest round the abdomen. The *nymphs* are very similar in appearance to those of the stage described above. From the similarity in the deformation of the leaves to that caused by *Aphis atriplicis*, Walker, which infests the plants at the same time, it requires considerable patience when searching for this

Trioza in the young form, as out of about 100 leaves which I opened only three produced the object of my search.

I have taken, and bred, a few males, but have only seen one female, which made its escape. The insect is now in the nymph state with us.

La Lironde, near Montpellier :

7th July, 1879.

DESCRIPTION OF A NEW SPECIES OF THE FAMILY PSYLLIDÆ.

BY JOHN SCOTT.

Genus FLORIA, F. Löw (Verh. z.-b. Ges., vol. xxviii, p. 590).

FLORIA HORVÁTHI.

♀. Greenish-grey. *Crown* pale brownish in the middle; posterior margin concave, length down the centre equal to about one-half the breadth. *Face-lobes* stout, projecting forward, longer than the crown measured down the centre, apex round, divergence about equal to the base of either, clothed with longish fine projecting hairs, and from the apex of each lobe a longer and stouter one. *Elytra* milky-white, length scarcely three times as great as the breadth; costal margin forming a continuous curve from the base to the apex; stigma wanting; extending from the base to the apex is a broad brown streak, dentate on the inner margin, and bounded exteriorly by the petiole of the cubitus, and a triangular brown patch having its base on the costal margin and its apex a little way within the cell formed by the arms of the cubitus. *Legs* greenish-yellow. *Thighs*: inner margin with a longitudinal blackish-brown streak not reaching the base or apex.

Head—crown greenish-grey, pale brownish in the middle, length down the centre about equal to one-half the breadth, posterior margin concave. *Face-lobes* stout, projecting forward, longer than the crown measured down the centre; apex round, divergence about equal to the base of either, clothed with longish fine projecting hairs, and from the apex of each lobe a longer and stouter one. *Antennæ* yellowish, fine, filiform, at least as long as the head and thorax together, 4th joint about three-quarters the length of the 3rd, 4th and 5th at the apex narrowly black, 6th and 7th more broadly and 8th to 10th black, the two terminal joints not thickened.

Thorax—*pronotum* greenish-grey, horizontal, about equally broad throughout, rounded at its extremities, close to which are two minute brown punctures; anterior margin angulate, rounded in the middle; posterior margin narrowly

blackish next the middle : *mesonotum* brownish, anterior portion (*dorsulum* of F. Löw) with pale greenish-grey margins, and a narrow line of the same colour down each side of the centre ; posterior portion brownish, with four longitudinal greenish-grey lines standing one on each side the centre and the other a little remote ; scutelliform process greenish-grey. *Elytra* milky-white, between the costal margin and the radius more transparent, length scarce three times that of the breadth ; costal margin brown, except at the base, and forming from the latter to the apex a continuous curve ; stigma wanting ; radius and cubital nerves pale, the former running almost parallel with the anterior margin until before joining it, where it is distinctly rounded, junction a little before the apex ; anterior arm of the cubitus convex towards the radius, but not running parallel with it ; base of the furcation about in a line with the outer nerve of the posterior furcation ; cell small ; posterior furcation low, somewhat elongate, breadth in the middle not equal to half the length measured on the dorsal margin ; a broad brown streak, dentate on the inner margin and bounded exteriorly by the petiole of the cubitus, extends from the base to the apex, leaving the clavus, an arc below the anterior arm of the cubitus, and a spot in each of the cells adjoining the dorsal margin, white ; from the apex of the radius to a little way within the cell formed by the arms of the cubitus, is a triangular brown patch, having its base on the costal margin. *Legs* greenish-yellow. *Thighs* : inner margin with a longitudinal blackish-brown streak, not reaching either the base or the apex.

Abdomen above somewhat black, posterior margin of the segments narrowly greenish-yellow ; beneath green, basal segment blackish, posterior and side margins of the remainder dark brown : *genitalia* : upper genital plate black at the base, apex brown ; lower genital plate brown, apex darker. Length, $1\frac{1}{2}$ line.

Most nearly allied to *F. vittipennella*, Reut., but it is larger than that species, and the characters on the elytra differ.

I have only seen a single ♀, taken in Hungary by Dr. Horváth, after whom I have much pleasure in naming the species. He does not know from what plant it was beaten, but I strongly suspect it lives on the broom (*Spartium scoparium*), dyer's weed (*Genista tinctoria*), needle whin (*Genista anglica*), or some closely allied plant, as all the other species of this group are attached to one or other of this section of the *Papilionaceæ*.

1, St. Mildred's Terrace, Bromley Road, Lee, S.E. :

August 15th, 1879.

DESCRIPTION OF THE NYMPH OF *SPANIONEURA FONSCOLOMBEI*, FÖRSTER, FAMILY PSYLLIDÆ.

BY JOHN SCOTT.

Pale green. *Head* large, anterior margin convex, palish, and with a few longish pale hairs. *Antennæ* whitish or with a slight green tint, 5—8 joints sometimes ex-

tremely narrowly brownish, 9 and 10 black. *Eyes* brown or reddish-brown, elongate-oval. *Thorax* green. *Lobes* containing the elytra and wings pale green, somewhat lanceolate, reaching to about the middle of the abdomen, apex narrowly rounded and slightly brownish; dorsal margin at the base sometimes with a pale brown spot; costal margin with a few longish, erect, pale hairs. *Legs* green; *tarsi* brown, basal half of the joints greenish-white.

Abdomen green, with a more or less fuscous-brown tinge, basal segment very pale cream-white; round the margin a few fine pale hairs; apex on each side with a large, almost round, black spot, having a narrow yellow margin.

Length, $\frac{2}{3}$ line.

This insect lives on the Box (*Buxus sempervirens*). Throughout its earlier stages, there appears to be but little indication of any injury done to the leaves or buds, as they are scarcely affected, the margins of the leaves alone being very slightly curved backwards longitudinally. In the stage of life above described the creature is very active, running all over the plant.

Although not known to be British, I think it quite probable that by careful searching or beating, this insect may be found at Boxhill, Surrey. The black spot with the narrow yellow margin, situate on each side of the apex of the abdomen, is an excellent character whereby to distinguish it. Time of appearance, the beginning of June.

I have been enabled to describe this creature through the kindness of my friend, M. J. Lichtenstein, who has also furnished me with several other species of the group in the nymph and earlier stages.

I am not aware that anything has been previously recorded as to the earlier forms of *Spanioneura*.

1, St. Mildred's Terrace, Bromley Road,

Lee, S.E.: 4th July, 1879.

NOTES ON THE BUTTERFLIES AND SPHINGES OF ZERMATT AND ITS VICINITY, OBSERVED IN JUNE AND JULY, 1878.

BY R. C. R. JORDAN, M.D.

For the few last days of June and the early part of July, 1878, I was in the Visp Valley, and at Zermatt, and I do my best to give the list of my captures. I cannot yet name all my moths, but may here repeat a word of caution to tourist-entomologists, never to neglect any insect: the commonest night flying moth in the Visp Valley was *Eucosmia montivagata*, I confounded it with *certata*, and only brought home two indifferent specimens.

One discovery made by me will prove of great use in future rambles, this is, that butterflies may be packed without the least injury on the following plan: place first a butterfly with its wings folded back of course, then a disc of paper, next another butterfly followed by another disc until the pill box is filled, and in this way thirty insects at least may travel in one box; it answers also with *Geometræ*, but greater care is needed with the antennæ and legs. If any one sent off the captures of the day in a tin box by post, I have no doubt, if the paper was slightly damped, that the butterflies might be set at home without need of any relaxing; if any one in Switzerland would send me such a packed box of common captures as an experiment, I should be happy to report upon the subject.

Papilio Machaon, common, Zermatt. *P. Podalirius*, one specimen only seen in the Visp Valley, near Stalden; on capture it proved rather small and darker than usual.

Parnassius Delius, Zermatt. *P. Apollo*, Zermatt, Visp Valley, Loèche, &c.; at Zermatt very small.

Aporia crataegi, abundant everywhere.

Pieris brassicæ and *P. rapæ*, a few at Zermatt, where I caught also one *Cidaria fluctuata*! *P. napi*, common at Zermatt and the Riffelberg. The males were all of the spotless form, the females of the var. *bryoniae*. It would be interesting to me to know if this insect has a second brood on the Alps, and if so, what it is like, I have never been late enough to meet with it.

Anthocharis Belia, var. *simplicia*, one female only, taken at Zermatt, settled on a flower of *Biscutella laevigata*. *A. cardamines*, common at Zermatt: the males were all of the orthodox character, with the central spot some lines within the orange patch; in all my South Devon specimens the insect is smaller, and the spot touches the white portion of the wing.

Leucophasia sinapis. I believe the var. *lathyri* (not the species *Duponcheli*), Zermatt.

Colias Hyale and *Edusa*, Visp Valley. *C. Phiconome*, common at Zermatt.

Rhodocera rhamni, Visp Valley.

Thecla rubi, This and *Vanessa cardui* were the only butterflies which frequented the flowers of *Rhododendron ferrugineum*, so abundant on the Riffelberg, others preferred moist mud.

Polyommatus Hippothoe, Zermatt, all of the var. *Eurybia*. Curiously, on the Gemmi some years ago, all that I took were very small specimens of the ordinary form. *P. Phœas*, one seen in the Visp Valley, with one white upper wing, the others as usual. *P. Alciphron*, var. *Gordius*, Visp Valley; in the previous summer, I had been taking the typical *Alciphron* at Heidelberg, the beautiful orange-copper female of *Gordius* is indeed a contrast to the dull brown female of the type.

Lycæna Ægon, common; at Zermatt this insect had a very broad black border to the wings. *L. Argus*, Zermatt, common. These two species, in dull or rainy weather, might always be found asleep in the juniper bushes. *L. orbitulus*, Riffelberg. *L. Astrarche*, all that I saw were of the form *Allous*, but the under-side showed no approach to *Artaxerxes*. *L. Eros*, *L. Icarus*, *L. Eumedon*, *L. Escheri*, all common on the Riffelberg. *L. Bellargus*, *L. Hylas*, not so abundant as the previous four species. *L. minima* and *L. semiargus*, both abundant. *L. Arion*; in the Zermatt specimens all the outer portion of the wings was shaded with black.

Vanessa urticæ, *V. Atalanta*, *V. cardui*, all met with at Zermatt. The latter was found high up on the mountains. *V. Antiopa*, one found dead near St. Nicholas.

Melitæa Aurinia, var. *Merope*, very common near the summit of the Riffelberg. *M. Phœbe*, very fine specimens, common in the Visp Valley, between Visp and St. Nicholas. *M. Didyma*, Visp Valley. *M. Dictynna*, *M. Athalia*, *M. Aurelia*, *M. Parthenie*, all common at Zermatt. *M. Parthenie* at least seems to me quite distinct from *Athalia*.

Argynnис Euphrosyne, often found high up on the mountains, but not higher than the pine woods. *A. Pales*, a very small form common on the summit of the Riffelberg. *A. Amathusia*, Zermatt. *A. Lathonia*, Visp Valley, near St. Nicholas. *A. Aglaia*, Zermatt. *A. Niobe*, Zermatt, the var. *Eros*, far the commonest form. *A. Adippe*, Visp Valley.

Melanargia Galathea, Visp Valley, below St. Nicholas.

Erebia Melampus, Zermatt, common. *E. Ceto*, most abundant at Zermatt. *E. Erias*, Zermatt. *E. Lappona* and *E. Tyndarus*, both common at the top of the Riffelberg. *E. Euryale*. Most abundant at Zermatt. I never saw a specimen shewing any approach to *E. Ligea*, which is common at Interlachen. The flight is also totally different.

Ceneis Aello, Riffelberg. This insect has the flight of our *Megæra*, and like it, seems fond of settling on stones.

Satyrus Alcyone, common in the Visp Valley below St. Nicholas, where it had the flight and habits of *S. Semele*. *S. Semele*, Visp Valley, larger than English specimens. *S. Actaea* and var. *cordula*, common in the Visp Valley, settling on the thistle blossoms.

Pararge Mæra, abundant; it is difficult amongst the Swiss specimens to think how nearly some of the German examples approach to *Megæra*, and how completely intermediate is the var. *adrasta*. *P. Hiera*, Riffelberg, common.

Epinephele Lycaon was "the meadow brown" of the St. Nicholas pastures. *E. Hyperanthus*, Visp Valley. *E. Janira* I saw in the Rhone Valley commonly, not in the Visp Valley, but this was probably a mere accident.

Cœnonymphia Satyrion. It requires a great amount of faith to believe this to be the same as *C. Arcanius*. At Heidelberg *C. Arcanius* is most abundant, and has exactly the habits of *Tithonus*, flitting about amongst the bushes and settling on the blossoms; *C. Satyrion*, like *Pamphilus*, is essentially a grass insect, and apparently very little subject to variation; common at Zermatt. *C. Pamphilus*, Zermatt.

Spilothyrus lavateræ, not common, Zermatt.

Syriethus Alveus, *S. cacaliae*, and *S. malvæ*, Zermatt. *S. Sao*, common, Zermatt.

Smerinthus tiliæ, one in the Visp Valley.

Macroglossa stellatarum.

Sesia muscæformis, a pair of insects which I refer to this species were taken by me near Zermatt, there was, however, no sea-pink near, the plants most likely for a *Sesia* to feed upon were *Oxytropus campestris*, *Astragalus exscapus*, and *A. monspessulanus*.

Ino statices and *I. Geryon*, both common at Zermatt.

Zygæna Minos and *Z. lavandulæ*, Visp Valley. There was another splendid *Zygæna* common near St. Nicholas, which at the time I took to be *Z. trifolii*, var. *dubia*, and accordingly only brought home one specimen. It has a much narrower border to the posterior wings than my type specimens of that insect, but this may be possibly a mere accident. No *Zygæna* was seen by me near Zermatt.

Syntomis Phegea, abundant in the Visp Valley, and everywhere most conspicuous, it had quite the habits of a *Zygæna*, whereas the little *Naelia punctata*, which I have taken near Heidelberg, has quite the manners of a *Lithosia*, flying at dusk, falling on its back, simu-

lating death, and its wings folding into plaits. The wonderful similarity of *Syntomis Phegea* to some of the forms of *Zygæna Ephialtes* must have a reason; the history of this insect and its varieties must surely be worth working out as an illustration of mimicry; the var. *peucedani*, with the perfect colouring of an ordinary *Zygæna*, *trigonellæ* and *coronillæ* completely that of *Syntomis*. This reminds me of one strange mimetic resemblance seen in the Visp Valley: *Hypercompa dominula* was very frequent and difficult to distinguish whilst flying from a locust, also provided with bright scarlet underwings.

If I were to carry on the account of my captures further, I should get out of my depth at once in the *Setinæ*, which were very abundant and very variable; but many British insects were found in my ramble: *Gnophria quadra* and *rubricollis*, *Emydia cibrum*, var. *candida*, *Nemeophila russula* and *N. plantaginis*, *Callimorpha dominula*, *Bombyx castrensis*, *Drepana falcataria*, *Leucania comma*, *L. e-album*, *Hydrilla palustris*, *Heliothis dipsaceus*, *Geometra vernaria*, *Cabera pusaria*, *Fidonia carbonaria*, *Cidaria montanata*, var. *fusco-marginata*, *Cidaria ferrugata*, *C. hastata*, *C. berberata*, and many others. The pretty little *Acidalia rusticata*, was common at Sierre.

Perhaps the most peculiar insect I saw in any other Order was a large *Creophilus*, twice the size of *maxillosus*, it was flying, and whilst on the wing, seemed quite golden in the sunshine.

105, Harborne Road, Edgbaston, Birmingham :

June 14th, 1879.

Habits of Emus hirtus.—On the high pasture lands, following in the track of the cattle, *Emus hirtus* is plentiful in the neighbourhood of Boulogne. It has a strong flight, going ahead much like the hornet, which it much resembles on the wing, although the colour is darker and more metallic. It seems to feed on *Onthophagi*, for, on two or three occasions, I have seen it struggling with *O. nuchicornis*, and these I have no doubt, with perhaps *Aphodii*, are its chief food. On watching carefully it will be seen to pass by the *Philonthi* and smaller *Cercyonidae*. On the 17th and 18th of July, of all the specimens I found none were imperfect or worn, so it is probable this date is near to the best time to search for the species. Last year I took a ♀ in the New Forest about the 10th of June, and now I know more of its habits, I hope my next visit to Lyndhurst will be the occasion of finding it again. A hot sun would be essential for success in capturing this species where individuals are not numerous.—G. LEWIS, Folkestone : *August, 1879.*

Curious gathering of Melanotus puncto-lineatus, Pelerin.—On an early day of this month, on the ground at Hythe used by the School of Artillery for practice, I found a large number of this *Elater* huddled together on a more or less blighted plant of *Senecio Jacobaea*. They were thrusting themselves into a common centre under the flower-head, and clinging to the stalk. I was first attracted to the plant by its extreme blackness, and then discovered the cause to be this mass of insect life. There were probably eighty specimens, as many got away in the shingle, for I counted fifty when I got home. Three or four other plants close by had single specimens, but in a more extended search I failed to find more. I have hitherto considered the species to be quite one of our early spring insects.—ID. : *August, 1879.*

Pentodon punctatus, Villers, captured in London.—In the June No. (p. 15, ante) I recorded the capture of *Carabus auratus* in the Borough Market; and I have again the pleasure to record another interesting capture,—this time of a beetle not indigenous to Britain, in Spitalfields Market. On the 10th of June last I had brought to me by a friend, who is a salesman in the Market, a fine specimen of the above-named insect: it was found by him sauntering leisurely over a sieve of cherries; although I do not suppose it was revelling in the luxury of the fruit. I need scarcely say the cherries were continental, having been sent from the south of France, and as I can find no record of this insect having been taken in Britain before, I thought this capture might interest many of your readers. It probably does to many seem strange that such insects as *Carabus auratus* and *Pentodon punctatus* should occur in our London markets, but my little experience leads me to think that if entomologists generally were to make friends amongst the many salesmen in the markets, we should not unfrequently have records of interesting captures, and probably some few rarities. I may add that *Pentodon punctatus* is a native of South Europe.—T. R. BILLUPS, 4, Swiss Villas, Coplestone Road, Peckham : *August 14th, 1879.*

Beetles inhabiting hot water.—One day on entering my pool as usual in order to take a bath, I was surprised to see in the water, then of the heat of 28 degrees,* a small beetle disporting itself vivaciously; I supposed that it was a poor creature that had fallen in through a window or otherwise, and I endeavoured, with all the desire of which an entomologist who had not for a long time taken a living insect was capable, to capture my little companion: I soon perceived it was a water-beetle and not a strange guest, for I had much difficulty in catching it, not having any instrument to aid me. Nevertheless, I gave myself eagerly to its pursuit, and having succeeded in taking it, on returning to my room I inspected it with a certain curiosity because its habitat then seemed to me peculiar, but with a lens I soon proved that it was a small *Laccobius*; and, knowing perfectly all the Swiss species of this genus, I saw that it was an example of a species new to our fauna at least, but which might probably be referred to one of those described by Rottenberg (Berl. ent. Zeits., xviii, 305, 1874). Every day when bathing I devoted myself to this new kind of *chasse*, and during the time I remained at Baden I succeeded, with the assistance of my bath-keeper,† in capturing thirty examples of my charming little insect.

* Its natural heat is from 47 $\frac{1}{2}$ to 49 degrees; in order to obtain 28 the baths are prepared in the evening and cool during the night, no other water being added, as I ascertained. (49° Réaum. = 142° Fahr., 49° Centigrade = 120° Fahr.)

† When I asked Jacob, my bath-keeper, "Have you ever seen in the baths you prepare a small black insect like this?" (showing him one of them), he replied: "Oh! yes; these little fleas, when one wants to catch them, go to the bottom of the water instead of jumping like others."

On my return home, being better and more in a condition for entomological occupation, I hastened to study my captures, in which I felt interested in the highest degree, and being now fortified with Rottenberg's monograph of the genus *Laccobius* I had no difficulty in ascertaining that my species was undescribed, and I named it *thermarius*.

The fact of a beetle living in hot mineral water of a maximum heat of 49°, which it must endure at least several times a day, and which in no case becomes less than 20°, is very singular, and I do not know if it has been hitherto observed; however this may be, there is a new and interesting addition to our fauna. I tried at Baden, when I had the living beetles, the experiment of putting some into a glass of drinkable water, cold, such as is served at table, and remarked that they became less lively and less active than in their usual condition.

Laccobius thermarius, n. sp.—Length, 1½ mill.; breadth, $\frac{3}{4}$ mill. One of the smallest species of the genus, smaller and especially shorter than *L. viridiceps*, Rott., and *L. Revelieri*, Perris, but of a form relatively broader and more convex; in general form it is like *L. nigriceps*, Thoms., and belongs to the same Group A of Rottenberg, of which the known species are distinguished from others by the puncturation of the thorax not being confluent but with intervals smooth and shining; it cannot be confounded with any of the varieties of *L. nigriceps*, Thoms., on account of its size, colour, and puncturation. The thirty examples I have before me are identical and show no variation. (A detailed description follows).—H. TOURNIER, in Mittheilungen d. schw. ent. Gesells., v, 434 (1879).

[The scene of this exploit was the baths of Baden, Canton Aargau, Switzerland, to which M. Tournier, being ill and scarcely able to walk, went under medical advice in July, 1878. It is not the first time that an entomologist has made an interesting discovery *in rebus adversis*, but I do not remember another instance of the pursuit of science under the difficulties of hot water.—J. W. D.]

Orchestes iota.—Last year, at the end of July and beginning of August, I found *Orchestes iota* in abundance in the neighbourhood of Brockenhurst, New Forest, on the sweet gale (*Myrica gale*) which grows very plentifully on some marshy ground about a mile from the village. I have found so many good collections without a specimen, that I thought this new locality for it worth recording.—W. W. FOWLER, Repton, Burton-on-Trent: *July*, 1879.

Insects in Sutherlandshire.—In September and October, 1877, I was for some time at Balbair in Sutherlandshire, and, among the Coleoptera there taken by me, was a *Cicindela* in the larval state. I dug it out of its burrow, one of several, in the sandy edge of a moor above the Shin river. I tried to rear the larva but failed, so I can only guess it to be that of *C. campestris*. Among other Coleopterous captures was a specimen of *Staphylinus stercorarius*, taken out of a patch of horse-dung, which was absolutely heaving with continuously changing thousands of *Aphodius contaminatus*. *Dromius quadrimaculatus* occurred at sugar, *Harpalus ruficornis* and *Otiorhynchus sulcatus* under stones, *Lema cyanella* and *Prasocuris aucta* by sweeping.

The Lepidoptera, particularly the Geometers, were very abundant. Among the Diurni, *Argynnis Aglaia* was pretty well represented, and the females of *Lycæna*

Alexis were the finest I have ever seen. Being unable to sugar more than twice, I took very few *Noctuæ*, but among the few a fine melanic *Xylophasia polyodon*. *Charæas graminis* was very common by day on yellow ragweed, and on the 8th of September I found two females on grass in the act of oviposition. *Polia chi* was only just coming out, but three specimens were taken resting on the northern side of tree trunks by day. On the 8th and 11th of September I took, on broom, a number of the larvæ, and one or two pupæ of *Orgyia antiqua*. The larvæ were most of them nearly full-fed, and such as attained the pupa state at all did so in the course of ten days. The perfect insects began to appear in about eighteen days, and the females at once commenced to deposit their eggs. The broom is not given in O. Wilson's list of food plants for this species. A species of *Conops* was abundant on yellow ragweed in both months.—L. DUFF DUNBAR, Wick, N.B. : 8th July, 1879.

Capture of Sphinx pinastri.—I have just received a specimen of this rare moth, taken in the gardens of Waldringfield Rectory, near Ipswich, by Mr. A. W. Waller. It was found on an Austrian pine. Two specimens were found in the same grounds last year, and the summer before one was taken at Coddenham, near Ipswich, which incidents I have already chronicled in your pages.—J. E. TAYLOR, 3, St. Martin's Place, W.C. : July 14th, 1879.

Mamestra abjecta.—Having found two fine larvæ of this species on June 14th, 1879, in their most perfect condition of size and colouring, and watched their subsequent changes, I became conscious that the individual larva described at page 20, *ante*, and mentioned there as full-grown, was really in a state beyond full-growth, and was completely full-fed. It therefore seems desirable to give in addition a note of these two more recent larvæ of *abjecta*, both found, as it chanced, under one stone, though at opposite ends of it.

The largest larva was of great thickness, and in length as much as one inch and seven-eighths; the other, one inch and a half long, and of more moderate stoutness; their heads, plates, and some other details agreed with my previous description, but the colouring of their bodies was a bright and glossy-glaucous greenish-grey, some parts along the sides, at intervals, dark and translucent, displaying a little of the internal anatomy, the tubercular spots very faintly deeper grey, chiefly noticeable for a fine wrinkly roughness and a minute central reddish-brown dot, and fine hair: the largest within a few hours began to lose its bright glaucous hue and to turn fawn colour, yet it fed well for two days longer, and then once more changed by degrees to a dirty flesh colour, and commenced its puparium in the mud amongst roots of the grass: the other remained glaucous for four days before undergoing similar changes, arriving at the last, a dirty flesh tint, on June 20th, where it also burrowed into the tenacious mud for pupation; and from this individual the moth, a handsome male, emerged on August 2nd. Quite recently I found the largest larva had died, much wasted, within an enveloping shroud of dirty whitish silk.—WILLIAM BUCKLER, Emsworth : August 12th, 1879.

Capture in London of Boletobia fuliginaria.—I have the pleasure to inform you that one of the men employed in our warehouse has brought me a female specimen of *Boletobia fuliginaria*, which he had just taken on our wharf in Upper Thames Street; unfortunately, he managed to damage the upper wing on the right side in

getting it into the box, in other respects the specimen is perfect. This is the second specimen that has been taken on the same premises: twenty years ago my friend—Mr. C. S. Mallett—took a male off one of the windows, which he has now in his cabinet.—J. R. WELLMAN, 14, Portland Place North, Clapham Road, S.W.: 15th August, 1879.

The larva of Rösterstammia Erxlebella.—Through the kindness of Mr. Grigg of Bristol, I have now made the personal acquaintance of this interesting larva. It was well described by Madame Lienig in the Isis of 1846, p. 292, who says of it that “it feeds in May and September on lime, on the under-side of the leaves, in which “it eats large round holes; I also found it on nut bushes.”

Treitschke (ix, 2, 115) had quoted from von Tischer’s notes a different description of the larva, to which it may now be desirable to call the attention of our numerous observers. Von Tischer says “The larva is green, with paler warts and a “brownish-green head. It feeds on heath (*Erica vulgaris*), on the twigs of which “it unites the small leaves by means of its web to form an elongate habitation, “within which it also assumes the pupa state. It occurs at the end of June in “woods. The imago appears in July and August.”

This habit of uniting the leaves of the *Calluna* to form an “elongate habitation” reminds one of the pretty knot-horn, *Aerobasis porphyrella*, which treats the *Erica arborea* in a similar way, but I am not aware that we have yet found any smaller heath-feeding insect with such a habit. Von Tischer was well acquainted with the heath-feeding larva of *Gelechia ericinella*, which (under the name of *micella*) is described from his notes in Treitschke (x, 3, 214), and its habits are totally different. When I was at the Meeting of German Naturalists at Hanover, in 1865, I understood from Herr Glitz of that place, that the young larvæ of *Erxlebella* mine the leaves of the lime; so far as Mr. Grigg’s observations at present go this has not been confirmed, as he has taken it “when exceedingly small, hanging from the leaves by its “silken thread.”

It would also be interesting to know whether any recent Entomologist has, like Madame Lienig, found this larva “on nut bushes.”—H. T. STANTON, Mountsfield, Lewisham, S.E.: August 15th, 1879.

A new British Autœon.—On examining lately my Scotch specimens of *Autœon*, I found that I had taken near Dumfries the *Autœon lateralis* of Thomson (Oef., 1860, p. 178, No. 10), a species new to our lists.—P. CAMERON, 31, Willowbank Crescent, Glasgow: August 13th, 1879.

A second British locality for Stenopsocus stigmaticus, Imhoff.—I recorded this species as British in this Magazine, vol. ix, p. 63 (1872), having found it near Reigate in some quantity. I again found it (not rare) in the neighbourhood of Uxbridge on the 1st and 2nd inst.; in fact, it was more common than its ally *S. immaculatus*, from which its smaller size and very bright green colour (when fresh) readily distinguish it, without considering the more precise characters already pointed out. That it is common, and probably universally distributed, on the Continent is evident. I have seen it in many continental collections, and in France I have taken it almost within Paris. It was not known as Scandinavian when Dr. Spångberg wrote his “*Psocina Suecæ et Fenniæ*” (Öfversigt Vet. Ak. Förhandlingar, 1878,

No. 2), but he recently informed me that he had since detected it. Having mentioned Dr. Spångberg's paper, I take the opportunity of recommending the study of it to all who take an interest in these insects. The species he describes in it are few (only 18), and well known, but his method of handling the subject is both original and masterly, and his outline figures of neurulation on the two plates are so clear as to leave nothing to be desired. He has studied these neural characters, for specific differences, far more closely than I had, when I wrote my "Monograph of the British *Psocidae*," and with excellent results.—R. McLACHLAN, Lewisham: 5th August, 1879.

Psectra diptera, Burm., at Strasbourg.—Mons. Ferdinand Reiber kindly forwarded a small collection of *Neuroptera* captured by him in and around Strasbourg. In it I find one example of the very rare and interesting *Psectra diptera*, new to my collection, and of which probably not more than a dozen individuals are known, although widely distributed. In Britain it has not been found since the late Mr. J. C. Dale took his solitary specimen in Somersetshire in June, 1843. There still remains uncertainty as to the sex of all the examples seen by me. From the formation of the abdomen, I should be inclined to consider them ♀, although it has been stated that this sex *with developed hind-wings* exists in the Berlin Museum, and that the dipterous (or nearly so) individuals are ♂. I have seen an insect with developed hind-wings forwarded from Holland some few years ago by Mr. H. Albarda, in which the abdominal formation did not appear to differ from that of the dipterous specimens. Thus the following problems remain to be solved: (1) are the dipterous and complete individuals of opposite sexes, and if so, which are ♂ and which ♀?; (2) has the same sex occasionally developed hind-wings, although usually dipterous?; (3) do the two forms pertain to distinct species?—Id.: 7th August, 1879.

Exorista hortulana, Meigen.—In the July number (p. 44) is a short notice by Mr. Porritt, of Huddersfield, of the occurrence of this parasitic fly in England, he having bred it from the larva of *Acronycta alni*. He then quoted a remark which I had made to him, that it had not been previously recorded as a British species. In this I find I was in error, as Stephens inserted the name in his Systematic Catalogue, published 50 years ago. Mr. McLachlan having very kindly examined his collection (now in the British Museum), cannot, however, find any specimen so labelled, therefore it is very doubtful whether he knew it.

My friend Mr. Porritt has attached too much importance to the circumstance of a Dipterous insect being new to Britain, for this order has been so much neglected here, that novelties, by which I mean species undescribed by Walker in the "Insecta Britannica," are of frequent occurrence in the experience of any one who has paid much attention to this extensive and interesting tribe.

The *Tachiniidae*, which are all parasitic upon the larvæ of other insects, are very difficult to determine; and many points in their economy are only imperfectly understood. Thus some species, as *Exorista vulgaris*, prey upon the larvæ of several different moths, while others appear to confine themselves to those of particular species. Much information might be gained upon this interesting subject, if the numerous British lepidopterists who rear so many of their specimens from pupæ, would carefully preserve all the parasitic *Diptera* which they breed in the place of butterflies or moths; noting the name of the species to which the pupa belongs. I shall be very glad to examine any fly thus bred, and will endeavour to name it if sent to me.—R. H. MEADE, Bradford: August 11th, 1879.

A superior mode of killing insects.—Dr. J. M. Eder has communicated to the Zool.-botan. Verein at Vienna (Verhandl., 1878, Sitzungsbs., p. 59) a mode of killing insects, especially *Coleoptera*, which he has used for many years, and finds superior to all others, inasmuch, as its action is more rapid, and the colour, hair or scales of the insects are not affected as by other agencies. All that is required is a wide-mouthed glass bottle, having a cork fitting tightly; into the bottle are put some pieces of stout blotting paper, and on these three or four drops of bisulphide of carbon (Schwefelkohlenstoff); of this a supply sufficient for the service of a day or two may easily be carried in a small bottle in the waistcoat pocket. When an insect is put into the bottle and the cork quickly replaced, death ensues instantly, or, in the case of the largest beetles, within a few seconds; and the bisulphide, by reason of its volatile nature, being immediately vaporized, the insect is dry and its condition in no way injured. Occasionally, if the bottle be often opened, a drop or two of the bisulphide must be added; in any case, it is essential that the cork be replaced directly and firmly. The bisulphide is also very effective in exterminating *Ptinus fur* and *Anthrenus*, and it is further recommended on account of its being cheap and easily obtained.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: 30th June, 1879.

ENTOMOLOGICAL SOCIETY OF LONDON.—August 6th, 1879. J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the Chair.

Mr. Philips exhibited living examples of *Spercheus emarginatus* from West Ham.

Mr. Stainton exhibited, on behalf of Mr. Grigg, larvae of *Röslerstammia Erx-lebella* from near Bristol. They fed exposed on leaves of *Tilia*, and, when full-grown, turned down the edge of the leaf and spun their cocoons in between like those of *Ornix*.

Miss Ormerod communicated "Notes on Sugar-Cane Borers from British Guiana," and exhibited the insects. The most destructive was a moth, probably identical with that described by Fabricius as *Phalæna saccharalis*; and there were also two beetles, viz., *Calandra sacchari* and *C. palmarum*. These had been placed in her hands by the Colonial Company, and she was desirous of obtaining suggestions as to the most likely means of lessening the evil. Mr. Distant said that in Malacca, where borers are destructive, the plan adopted was that of burning those canes that gave indications of being infested.

Mr. Swinton communicated "Notes on the urticating property of the hairs of the larvae of *Liparis auriflava*," and maintained that it was not merely mechanical in its origin, but that the hairs were poisoned by a caustic liquid issuing from the scarlet tubercles on the hinder segments.

Mr. McLachlan communicated a translation of Notes recently read before the Belgian Entomological Society by M. Méline, giving the results of direct experiments on the correlation of mutilation in the larva with deformity in the imago. Ten silkworms were operated upon, the right metathoracic leg being cut off from each of them. Of the ten moths produced, each showed deformity in the corresponding leg, but varying in degree, owing probably to the difficulty of amputating the leg of the larva at precisely the same spot in all cases. The operation caused apparently little inconvenience to the larvae, as they recommenced feeding almost immediately.

NOTES ON RARE, &c., SPECIES OF HYMENOPTERA TAKEN IN THE NEIGHBOURHOOD OF HASTINGS IN 1879.

BY EDWARD SAUNDERS, F.L.S.

This year, on the whole, seems to have been a most unfavourable one for *Hymenoptera*, but whilst staying at Hastings last month I got a few species which I think are worth recording; some on account of their rarity, others on account of their late appearance. The weather, while I was there, was fairly fine, and on some days really hot and sunny, but even then there appeared to me to be a very unusual scarcity of bees, especially of such genera as *Prosopis*, *Nomada*, *Colletes*, &c., which are usually so abundant in August. The following is a list of my rarer and more interesting captures:—

Myrmosa melanocephala, two ♀ (one very large) on a bank near Hollington.

Nysson dimidiatus, one specimen on an umbelliferous plant near Ore.

Odynerus melanocephalus, one ♀ near Ore.

Prosopis cornuta, five ♂ off *Achillea* in Hollington Wood. I worked hard for the ♀ but could not get it. *P. dilatata*, one ♀ off umbelliferous plants in Hollington Wood. *P. confusa*, ♂ and ♀ off various *Umbelliferæ*, &c.

Halictus maculatus, one ♀ off *Crepis virens* in Fairlight Glen. This is one of our rarest bees, only two specimens, so far as I know, having occurred in England before. *H. xanthopus*, one ♀ off thistles in St. Andrew's Park. *H. puncticollis*, near Guestling, &c., in the same localities as last year. *H. longiceps*, E. S., = *punctatissimus*, Schk., not uncommon.

I forwarded specimens of my *longiceps* to Mr. C. Ritsema, of Leyden, and he refers them to *punctatissimus*, Schenck, and kindly sent me specimens of that species, which agree exactly with mine. I therefore take this opportunity of withdrawing my name.

Andrena fulvescens and *fulvago*, on *Hieracium*, &c. *A. fulvicrus*, a large colony of this species in a bank by the side of the road near Hollington. ♂ and ♀ in perfect condition, just as one would expect to find them in April. Some of the ♀ having the white abdominal bands of *extricata*, Smith, and nearly all having them somewhat lighter in colour than usual.

Nomada Fabriciana, a few ♂ and ♀ off various flowers, especially *Senecio*. *N. varia*, a few ♂ and two ♀ flying about a colony of *An-*

drena fulvicrus. *N. sexfasciata*, one ♀ near Fairlight, this is usually quite an early species, appearing in the beginning of June, and parasitic on *Eucera*.

Stelis aterrima, off *Veronica* in a garden.

Cælioxys acuminata, two ♀ off *Veronica* in a garden.

Saropoda bimaculata, occasionally.

Anthophora furcata, one specimen, near Guestling.

Holmesdale, Wandle Road, Upper Tooting:

12th September, 1879.

DESCRIPTION OF AN ADDITIONAL SPECIES TO THE LIST OF BRITISH HEMIPTERA.

BY EDWARD SAUNDERS, F.L.S.

ATRACTOTOMUS MAGNICORNIS, Fall., Hem. Suec., 119, 8.

♀. Brown, densely covered with deciduous golden scale-like pubescence, intermixed with black semi-erect hairs. 1st joint of the antennæ with its sides subparallel. 2nd joint barely as long as the 3rd and 4th together, considerably swollen and covered with short black hairs. 3rd and 4th pale whitish. Femora with their apices paler; tibiæ and tarsi pale, the former with small black spots and black spine-like hairs. Length, 1½—1½ lines.

Very like *A. mali*, but with the first joint of the antennæ much thinner, and not widening to the apex, as in that species. 2nd joint shorter and less swollen, and the tibiæ with a small black spot.

I caught 3 ♀ by beating larches in the neighbourhood of Croydon on the 30th August, but did not succeed in taking the ♂, which, however, may be known at once by the long, comparatively narrow, parallel sided 2nd joint to the antennæ.

Holmesdale, Wandle Road, Upper Tooting:
8th September, 1879.

NOTES ON RARE LEPIDOPTERA IN SOUTH DEVON.

BY A. H. JONES.

During a stay of three weeks in June near Torquay, I met with several of the rarer *Lepidoptera*, and a note of them may not be devoid of interest, especially as the season has proved so bad for insects generally.

Three specimens of *Deilephila lirornica* came under my observation: one on June 8th, which had been found at rest in a garden, a second on the 11th, which I took at the flowers of *Silene maritima*, and a third on the 13th, which I saw, at the blossom of red valerian,

but was unable to capture. *Heliothis peltigera* and *marginata*, and the common *Dianthæciæ* visited occasionally the flowers of both these plants, those of *Silene maritima*, however, proving the more attractive.

Whilst passing over the Down on the night of June 12th, I secured a *Laphygma exigua* (♀) as it flew across my light; and on the 20th I captured, flying in a clover field in the bright sunshine, a fine *Heliothis armigera* (♀)—but I failed to obtain eggs from either.

The larvæ of *Sesia philanthiformis* were not uncommon in the stems of *Statice armeria*, and at Salcombe, where this plant grows in great luxuriance, *Sericoris littoralis* was tolerably plentiful.

I may add that *Vanessa cardui* and *Plusia gamma* occurred simultaneously on June 10th in the greatest profusion.

Shrublands, Eltham :
September 4th, 1879.

DESCRIPTION OF THE LARVA, &c., OF *NONAGRIA SPARGANII*.

BY WILLIAM BUCKLER.

In the number for March last (vol. xv, p. 236) was announced the interesting fact of Mr. Sydney Webb having discovered and bred this species new to our fauna, it is therefore presumed that some further detailed account of its larval existence may be acceptable, now that it has again been found and bred in England.

Here I express my thanks to Mr. Sydney Webb for his kindness in not only supplying me with this larva, but also for details of its habits, which, by observation, I have been able to verify completely, for the purpose of the following description undertaken at his request.

It is, then, through the end of July to about the middle of August that these larvæ in various stages of growth are found within the lower compacted parts of the leaves of *Iris pseudacorus*; sometimes two in one plant, but oftener only one, where it will have the tender young central leaf, in the very heart of the plant to feed on; it often migrates however, not only from the leaves of one plant to another, but sometimes enters the culm or seeding stem, where, after feeding on the central pith down almost to the root, it retires to attack another plant; and, when about half grown, it frequently acquires a taste for *Sparaganium ramosum*, therein inhabiting the basal part of the trigonous leaf, or, as often happens, will enter the stem of *Typha angustifolia*; though, in whichever plant it happens to be when full-fed, there it remains, in a perpendicular position, and changes to a pupa.

When a larva gnaws a hole in a fresh plant of *Iris*, and enters therein, it throws out to some distance from the hole a quantity of pale

frass during the first day or two, according to the size of the larva, but afterwards allows much to accumulate within the mine, where, turning to a darker colour, this often shows through the leaves when they are seen against the light: but, when the stem is entered, the larva mines downwards, and ejects all frass from the mine, which throughout its length is of a diameter little more than that of the larva itself; there, a little below the entrance, the larva gnaws out a narrow and deep channel horizontally in the circumferent pith near to the outer cuticle, and another similar channel near the bottom of the mine.

In order to observe the natural habits of the larvæ, it was necessary to have a number of the plants, growing in pots with plenty of water, in the open air for them—but at length, when too late, I found my confidence had been misplaced in allowing the larvæ too complete freedom, for it resulted eventually in the escape of all but three. Notwithstanding this mishap, I was lucky enough to have one turn to a pupa on August 11th, and another on the 15th; the other larva in captivity was supplied continually with fresh-cut pieces of *Iris* standing in water, and fed well to the end of the month, but afterwards wandered about, refusing to make up for pupation, until it died, the very day on which the first pupa disclosed a fine example of the moth—at 4.35 p.m., September 10th.

The young larva, when no more than three-quarters of an inch long, is remarkably slender, very translucent and tender looking, of a pale watery greenish tint, with pale brownish head, and plate on the second and anal segments, having on the body four fine longitudinal stripes of light olive-brownish or greenish, the spaces between them being slightly paler than the pale belly. This design continues to be developed with an increase of colour and distinctness in proportion to growth; the substance of the larva, when it is about an inch and a quarter to an inch and a half long, is considerable, though still slender; the stripes stronger, brighter, and fuller green, yet somewhat of a transparent nature, for when folds of skin occur at the segmental divisions, as they do when the larva is not stretched to its full extent, the stripes on the folds appear darker and the pale interspaces paler.

The full-grown larva when extended is about one and seven-eighths to two inches long, and very slender, with all the legs fairly well developed, very cylindrical and uniform in substance throughout the body, the head is of a full roundish form, broadest in front, glossy and of a pale brown colour with still paler papillæ, the mouth darker brown, and ocelli black; the plate on the second segment and that on the anal flap are also pale brown and glossy; the ground colour of the back and sides

is light semi-transparent yellowish-green, that of the belly rather paler, the stripes of brighter and deeper green are situated one on each side of the back and one below on each side close to the spiracles, the width of the stripes being nearly equal to the spaces between them, the dorsal space is faintly of a deeper greenish, showing more or less the pulsating vessel; the spiracles narrowly ovate are light reddish outlined with black, the minute tubercular dusky dots are set within the green stripes, and though lightly ringed with the paler ground colour are inconspicuous, the legs furnished with brown hooks.

When nearly full-fed it becomes shorter and stouter, growing more and more translucent as the stripes become fainter, the dorsal vessel plainly pulsating, and delicate ramifications of the tracheal system appear through the skin.

The pupa is about seven-eighths of an inch in length, moderately stout, and nearly uniform in substance throughout, being much of a cylindrical shape, though the upper parts of the thorax and short wing-covers swell out a trifle more than the rest, and the head has a beak, or rather pointed frontal projection, and the longish abdomen slopes off beneath the end of the last segment to form an obtuse dorsal ridge with granulated surface, and having two minute blunt thorny projections wide apart, and a few minute bristles between them: the colour, at first pale whitish-green, changes gradually to brown, and, during four days, the head, thorax, and wing-covers become darkish mahogany-brown; the abdomen bright pale ochreous, and it so remains about twenty-three days, when a further change of a dark purplish-red comes uniformly over the entire surface, lasting four days more, and then the perfect insect comes forth; thus it will be seen the pupa state lasts about a month.

Emsworth : September 13th, 1879.

Further notes on Nonagria sparganii.—I and Mr. W. R. Jeffrey have personally made the acquaintance of the perfect insects of this species flying at large. We tried for them both by sugar and light, but got most by nothing; they fly early, from 6.30 p.m., for about an hour. Mr. Buckler has, I know, described the larvæ, &c. I will add, that although the pupæ generally lie head upwards, this is not universally so, for in about 4 per cent. of them the position is reversed. According to the observations of my friends, the moths emerge about 4.30 p.m., but I have bred five times as many, and with me they nearly always appeared between 8 and 9 p.m. We found a few larvæ in *Sparganium*.—SYDNEY WEBB, Redhill : Sept. 16th, 1879.

Eromene ocellea at Folkestone.—The 4th inst. yielded me a small male of *E. ocellea* in excellent condition. I found it at rest on a grass stem in the Warren, at Folkestone.—ID. : August 24th, 1879.

THE NATURAL HISTORY OF *EMMELESIAS AFFINITATA.*

BY WILLIAM BUCKLER.

For many years a number of friends tried to send me the long desired larva of *Emmelesia affinitata*, which I have been unable to meet with here, yet their several consignments of seed-eating Geometers invariably proved to be its more common congener *decolorata*, until Mr. C. G. Barrett turned his attention to this somewhat local species, and it is entirely owing to his very kind efforts, sustained for two or three seasons, that my desire has been accomplished.

Of this species Mr. Barrett first sent me four eggs in 1876, at beginning of July, but on that occasion, for want of the proper food-plant, the young larvae were not reared much beyond their second moult, on seeds of *Lychnis vespertina*, a substitute food; but in 1878, Mr. Barrett found, and sent me from Pembroke, two young larvae on July 27th, feeding in seed-capsules of *Lychnis diurna*, one unfortunately injured died next day, but was replaced by another on 2nd of August, and supplemented by two more on the 19th, together with needful supplies of the seed-capsules, followed by more.

The first moth was bred on July 14th, the last on 4th of August, 1879, both females, and at an earlier date many chalcids emerged.

The egg in shape is a broad oval, its surface ribbed and pitted; when first laid the colour is pale straw-yellow, on the fifth day it begins to look a little dirty, and hatches on the sixth.

The young larva is whitish, with black head and a blackish plate on the second segment; after a moult it becomes of a faint drab tint on the body; after the second moult it assumes a deeper tint of drab and has a darker dorsal line, the belly whitish, the head, the plate in front and plate behind, brownish-black. As it advances in growth it becomes more or less tinged with pinkish on the upper surface, showing decided lines, and of a pearly-whiteness below.

The full-grown larva, with reference to the size of the perfect insect is, like some others of this genus, very small, not more than about from three-eighths to half an inch in length, and from the form and restricted size of its dwelling within the seed-capsule, its natural hunch-backed looping posture tends apparently to dwarf its actual dimension, its figure is dumpy for a Geometer, of about equal substance as far as the tenth segment, from whence it tapers a little to the anal extremity, the head is a little less than the second segment, though of a broadish character, the segments of the body well divided and very plump, yet each having two or three wrinkles across the back, the spiracular region rather tumid: in colour the head is black or blackish-brown

and glossy, the lobes on the crown well-defined by the margin of pale skin from the blackish-brown shining plate on the second segment, another plate less dark occurs on the anal flap, and there are two remarkable additional horny plates situated one on the outer side of each anal leg; the rest of the body is without gloss, and of a light drab colour broadly tinged with pink down the back and sides, becoming a little paler on the belly, or a pinkish-fawn colour, or pinkish-brown, as individuals differ, and having a dorsal line and subdorsal lines of deeper pink, but interrupted at each segmental pale fold of skin; a pinkish lateral line runs a little above the spiracles, these are rather large in proportion and blackish-brown, the tubercular dots inconspicuous, though their positions are indicated each by a minute bristle, when seen through a lens.

A variety occurs of a pearly pinkish-grey ground colour, and another variety with rosy-pink melting gradually into reddish-fawn colour on the hinder segments, and having the anterior plate dark only at its hind margin, quite light brown in front with a fine paler dorsal dividing line.

The pupa is of a dumpy form, five-sixteenths of an inch long; the thorax very plump and rounded off to the moderately produced head, the wing-covers long and tumid, having their neuration in slight relief, from them the abdomen rapidly tapers in the female to rather a sharp point furnished with two minute bristles; in colour it is brownish-ochreous with darker brown divisions of the flexible segments of the abdomen, the surface glistening. It is generally enclosed in an earthen-covered silken cocoon attached to a small stone or other substance, though sometimes the cocoon is spun within the remains of a seed-capsule eaten out by the larva, where it becomes partly adherent to quantities of frass.

Emsworth : August 7th, 1879.

DESCRIPTION OF A NEW SPECIES OF *PHYLLOMACROMIA*
(*CORDULIINA*) FROM WEST AFRICA.

BY BARON E. DE SELYS-LONGCHAMPS.

Ph. contumax.

♂. Length of abdomen, 58 mm. Length of posterior wing, 47 mm.

Form of *Ph. trifasciata*, but much larger.

Wings slightly tinged, with a scarcely perceptible vestige of ochreous at the base; neuration black, costal nervure finely yellowish externally; pterostigma small, black (2½ mm. long), surmounting nearly 2 cellules; membranule large, blackish; 18—19 ante-cubital and 7—8 post-cubital nervules; 4 hypertrigonal nervules; a single row of post-trigonal cellules; 6—7 median nervules in the anterior-wings.

Steel-black. Labium and sides of labrum ferruginous. Rhinarium and nasus dark brown, and there is a shade of the same colour on the prothorax. Thorax bronzy blackish-brown, with an appearance as of a brown band encircling the sides.

Abdomen slender, dilated at the base and apex; the sides of segments 7—9 much dilated, and even forming, in the first half of the 8th, a small "leaf," finishing abruptly in an obtuse angle. Colour bronzy-blackish, with yellowish markings as follows:—a narrow basal ring on the 3rd segment; a half ring occupying the basal fourth of the 7th above; the under-side varied with yellowish, somewhat ferruginous, 10th segment short, broader than long, narrowly carinate, its posterior edge somewhat semicircular.

Appendages blackish-brown or ferruginous. The superior twice the length of the 10th segment, distant, straight, sub-cylindrical, somewhat fusiform, slightly turned outward and upward at the apex, which is acute; the base somewhat dilated above. Inferior one-third shorter, almost quadrate, the end truncated or somewhat concave, each side produced into a short process, which, seen in profile, is up-turned and almost hook-shaped; in its middle, seen from above, there is a longitudinal carina.

Legs slender, long, blackish; posterior femora 12 mm. long; the anterior femora slightly livid internally.

♀ unknown.

Hab.: Akele, West Africa. 1 ♂ in Mr. McLachlan's collection (the colours somewhat altered).

Differs from *Ph. trifasciata* (of Madagascar) by its much larger size, its expanse of wings equalling that of *Macromia Sophia* (De Selys), but the abdomen is much longer. Also separated from *trifasciata* by the absence of the yellow transverse band on the nasus, and by the thorax being without distinct pale bands. In addition, the 10th segment is not elevated into a point as in the African group of *M. Sophia*, to which the anal appendages of the ♂ of *contumax* show some resemblance.

Liége: May, 1879.

CHARACTERS OF NEW GENERA AND DESCRIPTIONS OF NEW SPECIES OF *GEODEPHAGA* FROM THE HAWAIIAN ISLANDS.

BY THE REV. T. BLACKBURN, B.A.

(Resumed from p. 158, vol. xv).

III.

I have retained for this paper the title borne by the previous papers of the series, although I do not now intend to propose any new generic names; but, nevertheless, the title will be justified by allusions to characters which must probably, sooner or later, form the basis of genera, and I shall have to dislodge from its present resting-place a species for which a new generic name will pretty certainly be required eventually. The novelties described below were all taken during February of this year, on the island Hawaii.

ANCIIOMENIDÆ.

ANCHOMENUS.

A. LUCIPETENS, sp. nov.

Rufus vel rufo-testaceus, plus minusve infuscatus (nonnullorum exemplorum capite nigro-brunneo); capite elongato pone oculos contracto; oculis magnis convexis; antennis corporis dimidio multo longioribus; prothorace brevi, fortiter transverso (nec subcordato), postice quam antice haud angustiori, canaliculato, postice utrinque foveolato, antice leviter emarginato, marginibus latis, angulis posticis subrotundatis; elytris elongatis, subparallelis, parum convexis, striatis, interstitiis planis, humeris fere (nec abrupte) quadratis; tarsorum omnium articulo quarto bipartito.

Long. 15 mm.

Oolaa, Hawaii. Elevation, 2000 feet. In vegetable refuse, also flying at night.

A. INCENDIARIUS, sp. nov.

Apterus, convexus, piceo-niger, antennis, palpis, pedibusque rufescentibus; capite magno; oculis prominulis; antennis corporis dimidio paulo longioribus; prothorace transverso, rotundato, canaliculato, antice vix angustato modice emarginato, basi utrinque foveolato, angulis posticis rotundatis; elytris elongato-ovalibus, striatis, interstutiis planiusculis, humeris rotundatis.

Long. 17—22 mm.

Kilauea (active volcano). A small series occurred to me under bark of a fallen tree, within half a mile of the mouth of the crater. Elevation, 4000 feet.

This species is pretty closely allied to *Sharpi* and *ruplicola*. *Sharpi* is easily distinguished from the other two by its being winged, as well as by its extremely parallel form, deep black colour, &c. *Incendiarius* differs from *ruplicola* by its much narrower and more elongate build, and by the form of its thorax which is scarcely narrower in front than at base, and only moderately emarginate in front, with rounded anterior angles,—whereas, in *ruplicola* the thorax is much contracted in front, where it is deeply emarginate, with strongly produced and sharp anterior angles. I observe in all my specimens of *Sharpi* and *incendiarius* a rather conspicuous impression (which is quite wanting in *ruplicola*) on the outer side of the abbreviated sutural stria, and close to the base of the elytra. All three have a few impressions on the 3rd interstice, in common with nearly all Hawaiian *Carabidæ*.

In the original description of *A. ruplicola* (E. M. M., vol. xv, p. 122, line 12), the word "leviter" should be omitted, as it conveys the opposite meaning to what I intended.

The two species of *Anchomenus* described above are both members

of what seems to me a very distinct section of the genus (even if it be allowed no higher value) possessing the following combination of characters :—

- I. Head and thorax diminutive as compared with the large area of elytra. (The species have a sluggish "heavy-behind" appearance.)
- II. Scutellum set very far forward, so that its apex very seldom protrudes much (sometimes not at all) behind the basal ridge of the elytra.
- III. Mesothoracic epimera divided by a sub-diagonal suture.

The series of species forming this section appear sub-divisible into four groups, as follows :—

- A. Character III (see above) not so strongly marked as I and II. Slenderly built species. Anterior and intermediate tarsi with the 4th joint delicately bilobed, —hind tarsi with same only emarginate. Facies resembles *Dromius*. Only one species known to me—*Tantalus*—(I described it as a *Dyscolus*, where it must stand if the tarsal distinction between *Anchomenus* and *Dyscolus* be maintained).
- B. Same characters as the preceding, save that the species are very markedly more robust in build, and the 4th joint of all the tarsi alike is broadly bilobed. Two species known to me—*mysticus* and *lucipetens*.
- C. Character II not quite reliable. Character III very strongly defined. Species very robust. All the tarsi have 4th joint widely and conspicuously emarginate, but not bilobed. Facets of the eyes feebler than in average *Anchomenus*. Facies resembles *Pristonychus* (though I think there is no real affinity nearer than through *Anchomenus*). I know three species, occurring only on the highest mountains—*Sharpi*, *ruplicola*, and *incendiarius*.
- D. *Blackburnia*, Sharp. The extreme form of this series. Here the scutellum almost vanishes beneath the thorax, and the mesothoracic epimera become exaggeratedly bembidiiform. This genus is perfectly distinct from the groups A, B, and C, but they undoubtedly (I think) stand between typical *Anchomenus* and it. *B. insignis*, Sh., and *blaptoides*, mihi, are the only species I have yet met with, as recent investigations have led me to the conclusion that the singular insect described by me (E. M. M., vol. xv, p. 157) as *frigidus* and doubtfully (E. M. M., vol. xv, p. 120) referred to *Blackburnia*, does not belong to this series at all, but branches off from *Anchomenus* quite differently; concerning it and its allies, I hope to have more to say hereafter.

CYCLOTHORAX.

I have never seen a statement of the characters of this genus, nor can I ascertain any such to have been published. My acquaintance with the genus is founded on the possession of types of *C. insularis*, Mots. (named, I believe, by Mr. Bates), and the assignment to it by Dr. Sharp of the Hawaiian *C. brevis*. An examination of these two insects, however, and of the species of *Cyclothorax* since collected by me, leads me to the conclusion that *Cyclothorax* is satisfactorily dis-

tinguished from *Anchomenus* by the form of the prosternal projection, which in *Anchomenus* passes with an even unbroken surface between the anterior coxae, and is bent down behind them; whereas in *Cyclo-thorax* its surface is uneven, so as to give it the appearance of terminating between the anterior coxae in a sharpened point received into the emargination of a process bent forwards from behind the coxae. In this respect it agrees with *Olisthopus* (so far as I have had opportunities of examining that genus), to which it must be very close if the absence of a tooth from the mentum cannot be considered a constant character of *Olisthopus*.

C. PELE, sp. nov.

Convexus, nitidus, piceo-niger, marginibus suturâque plus minusve rufescentibus, antennis, palpis, pedibusque testaceis; capite mediocri; oculis prominulis; antennis corporis dimidio brevioribus; prothorace fortius transverso rotundatoque, leviter canaliculato antice haud emarginato, trans basin punctato, angulis posticis obtusis; elytris elongato-ovalibus, fortiter striatis, striis (marginem apicemque versus obsoletis) confertim fortiterque punctatis, interstitiis subconvexis, humeris rotundatis.

Long. 6—7 mm.

Kilauea, Hawaii, near the mouth of the crater. I have named this species in honour of the goddess whom Hawaiian mythology supposed to inhabit the volcano.

Allied structurally to *C. montiragus* and *micans*, from both of which it differs in its narrow elongate build and much greater convexity, also by the non-dentiform hinder angles and the absolutely truncate front margin of the thorax, the less prominent shoulders, &c. From the former it departs also by the narrow margin of the thorax.

The form of thorax which I have characterized in the diagnoses as having the basal angles "minute and subdentiform" is extremely difficult to describe successfully. The lateral margin of the thorax is very strongly rounded, but within almost a hair's breadth of the base suddenly becomes a right line more or less exactly at right angles to the base, and consequently forming a minute sharp angle with the base, having almost the appearance of a small tooth projecting from the apex of an excessively obtuse angle.

C. BEMBIDIODES, sp. nov.

Convexus, nitidus, ater, palpis antennarum basi pedibusque rufescentibus; capite mediocri; oculis parum convexis; antennis corporis dimidio longitudine aequalibus; prothorace angusto, leviter transverso, fortiter rotundato, postice fortiter angustato (nec subcordato), canaliculato, antice vix emarginato, antice et trans basin parce punctato, marginibus sat latis, angulis posticis rotundatis; elytris ovalibus, absolute glabris (striâ suturali et marginali exceptis); humeris haud prominulis.

Long. 4½ mm.

Mauna Loa, Hawaii. Elevation about 4000 feet. One specimen, under a stone. This is not closely allied to any other species I have met with. I think its place in the genus is not far from *Pele*.

C. PARADOXUS, *sp. nov.*

Convexus, nitidus, rufus plus minusve infuscatus (antennis apicem versus piceis); capite mediocri; oculis minus prominulis; antennis corporis dimidio longitudine aequalibus; prothorace fortiter transverso rotundatoque, postice parum angustato, canaliculato, antice vix emarginato, trans basin obscure punctato, basi utrinque foveolato, marginibus sat latis, angulis posticis obtusis; elytris oblongo-ovalis, striis suturali et marginali distinctis integris antice distincte punctatis, striis cæteris obscure adumbratis, angulis humeralibus rotundato-rectis. Long. 6 mm.

Mauna Kea, Hawaii. Under bark of a tree. Elevation, 3000 feet. The relationship of this is I think with *bembidioides*, though not very closely. Its superior size and differently shaped thorax at once distinguish it. My one specimen may not quite have reached full maturity in colour.

C. DEVERILLI, *sp. nov.*

Convexus, nitidus, nigro-æneus ad viridem accedens, marginibus rufescensibus, antennarum palporumque basi et pedibus testaceis; capite mediocri; oculis prominulis; antennis corporis dimidio brevioribus; prothorace leviter transverso, subcordato, canaliculato, antice vix emarginato, trans basin sparsim punctato, angulis posticis acute rectis; elytris subovalibus, antice angustatis, pone medium latioribus, subglabris (nonnullis punctorum seriebus obscure adumbratis), humeris rotundatis. Long. 5½—6½ mm.

Various localities on Hawaii, generally under bark of trees, at an elevation of about 3000 feet.

This species singularly resembles, in general appearance, *Miscodera aretica*. It is allied, I think, to *C. cordaticollis*, from which, however, its superior size, elytra narrower in front, broadest behind the middle, with strongly rounded sides, &c., readily distinguish it. I have named it in compliment to my friend, W. E. H. Deverill, Esq., to whom I am indebted for the first specimen I obtained, which he took while collecting in my company, and presented to me.

C. VULCANUS, *sp. nov.*

Subconvexus, nitidus, piceus, marginibus rufescensibus, antennarum basi, palpis, pedibusque testaceis; capite mediocri; oculis prominulis; antennis corporis dimidio brevioribus; prothorace transverso, subcordato, leviter canaliculato, antice leviter emarginato, trans basin rugato punctatoque, angulis posticis acute rectis; elytris elongato-ovalibus, punctato striatis (plus fortiter minusve), striis marginem apicemque versus obsoletis, humeris parum prominulis. Long. 4¾—5½ mm.

A small series occurred to me under bark, on Mauna Loa, Hawaii, not far from the mouth of the crater known as Kilauea. If I am right

in regarding them as being all the same species, that species has the unusual character of extreme variableness in the striation of the elytra, which in some specimens are absolutely *strongly punctate-striate*, while in others (the majority, strange to say) the striation is all but entirely effaced. I cannot, however, detect the slightest character apart from this on which to found a specific separation.

This species is rather closely allied to *corduticollis*, but differs by its more elongate and less convex build, the thorax less transverse with sides less strongly rounded, and almost total absence of basal foveæ, and the elytra quite strongly narrowed in front, with their striæ always distinctly (in proportion to the distinctness of the striæ) punctured to behind the middle. From *angusticollis* it differs by its subcordate thorax, from *nubicola* by its much less parallel build, &c., from *Deverilli* by its much less convexity.

BEMBIDIIDÆ.

BEMBIDIUM (LOPHA).

B. IGNICOLA, sp. nov.

Subconvexum, nigrum, antennarum basi et pedibus rufescentibus; capite mediocri; oculis fortiter convexis; prothorace transverso, subcordato, obsolete canaliculato, antice haud emarginato, trans basin obsolete punctato, angulis posticis rectis; elytris elongato-ovalibus, profunde punctato-striatis, striis apicem versus obsoletis, humeris rotundatis.

Long. 3½ mm.

One specimen, in a steam crack beside the crater Kilauea, Hawaii, where I almost burned my fingers in securing it.

Allied to *B. pacificum*, mihi. Apart from difference of colour and size, *ignicola* is a narrower insect, with the thorax very much less contracted behind. Both the Hawaiian differ from the European species of *Lopha* in the extremely deep sculpture of their elytra, the punctate striæ of which hardly become fainter laterally, but only towards the apex.

N.B.—I have now described (all in the E. M. M.) forty-nine Hawaiian species of *Geodephaga*—a large proportion I think for a small isolated group of islands.

Honolulu : 1879.

Chærocampa celerio at Banff.—I have had forwarded me by Col. F. Garden Campbell, of Troup, Banff, N.B., a specimen of the rare *Chærocampa celerio* in fairly good condition, caught by himself at Troup, on the 3rd inst. It was not quite dead when I received it.—H. W. WILSON, Leigham Lodge, Leigham Court Rd., Streatham Hill : September 6th, 1879.

Procris Geryon in North Wales.—On the 10th July last, when collecting *Melanippe tristata* and other insects on the mountains, a few miles to the north-east of Barmouth, Merionethshire, I caught a worn specimen of *Procris Geryon* at an elevation of upwards of 1000 feet. As I believe this species has not previously been observed in North Wales, its capture may, possibly, be worth recording.—H. GOSS, Surbiton Hill: September, 1879.

Nonagria fulva bred.—Last summer, while searching for the larvæ of *Elachista monticola* in stems of *Carex paludosa* (?), I came across a larva, mining in the same stems, which might have been a *Tortrix*, a young *Noctua*, or anything else, almost. About half an inch long, when I found it; thickish in the middle, and tapering down to head and tail; of a brownish-white colour with brown lines. It died young, I believe; as all my energies were directed at that time to the breeding of the *Elachista*, I paid no attention to anything else. This season I again met with the larva, under the same circumstances; and my attention having been directed (by my friend, Mr. Gardner, of Hartlepool) earlier in the season to the fact that the larva of *N. fulva* was still quite unknown to Mr. Buckler, I took special pains with it, thinking that it might prove to be the one wanted. Some time afterwards, when again searching for the *Elachista* larvæ, I found an unmistakeable *Nonagria* pupa changed in the *Carex* stem where the larva had last fed. This I put among dry leaves, &c. The larva I had in the meantime had also pupated, as I found when cutting up the stems which I had at home in the deep sand. This I took out, with the part of the stem containing the puparium, and put into a lamp-glass tube. Some fortnight after, I was delighted with the sight of a beautiful male *N. fulva*, and a few days after the other pupa also produced one. Thus again, accident has been the means of discovering one of Mr. Buckler's few remaining wants. The only wonder is, that it should not have been found long ago. Mr. WARREN, of Cambridge, has, I believe, also had the larva, but has not bred it.—J. SANG, Darlington: September, 1879.

Bryophila glandifera (var. *par*?).—This season I have taken eight more of this variety of *B. glandifera*—but none of the typical *glandifera*. The variety (?) has, in all cases, a dark line at the base of the cilia, which is wanting in the normal *glandifera*.—W. WARREN, 51, Bridge Street, Cambridge: September 15th, 1879.

Captures of Lepidoptera.—*Acronycta alni*. I was fortunate enough to capture an exceedingly fine male specimen of this species at sugar, in a wood near Salisbury, on June 5th.

Calligenia miniata, var. On August 2nd, in Jones's enclosure at Lyndhurst, I captured at sugar a remarkable variety of this species which, instead of being the usual red colour, is a bright lemon-yellow. There had been quantities of the same moth taken in the same place previously, but none of the collectors had ever seen such a variety before.—HENRY NEALE, 45, Canal, Salisbury: August 21st, 1879.

Irruption of Plusia gamma in Perthshire.—From letters in the "Times," I see that in various parts of the Continent quite an unusual visitation of *P. gamma* has taken place. I think it worth recording that here, at Pitlochry, we have had this

moth in unusual quantities. On the 8th or 9th of June, I noticed a few which were disturbed from the grass whilst beating for *Hemiptera*. After this date, for about a week, the moths swarmed to an extent I never witnessed before, flying up in numbers from the herbage on every shake of the net.—GEO. NORMAN, Pitlochry: 3rd September, 1879.

Eupithecia innotata on the Lincolnshire coast—Whilst staying at Skegness, during the latter half of July last, I took, right on the sandhills, two specimens of an *Eupithecia*, which at the time I suspected was *innotata*, and after my return home I satisfied myself was that insect. For fuller confirmation, however, I submitted one of the specimens to the Rev. H. Harpur Crewe, who quite agrees with my determination of the species. In general appearance it much resembles *fraxinata* in markings and shape, but is altogether a bigger moth than it. Judging from a figure of the larva of *innotata*, which Mr. Crewe has sent me for examination, drawn from a continental specimen, it is a very different creature from that of *fraxinata*. On the continent, *innotata* feeds on *Artemisia campestre*, and on our own coast it must, of course, be a low plant feeder, there being no trees of any kind on the sandhills on which I took these specimens.—GEO. T. PORRITT, Highroyd House, Huddersfield: September 9th, 1879.

Occurrence of *Gelechia lathyri*, hitherto only known as a fen insect, in Glen Tilt, Perthshire.—In a box of *Lepidoptera* sent to me for determination by the late Sir Thomas Moncrieffe, I found a specimen of *Gelechia lathyri*, placed in a row which were reputed to be all from Glen Tilt. I was rather surprised to see it from such a new locality, and enquired very particularly whether there was no mistake as to its being placed among Glen Tilt specimens.

Sir Thomas Moncrieffe's reply (the last letter I had from him) seems quite conclusive on the matter, so that *G. lathyri* must now be added to the list of Perthshire insects. "I am very much interested in the capture of a fen insect on the face of "Glen Tilt. There is no mistake in the locality; I know the exact spot where I "captured it, and I noticed several other specimens, but unfortunately at the "time I was rather lazy and only kept one. I had my little boy with me, and there "was a prospect of heavy rain, and I was anxious to get him home."

"It was by no means a very damp spot, about 1100 feet above the sea level. I "trust if all is well to hit upon it again next season. After I placed it on the board, "and before I settled the braces, I was struck with its appearance, and noted it "thus—!?. I intended to return and procure more, but wind and rain prevented "me, particularly as I had taken the two *Tortrices* [allied to *orobana*], and a speci- "men of *decrepitalis* in a diametrically opposite direction at a distance of about "four miles."—MONCRIEFFE HOUSE, Bridge of Earn: August 7th, 1879.

The date of the capture is not given, but the period of Sir Thomas Moncrieffe's stay in Glen Tilt this summer was the last fortnight of June and first week of July.—H. T. STANTON, Mountsfield, Lewisham: September 16th, 1879.

Further notes on *Gelechia gerronella*, Z.—A year ago I thought we knew something of the larval habits of this species, owing to two specimens having been reared from pieces of *Ulex*, which Mr. Machin had collected at Wanstead, as containing

webs of *Butalis grandipennis*, but, as I have since found that the insect occurs far away from any *Ulex*, we are driven to the conclusion that though Mr. Machin's specimens may have spun up on that plant, they had not fed on it : the food, therefore, of the larva of *Gelechia gerronella* yet remains to be ascertained.

On August 10th this year, I was startled by a keen-eyed entomologist, who was with me, pointing out a specimen of *Gelechia gerronella* sitting on a hawthorn-leaf, on the hedge (well known to most entomologists) which borders the drive here.

"Seeing is believing"—but as there was no *Ulex* and no broom anywhere near, I still felt utterly incredulous. The insect was, however, duly boxed and proved to be, what it had seemed to be, *Gelechia gerronella*.

I should have supposed it was an accidental specimen, which by some inexplicable means had got transported to the spot, and I certainly never for one moment dreamt of meeting with another in the same locality, but on August 12th, in the same hawthorn hedge, I saw two other specimens, one of which I secured ; and on August 14th I saw two more, and again secured one of them.

Being thus fairly at sea as to the food-plant of *G. gerronella*, I wrote to Mr. Machin to enquire if he had bred any more of the insect : from him I learnt that though he had collected a quantity of the webs containing larvae of *Butalis grandipennis*, he had not again bred any *G. gerronella*, though he had taken many specimens of the imago in fair condition, but from four to five weeks later than they were last year. He also mentioned that he found in his diary a notice of the capture of some specimens in the forest at Fair Mead Bottom far removed from any furze or broom, and that from this notice, and his want of success in rearing the insect this season, he could only conclude that it was not a furze-feeder.

This summer I did not go to Tunbridge Wells till August 19th, and, therefore, I was too late for decent specimens of *G. gerronella*, which sat as before on the furze-bushes and occasionally on fern-leaves, but, as *Gelechia rufescens* was also to be seen sitting on the furze-bushes, that was a good intimation not to lay too much stress on the apparent fondness of *G. gerronella* for furze : indeed, the idea floated through my mind more than once—may not the larva of *G. gerronella* be a grass-feeder, like that of *G. rufescens*? *Gelechia atrella*, which is known to feed on *Hypericum*, also seems to frequent the furze-bushes ; so that one might be disposed to suspect any of the low plants growing in the shelter of the furze-bushes, only that the question will arise—which of these same low plants grows also here with me, near the hawthorn hedge, on which the specimens of *Gelechia gerronella* occurred?

The problem is any way rather perplexing, and there is still something to be found out.—ID.

Larva of Depressaria rotundella, Dougl.—Mr. Sang, during a recent visit to Folkestone, had the pleasure of discovering the larva of this insect, which had been erroneously considered to occur on *Echium vulgare*. Mr. Sang found them feeding on the leaves of *Daucus carota* on August 4th. Mr. Sang says that these larvae had the head and thoracic shield black (this coloration being retained throughout their growth) ; the colour and stripes as in *D. applana*, only rather yellower.—ID. : September 13th, 1879.

Larvæ of Coleophora apicella, Stain.—When at Tunbridge Wells I collected, in

the first week in September, many larvæ of this species feeding on the seeds of *Stellaria graminea*. I only found it on a few plants, which grew well sheltered amongst the furze-bushes. On some *Stellaria* plants, which were equally well protected, not a single *Coleophora* larva was to be seen.—ID.

Larva of Coleophora deauratella in Cambridgeshire.—For the last two years I had sought in vain for the larva of this insect in a spot where the imago was plentiful, though local, and now I have at last succeeded in finding what is, I have no doubt, the larva of *C. deauratella*. The larvæ feed inside a floret of the red clover, using the simple floret at first for a case, and afterwards shortening it down to a stumpy-looking case, somewhat like that of *C. paripennella*; the larvæ are very active, brownish-yellow in colour, with two large dark spots on the upper part of the 2nd and 3rd segments, and two smaller spots on the 4th: there are also dark lateral spots on the same segments. The larvæ and the cases are both smaller than one would expect from the size of the imago.—W. WARREN, 51, Bridge Street, Cambridge: *September 15th, 1879.*

“*Beetles inhabiting hot water.*”—In the Ent. Mo. Mag., p. 91, *ante*, is the record of an interesting fact under the above title. M. Tournier’s observations may be supplemented by those of Sir Joseph Hooker, as detailed in his “Himalayan Journals,” vol. i, p. 25 (new edit., 1855). In the hot springs (called Soorukkoond) near Belcuppee, “a water-beetle abounded in water at 112°, with quantities of dead shells, at 90° frogs were very lively, with live shells, and various water-beetles.”—W. L. DISTANT, 1, Selston Villas, Derwent Grove, East Dulwich, S.E.: *August 31st, 1879.*

[In Hagen’s “Bibliotheca Entomologica,” i, 383, under the name of “E. J. Hornung,” is the following: “*Hydroporus thermalis*, n. sp., aus den heissen Quellen der Euganeen. Bericht d. naturw. Ver. d. Hartz, 1840–41, p. 12;” but this book is not accessible to me so as to get further particulars. This is the only reference Hagen gives for insects living in hot water, but I am informed there are a few other records, yet probably like that of Sir Joseph Hooker, not in entomological works, and therefore not generally known to entomologists; at any rate no references are given to me.—J. W. D.]

Note on a new species of Ceratorrhina from the West Coast of Africa.—Mr. Rutherford, in the hurry of his departure for Africa, has figured as *C. 4-maculata* in the Trans. Ent. Soc., 1879, pl. 1, a species hitherto uncharacterised. It is allied to that species, but differs in many essential points: chiefly in the armature of the head, which the figures referred to faithfully represent. Further, there is the difference in the punctuation of the thorax; in comparing the males in the present species the punctures are somewhat larger, and the rugosity at the sides more evident. On the elytra there are fine punctures, which assume the form of striae, both the humeral and apical spot are clear and distinct, and the general outline of the species more quadrate. The male of *C. 4-maculata* is at present unknown, the female has the pygidium red, and I think this character will be found to exist in both sexes. Bearing this in mind, I propose the name of *viridipygus* for the present species,

although I think *C. 4-maculata* will come in the *aurata* and *gemina* group. I hope, before long, either to write, or see written, a description of the female.—GEORGE LEWIS, Putney: 13th September, 1879.

Hemiptera near Norwich.—*Chilacis typhae*: I recently commissioned a friend to bring me some heads of *Typha latifolia* from the pit at Swanton Morley, where I swept up an example of this species last year, and in an old head of last year which had assumed the floccose condition, I found several defunct specimens. *Derephysia foliacea*: I beat a specimen of this species from ash yesterday. *Heterocordylus unicolor*: I took three worn examples off *Genista tinctoria* at Wacton on the 4th instant. *Loxops coccineus*: this species, for which I have been on the look out for several years, I took off ash-trees yesterday; I could not get more than two examples from any one tree, and it was decidedly a case of no “keys” no bugs. *Typhlocyba jucunda*: this species occurs sparingly on alders just now in two or three places in the Norwich district. I have also met with the following: *Eupteryx Germari*, in two localities, on Scotch firs which have evidently been planted. *Psylla pruni*, on blackthorn, immature late in August (I have one mature ♀ from fir in March). *Psylla visci*, the spring brood, larvæ, pupæ and perfect insects on mistletoe, 25th June; and *Trioza hæmatodes* off *Salix alba* September 16th.—JAMES EDWARDS, Bracondale, Norwich: September 19th, 1879.

Dr. J. Spångberg's works on Hemiptera.—I have recently received from Dr. Jacob Spångberg, of Upsala, two excellent monographic memoirs, of which he is the author, and which are devoted to the insects comprised in two genera of Homopterous-Hemiptera. The first is entitled, “Species Gyponæ generis Homopterorum” (*Bihang till Svenska Vet. Akad. Handl. Band, v, No. 3, 1878*), in which 96 species are critically arranged and described, many for the first time. The second, “Species Jassi generis Homopterorum” (*Öfv. Kongl. Vet. Akad. Förhandl., 1878*), deals with 51 species in the same manner. An examination of these memoirs exhibits a method and thoroughness of work which will be appreciated by all who have to consult the same. Unfortunately, but perhaps, inevitably, the work of the late Mr. Walker has been ignored. British entomologists who know the risk and difficulty of identifying insects from Mr. Walker's descriptions without examining the types in the British Museum, can well realize that the writings of that author must be sealed to continental workers; but whilst the descriptions and types remain in existence, the names will always stand in nomenclature, at least in this country, and their resurrection from time to time will add to the difficulty of synonymy abroad. To insular prejudices it is not gratifying to see such good work being done on the continent, and the catalogues of our National Museum, for such valid reasons, rejected and ignored.—W. L. DISTANT, 1, Selston Villas, East Dulwich: 9th September, 1879.

Description of the ♀ of Trioza atriplicis, Lichtenstein.—I am enabled to give a description of this sex of the insect through the kindness of M. J. Lichtenstein, who forwarded to me the three larvæ which he mentions at page 84, *ante*, as having found after opening about 100 leaves of *Atriplex patula*. Two were dead on their arrival, but the third, although in a weakly state through want of food, the portion of the plant sent with them having dried up, soon recovered on being placed on some fresh leaves which I gathered for it. It remained very nearly on the same spot

during the remainder of its larval condition, and when in the nymph state. This last stage is but of short duration, not exceeding thirty-six to forty-eight hours. I last saw it as a larva on the morning of the 8th July, and on the 10th of the same month it had assumed the perfect form.

Head very pale yellow; *Face-lobes* projecting considerably forward, apex narrowly black, and with a few longish pale hairs. *Eyes* purplish. *Antennæ* as in the ♂. *Thorax*—*pro-* and *mesonotum* very pale yellow, side margins of the latter narrowly fuscous. *Elytra* and *legs* as in the ♂.

Abdomen clear pale bright green, upper margin longitudinally very convex: *genitalia* clear pale bright green, genital segment stumpy, anterior margin about equal to the length, upper plate broad, brownish towards the apex which is black, lower plate narrow, pale greenish-yellow, apex black. Length, barely $1\frac{1}{4}$ line.

As there are several species of *Atriplex* in this country, and amongst them *A. angustifolia*, which Babington seems to think is identical with *A. patula*, and says is common, it is not improbable that by searching *T. atriplicis* may be found here.—JOHN SCOTT, 1, St. Mildred's Terrace, Bromley Road, Lee, S.E.: 16th August, 1879.

Popular Entomology.—“I send you a specimen of the grape-pest, called *Phylloxera*, which I found in a bunch of grapes lately imported. I at first thought it to be a Colorado beetle, and although I am informed it is not, still it resembles the potato-pest very much. The animal is alive, and may interest you, and I should be glad to hear what you think of it.”—W. G.

“Very like a whale!” The insect sent to me was the not uncommon British Hemipterous *Eurygaster maurus*! The correspondent, who being eventually satisfied that his capture was not a Colorado-beetle, yet has no doubt it is a *Phylloxera* of the grape-vine, is a too common example of the utter ignorance of natural objects prevalent among otherwise intelligent persons, even when the names of the objects are “familiar in their mouths as household words.”—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham: 6th September, 1879.

Notes on some garden-insects in 1879.—During this exceptionally wet, cold, and sunless year, in which there has been neither spring nor summer weather, I have had no opportunity of making observations except in my garden, and then often by the aid of an umbrella *not* inverted, yet it may be worth while to publish a note of some of the concomitants of the climatal eccentricities:—

Abraxas grossulariata.—The hibernating pupæ, of which I had a note in vol. xv, p. 205, were swept away by the storms of later date, and I know not, therefore, if moths would have been developed at all or earlier than usual from them or from others similarly conditioned, but surviving;—it was an inauspicious time for the aspiring experiment. At any rate, I saw no moths until July and August, and these, as far as I know, had proceeded from the ordinarily-hibernated larvæ which had escaped from the attack I made upon the brood that appeared in April in great abundance, notwithstanding the raid I had made on their race last autumn. The moths, I am glad to say, were few, the small number being due, I trust, to my persistent enmity, and it is to be hoped that for their own sake their progeny will also be few, for there is very little for them to eat.

Nematus ribesii has blasted any hopes I might have had arising from the lessened numbers of the currant-moths, as well as injured the prospects of any caterpillars thereof that may be forthcoming, for the larvæ of this saw-fly have defoliated the gooseberry- and red and white currant-bushes, leaving the black currants untouched. I hear that this pest is widely prevalent. The natural history of the *Nematus* is given by "Rusticus,"* in his usual graphic manner, under the head of "Gooseberry-grub," and he writes that in the year of which he speaks the damage done by it was unprecedented. The only cures he mentions are smoke, picking off the leaves while the larvæ are infants, and treading the earth firmly round the bushes when (but not before) the larvæ that have fed-up have descended into the ground to become pupæ, the emergence of the imago being then prevented by the hardening of the surface.

Sitones lineatus.—Last year the peas were infested with the larvæ of this weevil, and there were also a good many of the beetles; this year the crop of peas was more abundant, and yet scarcely a larva or beetle has been seen. I have reason to think this immunity is exceptional.

Plusia gamma.—Never a rare moth, this has been unusually abundant this year; at dusk the flowers of *Stachys lanata* often had six moths at a time flying and feeding at a spike, and the same with the everlasting-peas. These two, of all the flowers in the garden, were the favourites. From all sides, all through Europe as well as Britain, we hear of countless swarms of these moths this year, and of the serious damage to many vegetables done by the larvæ. I can testify that these are omnivorous, having found them on all kinds of plants.

Zenzena aesculi.—The larvæ are not uncommon here in the stems of lilac, the moth appearing early in July; but this year I found a male just out on the 10th August, he also making experience that the times are out of joint.

Gelechia nanella appeared at the proper time, in July, on the stem of the apple-tree on which I usually find them. I saw no pupa-skins sticking out of the bark, as last year (see vol. xv, p. 207), so if the pupæ of these moths had hibernated, they had done so elsewhere than on the trunk of this tree, and if their larvæ had fed in May last, they did not eat the flowers, for there were none on this or any other of my apple trees.

Colias Edusa.—I saw one fly along the railway-bank next the garden on the afternoon of 31st August, the only example I have seen this year.—ID.: 8th September, 1879.

On Microgaster dilutus, Ratz., and Paecilosoma longicorne, Thoms.—Several correspondents have forwarded to me cocoons and insects of the *Microgaster* parasitic on *Liparis auriflua*, so that perhaps a description may not appear out of place.

Microgaster dilutus, Ratz. (male).—Black. Long., $1\frac{1}{4}$ line; Expans. alæ, $3\frac{1}{4}$ lines. Antennæ: long., $1\frac{1}{2}$ line; joints, 1—6 tawny-yellow, with apices and remaining joints black. Wings with distinct stigma. Mandibles sickly-yellow. Anterior legs and under-side of abdomen yellow, inclined at times to rufous. Posterior legs rufous-yellow; apical segments and tarsi black. Abdomen black, dusky towards thorax. The imago is very variable.

I was fortunate in capturing an insect named for me by Dr. Vollenhoven as

* "The Letters of Rusticus," p. 56.

Pœilosoma longicorne, Thoms., which, if it proves to be the same, would be new to Britain, and rare in Europe. I have given it to Mr. W. D. Roebuck, of Leeds, who reports on the group for Yorkshire, and he will doubtless take the matter in hand, and inform upon it shortly. I captured it flitting about a tree of boxwood in the garden adjoining the house.—S. D. BAIRSTOW, Woodland Mount, Huddersfield : 1st September, 1879.

Reviews.

TRANSACTIONS OF THE NORFOLK AND NORWICH NATURALISTS' SOCIETY, vol. ii, part v. 1879.

The entomological interest of this Part (which concludes vol. ii of the Transactions) is centred in a continuation of the "Fauna and Flora of Norfolk, part ix; *Hymenoptera—Chrysidae and Aculeata*," by Mr. J. B. Bridgman, one of the Vice-Presidents. This list is worked out in the same complete manner as was Mr. Barrett's contribution to the same "Fauna," noticed at p. 43, vol. xi, of this Magazine, and we could not accord it higher praise than by so saying. Norfolk is evidently rich in Aculeates. Mr. Bridgman records 12 species of *Chrysidae*, 11 *Heterogyna* (9 ants and 2 *Mutillidae*), 74 *Fossores*, 16 *Diploptera*, and 133 bees; and believes the number might be much increased if observers were sufficiently spread over the county. By what was probably a mistake of the printer the value of the sub-divisions is in a few instances not very clearly indicated, through wrong type having been apparently used. Norwich (and the county of which it is the capital) is happy in possessing as energetic and intelligent a body of Naturalists as can be found in any provincial city or town of the same importance, as the Transactions of its Natural History Society sufficiently prove. The other papers in the Part before us are chiefly ornithological, but of interest to all Naturalists, not the least so being an historical and categorical sketch of the duck-decoys of the county. There is also a memoir of Samuel Woodward, the founder of the family of scientific men of that name, and who, as is well known, was a Norwich citizen. Also a highly instructive and painstaking address from the President, Mr. F. W. Harmer, F.G.S. We wish the Society all success.

JOURNAL OF THE ROYAL MICROSCOPICAL SOCIETY. London and Edinburgh : Williamis and Norgate.

The publications of this old-established scientific Society need no praise from us ; yet we cannot refrain from noticing the vast improvement in the Journal in its present form, and which we are probably not far wrong in believing to be due to the great energy of Mr. Frank Crisp, LL.B., B.A., F.L.S., one of the working Secretaries. It now forms a complete repertory of everything connected with Microscopy, each part (in addition to the ordinary publication of papers read before the Society) being crammed with paragraphs abridged from publications all over the world, and on every imaginable subject ; and the most complete bibliography we have ever seen published in the Journal of a scientific Society. We think also that we notice indications of a desire to discourage the making use of the Society by rival opticians for advertising purposes (excepting in the proper place on the cover). Most of the best microscopic work has been done with the simplest instruments ; it is only the thorough-going amateur who turns the microscope into a toy, and spends a small fortune in expensive

apparatus, with no appreciable result to science, and, in the long run, with but little satisfaction to himself. We wish particularly to call attention to a remarkable paper styled "A contribution to the knowledge of British *Orobatiidae*" (a Family of Mites), by A. D. Michael (with the assistance of C. F. George), which appears to us as one of the most valuable publications on *Acaris* that have ever appeared in this country, illustrated by beautiful plates from Mr. Michael's drawings. It is published in vol. ii, No. 3 (May, 1879), and we hope will be followed by others on other Families.

Obituary.

Sir Thomas Moncreiffe, Bart., died on the 16th August, after a short illness at his residence—Moncreiffe House, Bridge of Earn. Born January 9th, 1822, he succeeded to the Baronetcy on the death of his father in 1830, and was, if we mistake not, educated at Harrow. In 1839 he entered the Army, from which he retired in 1842. In the following year he married Lady Louisa Hay, daughter of the Earl of Kinnoul, by whom he had a family of eight sons and eight daughters.

Sir Thomas was a keen sportsman, and for many years was the best shot in Perthshire. He was also, in his younger days, a skilful cricketer, &c.

Though always possessed of a love of natural history, it is little more than ten years ago that he first turned his attention to entomology, and I think we may search in vain for another instance of one first becoming an entomologist in his forty-eighth year, who thenceforward pursued the study with such eager interest to the close of his career.

It has been well said of him that "he had all the enthusiasm of the true lover of Nature, and the keen inevitable eye of the born observer; nothing escaped his notice, and, had he cared to chronicle all he knew of his favourite studies, he would have added very considerably to our knowledge of natural history. But he never made any pretensions himself to be a scientific man, and characteristically undervalued his attainments."

I can confirm this innate modesty, as in one of his letters he begins—"Many thanks for yours, I do not wish to make any remarks on your decision" [as to the name of some insects] "as I know you must be right."

To the pages of the "Scottish Naturalist" he contributed a valuable series of papers on the *Lepidoptera* of Moncreiffe Hill—no less than 603 species are there recorded as having been captured in the space of a square mile at Moncreiffe—this is enriched with many interesting remarks and observations, all written in a peculiarly genial style.

Of the repeated exertions made by Sir Thomas Moncreiffe to solve the mystery of the habits of *Gelechia humeralis* I have a lively recollection, he having actually sent me, in February, 1877, a series of living specimens of the insect, captured whilst flying amongst conifers in his garden, in the hopes that I might succeed in obtaining ova from them. The idea of receiving living *Micro-Lepidoptera* from *Perthshire* in February was to me quite novel.

For several years Sir Thomas Moncreiffe was President of the Perthshire Society of Natural Science, and in that capacity he first ventilated the idea of providing a new Public Museum worthy of the city of Perth. "With characteristic energy, he threw his whole soul into the movement thus inaugurated, and lived long enough to find that his views commended themselves generally to the citizens."

In 1876, Sir Thomas suffered from a bad attack of dysentery, and since then he had frequently been more or less ailing, but so late as the end of last June he was actively entomologising in Glen Tilt, having gone there "in search of health and insects," and made there several captures of more than ordinary interest.

One resident in Perth has testified that Sir Thomas was "ever ready to help his friends to the utmost of his ability, his kindly and genial manner endeared him to every one who knew him, and his popularity even amongst those opposed to him in polities (in which he took a very active interest), was deservedly great."—H. T. S.

William Wilson Saunders died at his residence, Raystead, Worthing, on the 13th September, after a very short illness. He was the second son of the Rev. James Saunders, Vicar of Kirklington, near Oxford, and was born on the 4th June, 1809, at Little London, near Wendover, Buckinghamshire. Having completed his education at Addiscombe, he passed as an officer of Engineers, and proceeded to India in or about the year 1830, but soon quitted the army, returned to England, and married. He settled at East Hill, Wandsworth, and commenced business as an underwriter, in which, for very many years, he was so pre-eminently successful that for a long time he was regarded as the chief authority amongst his colleagues at "Lloyds," of the Committee of which he was long chairman. Very few years after his return from India, the Entomological Society of London began its existence. Mr. Saunders was one of the 101 "original" members,* and his first entomological paper—"On the habits of some Indian insects"—was read at the meeting of the Society on April 7th, 1834, and was published in vol. i of the "Transactions," pp. 60–66. Several of his succeeding papers were also on Indian insects, proving that the powers of observation, afterwards so largely developed in him, were put to good service during his short sojourn in India. In the welfare of the Entomological Society he always took the warmest interest; there are many of us who remember with pleasure those annual excursions at Reigate (he having removed to that town in 1857), to which the members of the Society and other friends were invited, and it was on these occasions that his great general knowledge of entomology and botany especially showed itself in the field. Considering his long life, his published papers were not numerous, those on Entomology not exceeding thirty. Yet but few men have more contributed to the advancement of both entomology and botany. The constant demands upon his time entailed by a busy business life, and by his official connection with most of our scientific societies, rendered impossible the undertaking of long scientific researches, notwithstanding his persistent energy, which was remarkable. As a patron of natural science, he was perhaps unequalled. It was mainly owing to his liberality that for very many years collectors abroad were enabled to commence and continue their researches. He himself accumulated vast collections from these sources, not only of insects, but also of plants, for his grounds at Reigate became noted as the place where numerous exotic plants could alone be seen in cultivation in this country; and at all times he sought to render his materials available for study. Many of the insects were described in the "*Insecta Saundersiana*," which he edited, and the illustrations in the earlier parts of Hewitson's "*Exotic Butterflies*" were largely drawn from specimens in his cabinets (as is acknowledged in that work). In botany he edited a publication known as the "*Refugium Botanicum*," in which are described and illustrated very many plants that to this day would otherwise have been less perfectly known. Also (with Mr. W. G. Smith) he edited two thick parts (1871 and 1872) of a work on British Hymenomycetous Fungi, many of the illustrations

* Of these only seven now remain on the list.

in which were from his own drawings (for he was an accurate artist in Natural History subjects). Locally he largely contributed materials for Brewer's "Flora of Surrey." It has already been said that he was one of the original members of the Entomological Society of London, of which he was President in 1841 and 1842, and in 1856 and 1857. In 1833 he was elected a Fellow of the Linnean Society (of which he was Treasurer from 1861 to 1873), and in 1853 of the Royal Society. In the affairs of the Royal Horticultural Society he also took a warm interest, and was Vice-President during the most troublous times in the annals of that somewhat unfortunate body: in fact, wherever Natural Science in any form could be forwarded, he was always ready both with his services and his purse. Unfortunately, his powers of rendering assistance came to an abrupt termination a few years before his death. In 1873 a period of unprecedented disasters to all engaged in marine insurance reached its height, and, to the surprise and regret of all, the great underwriting firm of which he was the head, collapsed; and the vast collections formed during a long life were dispersed, most of the insects being fortunately secured by the British Museum, and the Hope Museum at Oxford; to the former institution he had some years previously presented the whole of certain Orders. He passed the few latter years of his life quietly at Worthing, devoting himself to his old favourite pursuit of Horticulture, and contributing occasional papers to the Horticultural Society.

Mr. Saunders was thrice married, and leaves a widow, three sons, two daughters, and many grandchildren. His youngest son has abundantly proved that he fully inherits his father's scientific tastes. One of his daughters is the wife of the Rev. T. R. Stebbing, well-known as a student of, and writer on, *Crustacea*.

ENTOMOLOGICAL SOCIETY OF LONDON.—September 3rd, 1879. J. J. WEIR, Esq., F.L.S., Treasurer, in the Chair.

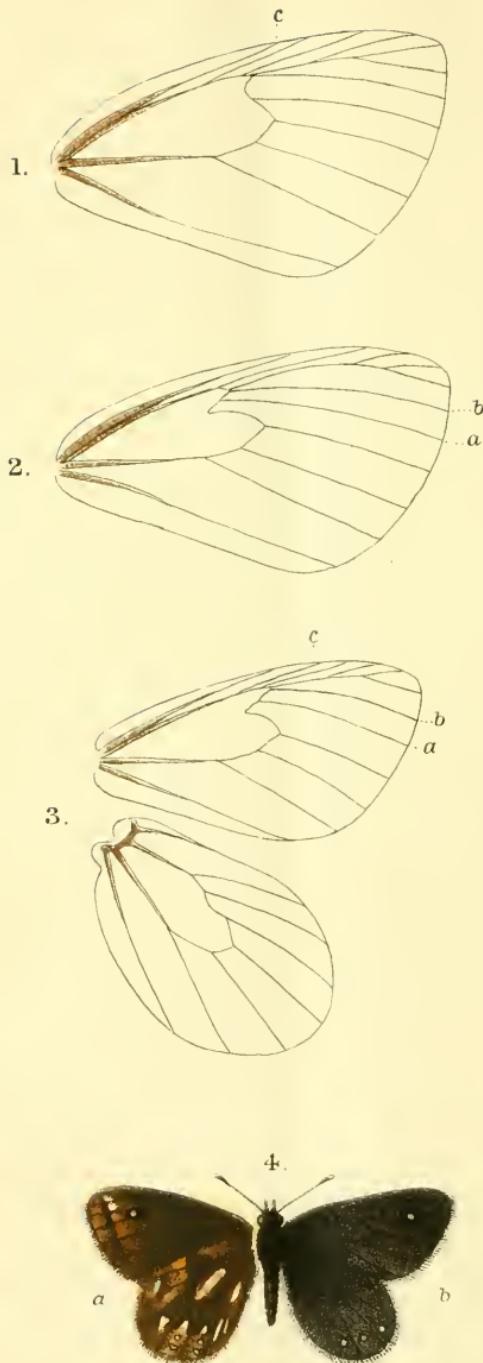
Mr. P. B. Mason exhibited specimens of *Harpalus oblongiusculus*, Dejean, taken in August, at Portland. Many examples had been found. He also exhibited, on behalf of Mr. Garneys, an example of *Euplectus ambiguus*, Reich., as illustrating the difference between the type-form and the var. "duplo minor," described by Thomson.

Mr. Weir exhibited ♂ and ♀ of *Cicada montana*, Scopoli, from the New Forest.

Miss Ormerod exhibited further examples of sugar-cane borers from Demerara, consisting of the moth and a species of *Calandra*, and read an account of the means employed on the plantations for their destruction, which appeared to mainly consist of burning the infested canes on the ground, thus destroying not only the borers, but also their natural enemies, especially ants. The *Calandra* appeared only to infest canes already attacked by the Lepidopterous larva.

Mr. McLachlan stated that the moth was probably no other than that noticed by Fabricius in 1794, under the name of *Phalæna saccharalis*, and which had been repeatedly observed since his time in various parts of the West Indies and South America. He agreed with the practice of burning the canes, but not on the plantations, as they stand. The canes that shewed signs of being attacked, should be at once up-rooted, collected, and burned outside the plantations.

Mons. Ch. Oberthur communicated descriptions (with figures) of *Lepidoptera* from the island of Sangir.



PARASITIC DIPTER. I.

BY R. H. MEADE.

The short appeal which I made in the September number of this Magazine to British Lepidopterists, asking them to preserve any parasitic flies that they might breed from the pupæ of butterflies or moths, has, I am glad to say, been already attended with some success, for I have lately received several specimens from Mr. Bignell, of Stonehouse, among which are two species of considerable interest.

The collection contained four distinct species, viz.: *Tachina larvarum*, Linn., *Exorista vulgaris*, Fall., *Exorista grandis*, Zett., and *Masicera Atropivora*, Desv. The first two species were both bred from *Zygæna filipendulae*; Mr. Bignell did not say that they emerged from the same cocoon, so I think they were probably bred from separate ones. They are both tolerably common species, the latter especially so, and seem to be parasitic on the larvæ of several different moths, for Meigen says that *T. larvarum* is frequently met with on *Hyponomuta evonymella*, and Zetterstedt has seen it emerge from *Arctia caja*. I have specimens myself of *E. vulgaris*, which have been bred from a variety of species of *Lepidoptera*.

Of the two other parasites, *Exorista grandis* was bred by Mr. Bignell from *Saturnia carpini*; he sent me both male and female specimens for examination. This fine Dipteron was named and described by Zetterstedt in the "Diptera Scandinaviae," but it has not been found in Germany, France, or Italy. Zetterstedt only knew the male, and says it is very rare in Sweden, but has been bred there from *A. caja*, and also, according to Professor Wahlberg, from *S. pavonia-minor* (*carpini*). It is an interesting addition to the British fauna.

The last species, *Masicera Atropivora*, has only been found in France and Italy, and, as its name implies, is parasitic upon the death's-head moth. It was first named and described by Robineau Desvoidy in his great work on the Myodaires, under the title of *Sturmia atropivora*. He says that M. Serville found more than twenty-four individuals of this species in one chrysalis of *Acherontia Atropos*. Macquart has also found it in France, and Rondani says* it is common in Italy, parasitic upon the same larva.

When I received specimens of this fly from Mr. Bignell, and he wrote me word that he had bred them from *A. Atropos*, I hoped that it would prove another addition to the British list; but in a subsequent letter he tells me that the larvæ were given him by an officer in the navy, who he believes obtained them in the Mediterranean.

* *Prodromus dipterologie Italicae*, Tom. 4, p. 15.

Mr. Bignell says he received eight larvæ of *A. Atropos*, which were all infested by this parasite. His observations bear out those of M. Serville that great numbers live in the same larva, for he says that he only kept the first batch that came out (about 20), and threw many others away. Mr. Bignell sent me some of the pupa-cases of the fly, which were agglutinated together in groups of six or eight, and arranged side by side like cells in a honeycomb.

This fly is interesting, as it affords an example of one species of parasitic Dipteron being apparently confined to one species of Lepidopteron ; and also from its habit of infesting the same larva in large numbers ; the parasite being rather a small species (about 4 lines in length), and the victim a very large one. In conclusion, I beg to return my thanks to Mr. Bignell for the trouble he has taken, and the interest he has shown in the subject ; and I hope other entomologists will follow his example.

Bradford, Yorks :
September 24th, 1879.

AN ADDITION TO THE LIST OF BRITISH HEMIPTERA.

BY F. S. SAUNDERS.

In July I caught two specimens of a bug off *Salix* on Wimbledon Common which I had not taken before, and on shewing them to my uncle, Mr. Edward Saunders, he told me that they belonged to a species not yet recorded as British, viz., *Lygus limbatus*, and I therefore forward their description for the information of the readers of your magazine.

LYGUS LIMBATUS, Fallén.

Similar in shape to *L. lucorum* ; pale yellowish-green, densely clothed with pale pubescence ; antennæ dark, with the base of each joint narrowly pale ; a spot on the head in front, the base of the thorax, the scutellum, clavus, a large spot on the end of the corium internally, dark brown ; scutellum lighter in the front angles, and with a small yellow spot at the apex. Extreme outer margin of corium and cuneus black. Membrane dark, with the nerves and a spot below the apex of the cuneus pale. Legs pale ; apices of femora bright red, with two deeper red rings ; tibiæ with black spines, each springing from a black spot at its base ; apical joint of tarsi black.

Length 2 lines.

The species varies to a pale uniform green, with the dark markings scarcely distinguishable, but the bright red apices to the femora, and the black spines springing from black spots on the tibiæ, at once separate it from any of its allies.

Wray House, Lingfield Road, Wimbledon :
26th September, 1879.

DESCRIPTION OF A SPECIES BELONGING TO THE COLEOPTEROUS
GENUS *EUPLECTUS*.

BY CHAS. O. WATERHOUSE.

EUPLECTUS KIRBYI, Denny.

Rufo-piceus, nitidus; capite impressionibus duabus profundis antice convergentibus, et in vertice puncto distincto; thorace sut lato, ad basin foveolis tribus sulco transverso conjunctis, et in disco impressione profunda elongatâ; elytris fere nigris, bistriatis, striâ secundâ parum abbreviatâ; pedibus piceo-testaceis.

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

This species is extremely close to *E. nanus* (Waterh., Cat. Brit. Col.), but differs in having the elytra darker, and the abdomen more red. It is at once distinguished from *nanus* by the impressions on the head, which in *nanus* nearly form a U, and in the present species form a V; the inner line of the lateral impressions is oblique in both species, but the difference is caused by the lateral impressions being widened in front in *nanus*, united anteriorly by a wide transverse impression; whilst in *alternans* the lateral impressions unite in front, without the aid of any transverse impression. The head behind the eyes is decidedly more obliquely rounded off than in *nanus*, and the second stria of the elytra is longer, being at least two-thirds the length of the elytron. In other respects, these species agree.

I have not seen any description of any *Euplectus* which gives the coloration found in this species. I believe it to be *E. Kirbyi* of Denny, but the type specimen of that species differs in being almost entirely of a pale pitchy-yellow, and has the thorax a trifle narrower.

My attention was first drawn to this species by having a specimen brought to me by my colleague, Mr. M. R. Oldfield Thomas, who captured it in a garden at Hillingdon, near Uxbridge. I find that my brother, Mr. Edward A. Waterhouse, has had a specimen in his collection for a long time, which agrees perfectly with that found by Mr. Thomas, except that the abdomen is more distinctly red. There are two specimens in the Stephensian cabinet in the British Museum under the name of *Reichenbachi*.* Mr. Thomas has also brought a second specimen, found in the same locality as the first.

Zoological Department, British Museum :

October, 1879.

* The specimen of *Reichenbachi* in Leach's collection is *nanus*.—C. O. W.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 9.

Cainozoic Time.

[*On the Insecta of the Eocene Period, and the animals and plants with which they were correlated.*]

With the Eocene Period commences a new epoch in geological history, which is separated from the preceding by an immeasurable lapse of time. In Europe* there is a complete break between the rocks of the Mesozoic and Cainozoic Ages; in no instance have rocks of the latter Age been found resting conformably on those of the former; and the separation between the animal life of the Cretaceous and Eocene Periods is most distinctly marked, scarcely any species being common to both.

At the opening of the new era, the *Reptilia*—multitudes of which disappeared before and about the close of the Cretaceous Period—still further declined both in number and size of species, and the *Mammalia* became the dominant race. With the rapid development of dicotyledonous plants, the *Insecta* increased in abundance, and Orders which in the preceding Age had been sparingly represented, were now thoroughly established.

*Great Britain.**Lower Eocene.*

A few elytra of *Coleoptera* have been obtained from the London clay in various parts of the Isle of Wight,† and remains of insects of the same Order have also been discovered at Peckham. The remains last mentioned were referred to Dr. Henry Woodward, and by him submitted to the late Mr. Frederick Smith, who detected amongst them elytra of *Curculionidæ* and *Elateridæ*.

Middle Eocene.

In 1854 Prof. Westwood described and figured several *Coleoptera* obtained from the leaf-beds of Creech, near Corfe, Dorset, including *Buprestidæ*, *Curculionidæ*, and *Helopidæ*.

In the course of the last three or four years, Mr. John Starkie Gardner, Mr. Wanklyn, and others, have discovered numerous fossil insects in the Bournemouth leaf-beds, belonging to the Orders

* In North America the line of demarcation between the Upper Cretaceous Rocks and the lowest of those of the Tertiary Age is not so clearly defined.

† Quar. Jour. Geol. Soc., 1853, pp. 53, 54.

‡ The Geologist, for Jan., 1861, pp. 39, 40; and the Quar. Jour. Geol. Soc., vol. x, pp. 378–396.

Coleoptera, Neuroptera, Diptera, and Hymenoptera. The *Coleoptera** are principally represented by elytra of *Buprestidæ* and *Curculionidæ*; and the *Neuroptera* include the wing of an *Aeschna* in a remarkably fine state of preservation.

Upper Eocene.

The most important collection of fossil insects from strata of this, or indeed any other, division of the Eocene Period, was obtained by Mr. E. J. A'Court-Smith,† from a thin bed of limestone, belonging to the Bembridge series, at Gurnet Bay, Isle of Wight. A large number of the insects comprised in this collection were placed in the hands of Dr. Henry Woodward, and were by him submitted to Mr. Frederick Smith,‡ who identified about 12 species of *Coleoptera* belonging to the genera *Hydrophilus*, *Dytiscus*, *Curculio*, *Anobium*, *Doreus*, and *Staphylinus*; 23 species of *Neuroptera*, belonging to the genera *Termes*, *Perla*, *Agrion*, *Libellula*, *Phryganea*, and *Hemerobius*; 3 species of *Orthoptera*, including a *Gryllotalpa*, and two grasshoppers; and 2 or 3 *Hemiptera*. The collection also included about 50 specimens of *Diptera*—chiefly *Tipulidæ* and *Culicidae*; 35 wings of *Hymenoptera*, the great majority of which were referred by Mr. F. Smith to ants of the genera *Myrmica* and *Formica*; and 2 specimens referred to the genus *Lithosia* of the *Lepidoptera*. These two specimens of *Lepidoptera* are of especial interest as being the first recorded representatives of this Order from British Tertiary strata.

From the nature of the flora of this country during the Eocene Period, as evidenced by the numerous and varied plant remains of the lower Bagshot sands, and some other divisions of the same Period, there can be little doubt that the *Insecta* were then abundantly represented, and their rarity as fossils in the Eocene formations of Great Britain can only be accounted for on the assumption that the conditions under which they were deposited must have been generally unfavourable to their preservation.

Continental Europe.

Middle§ Eocene.

The only strata of this division of the Eocene Period, on the

* Proc. Entom. Soc. London, for March 6th, 1878.

† Nature, vol. xi, No. 266, December, 1874.

‡ Proc. Geol. Soc. London, for December 19th, 1877, No. 343 (Session 1877—1878).

§ In June, 1877, Professor Rupert Jones informed me that a number of fossil insects had then recently been obtained from freshwater limestone of Lower Eocene Age in the neighbourhood of Serzanne, Marne, France; and that delicate plaster casts of several of them had been made by Professor Hébert and his assistants. As I believe these insects have never been described, I have thought it unnecessary to refer to them, except in a note.

continent of Europe, in which any remains of *Insecta* have been discovered, are the marls and limestones of Monte Bolca, near Verona, in Italy, which have for more than a century been celebrated for the number and variety of the fossils obtained from them.

The earliest known fossil insect from this celebrated formation was figured by Scheuchzer, in 1723, in his "Herbarium diluvianum," and referred by him to the *Libellulidæ*, genus *Cordulia*. This fossil has since been described by Signor Massalongo,† who has named it *Cordulia Scheuchzeri*, and who states that it appears to be more like *Cordulia metallica* than any other living species. Signor Massalongo has also described‡ and figured six other species from Monte Bolea, viz. :—1 *Neuroptera* (*Termes Peccanæ*), 2 *Coleoptera* (*Ancyllochira deleta* and *Perotis laevigata*), 1 *Orthoptera* (*Forficula Bolcensis*), and 2 *Diptera* (*Dipterites Angelini* and *Bibio Sereri*).

Upper Eocene.

The freshwater marls and beds of gypsum in the neighbourhood of Aix, in Provence, have long been celebrated for their fossils. The first allusion to the discovery of insects in these strata was made by M. Marcel de Serres§ in 1828, and in the year following, in an important work|| on the fossil invertebrates of the Tertiary formations of the south of France, he published a list of the genera to which all the then known fossil insects from this district had been referred.

In the same year (1829) a collection of fossil insects was made at Aix by Sir Roderick Murchison¶ and Sir Charles Lyell; and since that date numbers of specimens have from time to time been obtained there by collectors from various parts of Europe. For lists of the genera and species of these fossils, and for descriptions and figures of upwards of a hundred species, we are indebted to M. Mareel de Serres,** Mr. Curtis,†† Prof. Bronn,††† the Rev. F. W. Hope,§§ Prof. Germar,||| Dr. Boisduval,¶¶ M. Saussure,*** Prof. Oswald Heer,††† M. Oustalet,††† Mr. S. H. Scudder,§§§ and M. Daudet.||||

It is impossible to estimate the total number of *species* of all Orders obtained from the Aix formations, as in many cases only the names of the genera to which they have been referred are given; but

† *Studii Paleontologici*, 1856, pp. 14—21. ‡ *Op. last cited.* § *Annales des Sciences Naturelles*, 1828. || *Géognosie des Terrains Tertiaires, &c.*, 1829. ¶ *Edinburgh New Phil. Jour.*, pp. 287—297, October, 1829. ** *Op. anteac cit.* (*Géognosie des Terrains Tertiaires*). †† *Edinburgh New Phil. Jour.*, *anteac cit.* ‡‡ *Lethaea Geognostica*, vol. ii, p. 811, 1838. §§ *Trans. Entom. Soc. London*, vol. iv, pp. 250—255. |||| *Zeitschrift der deutschen Geolog. Gesellsch.*, I, pp. 52—63, 1849. ¶¶ *Ann. Soc. Ent. de France*, ix, p. 371. *** *Rev. et Mag. de Zool.*, iv, 1852. ††† "Über die Fossile Insekten von Aix, in der Provence"—*Vierteljahrsschrift der naturf. Gesellsch.*, Zurich, I, pp. 1—40, 1856. ††† Recherches sur les Insectes Fossiles des Terrains Tertiaires de la France (2nd pt.), 1874. §§§ "Fossil Butterflies," in the *Mem. Amer. Assoc. for the Advancement of Science*, Salem, Mass., 1875. |||| *Rev. et Mag. de Zool.*, pp. 415—424, 1876.

upwards of 120 genera appear to have been determined, which are distributed as follows, viz.:—*Coleoptera* (50), *Neuroptera* (3), *Orthoptera* (6), *Hemiptera* (20), *Diptera* (25), *Hymenoptera* (11), *Lepidoptera* (10). The *Coleoptera* have received especial attention from Prof. Heer and M. Oustalet, who have described about 80 species, belonging to the following Families, viz. :—*Carabidae*, *Hydrophilidae*, *Staphylinidae*, *Scydmaenidae*, *Mycetophagidae*, *Scarabaeidae*, *Eucnemidae*, *Anthicidae*, *Circulionidae*, *Scolytidae*, *Cerambycidae*, and *Chrysomelidae*. The *Neuroptera* are represented by *Libellulidae* and *Phryganeidae*; and the *Orthoptera* by *Gryllidae*, *Locustidae*, and *Forficulidae*. The *Hemiptera* have been referred to *Pentatomidae*, *Coreidae*, *Lygaeidae*, *Tingidae*, *Nepidae*, *Cicadidae*, *Cixiidae*, *Cercopidae*, *Reduviidae*, *Gerridae*, *Notonectidae*, *Tettigoniidae*, and *Aphidae*. The *Diptera* include *Tabanidae*, *Stratiomyidae*, *Syrphidae*, *Empidae*, *Asilidae*, *Bibionidae*, *Tipulidae*, *Mycetophilidae*, *Cecidomyiidae*, *Chironomidae*, *Bombyliidae*, &c. The *Hymenoptera* are represented by *Tenthredinidae*, *Ichneumonidae*, *Formicidae*, *Vespidae*, and *Chalcidae*. Of the ten *Lepidoptera*, seven species* have been described by Dr. Boisduval, Professor Heer, and Mr. Scudder, viz. :—five butterflies—*Neorinopis† sepulta*, *Lethites Reynesi*, *Coliates Proserpina*, *Thaites ruminiana*, and *Pamphilites abdita*; and two moths—*Noctuites deperditus* and *Pyralites obscurus*. To this list may be added a fossil larva of a species of *Satyridae*, discovered at Aix by M. Henri Daudet, and named by him *Satyrites incertus*. Two of the butterflies, *N. sepulta* and *L. Reynesi*, belong to the *Nymphalidae*; two others, *C. Proserpina* and *T. ruminiana*, to the *Papilionidae*; and one, *P. abdita*, to the *Hesperiidae*. One fact of especial interest in connection with these fossil butterflies, to which Mr. Scudder has called attention, is, that in every case, except one, fossil remains of the plants, which in all probability served their larvae for food, have been found in the same beds from which the insects were obtained.

In conclusion, I will call attention to some of the leading types of animals and plants with which the *Insecta* of the Eocene Period were correlated.

Of the *Mollusca*, the *Brachiopoda* had become much less common than at any former Period, and the majority of the species belonged to existing genera. The *Lamellibranchiata* and *Gasteropoda* were represented by a great number of species belonging to many of the existing genera; but the most interesting forms of the *Cephalopoda*, characteristic of the Cretaceous Period, had disappeared.

* Four genera of *Lepidoptera*, i. e., *Satyrus*, *Zygæna*, *Sesia*, and *Bombyx*, were enumerated by Marcel de Serres and the Rev. F. W. Hope in their lists.

† This is the insect referred by Marcel de Serres to the genus *Satyrus*.

Of the *Vertebrata*, the fishes were abundantly represented by species belonging to the existing Order *Teleostei*, and remains of a few *Ganoids*, and of a large number of *Placoids* have also been discovered in rocks of this Period.

The modern Orders of the *Reptilia*—*Chelonia*, *Crocodilia*, *Ophidia*, and *Sauria* (*Lacertilia*), were numerously represented; but the characteristic types of the Mesozoic Age—the *Plesiosauria*, *Pterosauria*, *Ichthyosauria*, and *Dinosauria* had passed away.

The birds include species belonging to almost all the existing Orders.

The *Mammalia*, which in the Mesozoic Age was represented only by the *Marsupialia*, one of the lowest Orders of the whole Class, had now become the dominant race, and included types of most of the existing Orders, viz.:—*Marsupialia*, *Chiroptera*, *Insectivora*, *Ungulata*, *Cetacea*, and *Carnivora*. There are also traces of the existence during this Period of animals belonging to the *Rodentia* and *Quadrumana*.

The change in the conditions of the Vegetable Kingdom, which had commenced before the close of the Cretaceous Period,* still continued; and whilst the Cycads had almost disappeared, and the Conifers were no longer the predominant group, the Angiosperms and Monocotyledons were rapidly increasing in number and variety, and included the great majority of the plants of the Period.

Surbiton Hill, S.W.: 30th September, 1879.

DESCRIPTION OF A NEW GENUS AND SPECIES OF BUTTERFLY OF THE SUB-FAMILY *SATYRINÆ*.

BY RICHARD WM. FEREDAY, C.M.E.S.L.

(Read before the Philosophical Institute of Canterbury, N. Z., June 5th, 1879).

EREBIOLA, *n. gen.*

Antennæ: the club much narrower and longer than in *Perenodaimon Pluto*, but not so narrow or long as in *Erebia Blandina*.

Eyes naked.

Labial palpi rather longer, and densely clothed with much longer stiffish hairs than in *P. Pluto*; the hairs of the tip forming an obtuse-pointed pencil.

Body and legs clothed with rather longer hairs than in *P. Pluto*.

Wings entire. Primaries rather more elongate, and hind margin more oblique than in *P. Pluto*; the nervures and discoidal cells of both the primaries and secondaries very similar to those of *P. Pluto*, except that in *P. Pluto* the first (e. fig. 3) sub-costal nervure is absent, and the space between the externo-medial

* See ante, p. 60 of this vol. of the E. M. M.

(a. figs. 2 and 3) and innermost (b. figs. 2 and 3) sub-costal nervures,* at their junction with the vein closing the discoidal cell, is rather broader than in *P. Pluto*; none of the nervures dilated at the base.

Type, *Erebiola Butleri*.

The accompanying diagrams on Plate i represent

Fig. 1. The disposition of the nervures in the primary wings of *Erebia Blandina*.

Fig. 2. Do. do. of *P. Pluto*.

Fig. 3. Do. in the primary and secondary wings of *Erebiola Butleri*, and are given for comparison; the figures enlarged to two diameters.

Not having the descriptions of all the genera of the *Satyrinæ*, I should hesitate in forming a new genus for this insect; but, as "the lower radial of primaries emitted above the angle of the discocellulars instead of below it" is given by Mr. Butler (Ent. Mo. Mag., xiii, p. 152) as one of the distinctive characters of his new genus *Perenodaimon*, and as the present butterfly has the like character, but disagrees with *Perenodaimon* in the form of the club of the antennæ, and the presence of the first sub-costal nervure,† I may reasonably assume that it differs from all the other genera, and have therefore ventured to describe it as belonging to a new genus.

EREBIOLA BUTLERI, *n. sp.*

Primaries. Upper-side smoky-black; a white-pupilled black ocellus between the extero-medial and innermost sub-costal nervures, and equidistant between the discoidal cell and hind margin.

Under-side ferruginous, suffused (except the apical and hind marginal area), with slaty-black; ocellus as on upper-side; sub-hind-marginal row of four whitish marks—the two nearest the apex being the more distinct and silvery—followed by a dusky shade on their outer margin.

Secondaries. Upper-side smoky-black: a transverse row of three minute white dots near the hind margin; the dots arranged in a straight line, pointing towards the anal angle, and situated respectively between the extero-medial, sub-extero-medial, interno-medial, and sub-interno-medial nervures.

Under-side ferruginous, suffused with a dusky shade from the base to the transverse row of spots; a longitudinal discoidal streak of silver; a transverse row of three silvery spots near the hind margin, followed by two small longitudinal silvery streaks near the anal angle; also a small longitudinal streak of silver between the latter streaks and the base of the wing; the transverse row of spots consists of a conical spot—between the extero-medial and sub-extero-medial nervures—with its apex pointing to the hind-margin, a sagittate spot between the sub-extero-medial and interno-medial nervures, and a similar one between the extero-medial and sub-extero-medial nervures, all bordered internally with a dusky shade, the latter two spots pointing towards the base of the wing, and each followed towards the hind margin by a small silvery dot, between which

* The Orismology in Kirby and Spence's Introduction to Entomology (the only authority I have) is followed in describing the nervures.—R. W. F.

† As Mr. Butler does not mention the absence of this nervure in describing his genus *Perenodaimon*, I imagine he must have overlooked it.—R. W. F.

and the hind margin is a small silvery point edged externally with black; a small, pale, irregular sub-costal mark near the base of the wing; and on the costa, two-thirds from the base of the wing, a larger pale triangular mark, followed by two pale irregular spots. ♂ and ♀ alike, except in size.

Expanse of wings: ♂, 18½ lines; ♀, 20 lines.

Habitat: Whitcombe's Pass, Canterbury, New Zealand.

I have described this butterfly from three dilapidated specimens brought to me by J. D. Enys, Esq., who has favoured me with the following account of their capture:—"I caught the three butterflies "on Whitcombe's Pass, up the Rakaia, on the 8th March, 1879. The "Pass is over 4000 feet, and the first of the butterflies was caught "close to the top, the others were near it. They were knocked down "by my hat and put in paper, which must be my excuse for their state. "They seemed to be rather slow in their flight, and were chiefly found "on the snow-grass (*Danthonia*) which covers the slopes of the hills "at that height. I saw a number, but only got four."

In the accompanying coloured drawing, fig. 4 represents the ♂; "a" the under-side, "b" the upper-side.

I have named the butterfly after Mr. A. G. Butler, who has recently contributed valuable lists of, and papers on, the *Lepidoptera* of New Zealand, and to whom I am much indebted.

Since writing the above, Dr. Julius Von Haast informs me that it was a specimen of this butterfly which he took in 1866 on Whitcombe's Pass; not of *P. Pluto*, as he before stated (*vide Trans. N. Z. Inst.*, vol. iv, p. 217). Dr. Von Haast speaks from recollection, not having preserved the specimen he took.

Canterbury, New Zealand : 1879.

Larvæ of Vanessa cardui in September.—On the 22nd of September I found larvæ of *Vanessa cardui* in considerable numbers, and in various stages of development, on the Crymlyn Burrows, Swansea. Many of the thistles were denuded of leaves by them, and in place of their foliage were adorned with silken cells of various sizes—the successive domiciles of the caterpillars. Before leaving the neighbourhood I took some of the larvæ, since become pupæ, from which I am daily expecting the imagoes to emerge.

I know the fact of this species undergoing its metamorphoses in the autumn has been previously noted, but still thought my observations worth recording. I may add that I incline to believe that the larvæ in question are a late, but not a second, brood.—W. G. BLATCH, Green Lane, Birmingham : October 13th, 1879.

Larvæ of Vanessa cardui in October.—I hear from Mr. Harwood that he found on the 6th inst. three larvæ of *V. cardui* on *Carduus nutans*, two of them full-fed, the other quite small.—W. BUCKLER, Emsworth : October 12th, 1879.

[We strongly incline to the belief that both these cases concern a second brood of larvæ, i. e., the progeny of the descendants of the butterflies that appeared so abundantly in spring.—Eds.].

NOTES ON THE *ADELIINÆ*, WITH DESCRIPTIONS OF NEW SPECIES.

BY FREDK. BATES.

(Continued from page 75).

CARDIOTHORAX ACUTANGULUS, sp. n.

♂. Very near *C. Walckenæri*, Hope; differs in the prothorax not having the well marked sulcation between the disc and foliaceous sides: the basal foveæ smaller, the sides more constricted at the base; the hind angles longer, more acute, not dentiform: the posterior tibiæ are still more strongly compressed and expanded, and are finely and rather closely granulose on their inner face. The colour is shining black, a little bronzed on the prothorax.

Long. 8½ lines.

Brisbane.

CARDIOTHORAX HOWITTI, Pascoe.

This, the most brilliant of all the members of the genus, has the elytra flattened above, the epipleuræ are consequently more vertical than in any of those preceding: there are six well marked sulci on each elytron, arranged in pairs, the intervals between each pair being much wider than the others; these sulci do not quite extend to the sides, which, together with the epipleuræ, are nearly smooth. The ♀ has the legs much more slender than in the ♂.

CARDIOTHORAX CAPTIOSUS, sp. n.

♂. Elongate, rather narrow, bronzed-brown with purplish reflections, the prothorax and suture tinged with green: head foveated between the eyes: prothorax transverse, sides well rounded anteriorly, widest at the middle, more strongly contracted behind than in front, finely and completely margined at base and apex, evenly margined at the sides; base feebly triangulately emarginate; apex arcuately emarginate; hind angles rather small, but distinct, and outwardly directed; foliaceous sides well developed, separated from the disc by a well marked curved depression, most marked on the apical half; disc with two foveæ at each side the median line, the most apical are faint; median line faintly impressed except at the base: scutellum smooth, triangulate, not pointed behind: elytra narrowly oval, somewhat depressed above, shoulders well rounded; having each six well marked sulci on the back, the intervals sub-equal, the sides and epipleuræ faintly punctate-striate: under-side, legs, and antennæ black; tarsi reddish-brown.

♀. Broader; hind legs shorter; tibiæ straight.

Long. 7 to 7½ lines.

Cape York, &c.

CARDIOTHORAX ÆNEUS, sp. n.

♂. Unknown.

♀. Elongate; head and prothorax deep shining black; the usual markings on the former very deeply impressed; faintly foveated between the eyes: prothorax

convex, apex feebly emarginate, and bordered only for a short distance at each side; front angles short, obtuse, and somewhat reflexed; sides well rounded anteriorly, contracted posteriorly, finely and equally bordered; foliaceous sides rather narrow, obsolete behind, not marked off from the disc by a depression; disc smooth, median line very faintly impressed, except at the base; base much narrower than the apex, a little sinuously truncated; hind angles small but distinct, acute, outwardly directed; scutellum black, smooth, narrowly rounded behind; elytra oval, brassy-green, brighter and clearer on the sides and epipleurae; depressed behind the scutellum; shoulders narrow, very obliquely rounded; on each elytron six rather fine sulci, which unite in pairs at the base, the outer one very faint and distinctly punctured, the others fainter and punctate at base and apex; sides and epipleurae nearly smooth; intervals not visibly punctured, unequal, 3 and 5 widest: under-side and legs shining black; antennae brownish-black; tarsi rufescent: all the tibiae straight. Long. 6½ lines.

New Holland.

An elegant little species, the jet black head and prothorax contrasting strongly with the more brightly coloured elytra. A single example obtained from an old French collection and labelled "*Æbalus aeneus*, Dej."

CARDIOTHORAX DISTINCTUS, sp. n.

♂. Elongate, slender, shining dark greenish-black, with faint purplish reflections on the prothorax, sides, and epipleurae: prothorax ample, as wide across the middle as the elytra; apex rather feebly emarginate, finely bordered, front angles obtuse; sides well rounded anteriorly; base much narrower than apex, truncate; hind angles prolonged backwards; foliaceous sides moderate, widest at the middle (where they equal about one-fifth the width of the disc), much narrowed behind; disc smooth; median line very faintly impressed except at the base; elytra elongate-oval; not depressed behind the scutellum; each elytron with six rather shallow feebly punctured sulci, the two outer very faint; intervals sub-equal; sides and epipleurae nearly smooth; under-side and legs shining black; tarsi rufescent; antennae fuscous; legs rather elongate; hind tibiae a little flexuous.

♀. More robust, the elytra more broadly oval, the legs shorter, the hind tibiae straight. Long. 7½ to 8½ lines.

New South Wales.

CARDIOTHORAX CRENULICOLLIS, sp. n.

Black, glossy on the elytra: head broadly rounded in front; a depression at each side in front, and a large deep crescent-shaped depression between the eyes; prothorax ample, somewhat parabolically rounded at the sides; base much narrower than apex, and strongly bisinuate; hind angles prominent and outwardly directed; apex deeply emarginate; foliaceous sides well developed, broadest at the middle (where they equal one-fifth the width of the disc), narrowest behind, separated from the disc by a strong uninterrupted furrow; lateral edges finely crenulated and distinctly reflexed; disc very uneven; median line deeply and broadly channelled; at

each side and near to this is an irregular elongate depression, terminating behind in a large somewhat lozenge-shaped fovea: elytra convex, broad at base, sides subparallel, somewhat rapidly declivous behind; a depression behind the scutellum; shoulders broadly rounded, very strongly reflected by an expansion of the epipleural fold; strongly sulcated, the sulci not punctured; intervals convex, 1, 3, 5, 7 and 9 most strongly so, especially at base and apex: under-side, legs, tarsi and antennæ black.

Long. 9 lines.

Endeavour River.

CARDIOTHORAX HUMERALIS, *sp. n.*

Elongate, black, glossy on the elytra: head not depressed at each side in front; a large shallow rounded depression between the eyes: prothorax nearly as long as wide; apex deeply emarginate, front angles obtuse; base depressed, feebly arcuately emarginate, much narrower than apex; hind angles rather small, depressed, acute, outwardly directed: sides parabolically rounded, a little sinuate behind the middle; foliaceous margins broad (at their widest part equal to one-third the width of the disc), narrowest behind, reflexed, the lateral edges entire, not separated from disc by a deep furrow; disc much less uneven than in the preceding species, moderately sulcated down the median line, and at each side of this an irregular interrupted depressed line, terminating behind in a rather large and deep fovea; elytra somewhat depressed above; more gradually contracted, and less rapidly declivous, behind than in the preceding; a large triangulate depression behind the scutellum: epipleural fold more abruptly expanded at the base, strongly reflecting the humeral angle; broadly and deeply sulcated; the intervals crenulated, sub-equal, convex, 7, 8, 9 more sharply costiform than the others, and 8 unites with 9 before reaching the humeral angle: under-side, legs, &c., black.

Long. 9½ lines.

Australia.

CARDIOTHORAX HAAGI, *sp. n.*

Nearly related to the preceding. Black with a slight bluish tinge, the alternate elytral intervals only being nitid: prothorax shorter than in *C. humeralis*; sides arcuately rounded, a little more sinuate behind the middle, more abruptly incurved to the hind angles, base and apex wider; a depression along the base as in the preceding; base a little sinuate; hind angles larger, less depressed, more acute; foliaceous sides as in the preceding; median line rather finely sulcated; disc with a small rounded fovea at each side the median line nearer the apex, and another larger nearer the base: elytra more rounded at the sides, less gradually narrowed behind; humeral angle less strongly reflected; much more finely sulcated, the sulci having a line of smallish punctures, which do not crenulate the sides of the intervals; these latter alternately broader, flat, and not nitid; 7 and 8 are costiform and unite at the humeral angle, and 8 unites to 9 a little lower down.

Long. 9½ lines.

New Holland.

(*To be continued.*)

Helophorus tuberculatus in Scotland.—Perhaps it may be as well to record the occurrence of *Helophorus tuberculatus* near Dumfries. On looking over some of my flood-refuse captures of last autumn, a single specimen of this species turned up. I am indebted to Dr. Sharp for naming the species for me.—W. LENNON, Crichton Institution, Dumfries : October, 1879.

Coleoptera on Cannock Chase.—I have lately found the following species of *Coleoptera* on Cannock Chase, a locality from which they have not been previously recorded : *Cymindis vaporariorum*, *Misodera arctica*, *Pterostichus lepidus*, *Amara patricia*, and *Trechus rubens*.—W. G. BLATCH, Green Lane, Smallheath, near Birmingham : October 13th, 1879.

Longicornia in Bewdley Forest.—From June until September of this year, certain species of *Longicornia* appeared in Bewdley Forest in such unusual abundance as to be worthy of record. The flowers of every kind, from apple blossom to meadow-sweet, were alive with these lovely beetles ; but perhaps the blooms that attracted the greatest number and variety of Longhorns were those of the *Viburnum*. Even the common spurge, *Euphorbia amygdaloides*, was patronised, though, curiously enough, by only one species—the elegant little *Strangalia nigra*. The following species were most common, and of each kind hundreds of specimens were taken without any apparent diminution of their numbers : *Toxotus meridianus* (in at least three distinct varieties), *Pachyta octomaculata*, *Strangalia armata*, *S. nigra*, *S. melanura*, and *Grammoptera ruficornis*. *Clytus arietis*, *Liopus nebulosus*, *Rhagium inquisitor*, *R. bifasciatum*, *Pachyta collaris*, *Strangalia quadrifasciata*, *Leptura livida*, and *Grammoptera tabacicolor*, though not so extremely plentiful as the others, were taken much more freely than usual—one collector alone having secured more than two dozen specimens of *S. quadrifasciata* ! It is a curious fact, on the other side, that although I found a tolerable number of *Saperda populnea* in the spring of 1878, I did not meet with a single individual during the last season. The weather seemed of no consequence, dull showery days being apparently the best. I have been out in the rain on several occasions until wet through, but always found plenty of Longhorns. What seemed to me exceptional and noteworthy were, more particularly, these two facts—the extreme abundance of the beetles named, and the unusual length of time they were “out.”—ID.

Coleoptera from Portland, &c.—During the month of August I captured more than a score examples of *Harpalus oblongiusculus*, Dejean, in the Isle of Portland, the first British specimen having been taken there last year by Mr. J. T. Harris. I also found, in the same locality, two specimens (δ and φ) of the variety *exasperatus* of *Carabus violaceus* (*Carabus exasperatus*, Duft.). This insect was figured by Curtis from Portland in “British Entomology,” plate 446.

While walking near Croydon in the beginning of September I knocked an insect down with my stick, which proved to be a black φ of *Odontæus mobilicornis*.—P. B. MASON, Burton-on-Trent : September, 1879.

Ceratorrhina viridipygus.—In my note on this species in the magazine for October, page 113, there is a serious error. Instead of “that species,” the line should read : “It is allied to *Hornimani*.”—GEORGE LEWIS, Putney : October 5th.

Dragon-flies and telegraph wires.—Small *Libellulæ* hold a daily parade upon the telegraph wire. I noticed them upon my way from Geneva; and since then a Frenchman (ignorant of Entomology) was so struck by their singular appearance that he called my attention to them. When one chances to catch a fly it returns to the wire to eat it (the fly, not the wire).—A. E. EATON, Samoëns, Savoy : 12th September, 1879.

An unrecorded habit in the life-history of certain Trichopterous insects.—Mr. Salvin recently placed in my hands three leaves of hazel, upon each of which was a gelatinous mass, enveloping either ova or recently-hatched larvæ of some Trichopterous insect; the bushes upon which they were found were situated at a considerable distance from the nearest stream. The ova in the still undeveloped mass were arranged in regular series, made still more evident by the two black eye-spots of each embryo, which shewed both through the eggs and through the viscid surroundings. After the lapse of about twenty-four hours, the previously unhatched larvæ were roaming in their transparent environment, and some of those already hatched had left it, and were wandering about the box, probably in search of the element they were not destined to find, and their size had wonderfully increased since they were hatched.

Only a few days before this experience, Mr. Rye informed me that poplar leaves bearing similar gelatinous masses had come under his notice. This reminded me that Prof. Westwood had once either recorded, or mentioned to me verbally, quite a parallel case (I now believe it was a verbal communication); the accumulation of evidence appears worthy of notice in a more prominent manner.

The size of the gelatinous masses was considerable; undoubtedly large at the time of deposition, and increased by the absorption of moisture from the air. The juvenile larvæ appeared to me to belong to the Family *Limnophilidæ*, and, considering the time of year, I have little doubt they pertain to the genus *Halesus*, all the conditions agreeing therewith.

These observations open up more than one interesting problem in the early life-history of Trichopterous larvæ. *Halesus* is a genus the larvæ of which frequent streams. The larvæ hatched from the egg-masses collected by Mr. Salvin would have had to travel many yards before they reached the nearest stream, or water of any kind, save that resulting from recent rains. Furthermore, it appears to me that the gelatinous secretion in which the eggs are enveloped may serve as food for the young larvæ, otherwise it is difficult to account for the very considerable increase in size of those I had under observation, amounting in less than two days to about double that of the newly emerged larva.

All *Trichoptera* (so far as is known) void their eggs in a viscid surrounding. Most of them deposit this mass in the water or on water plants. In the case now under consideration it appears probable that certain of them prefer (either habitually or casually) to avert immediate contact with the element in which their progeny must eventually pass the greater part of their lives, and to trust to chance that some of them may, at the proper time, reach their aquatic home.

There is mystery about the infantine life of most Trichopterous larvæ, notwithstanding that it was from observations on the eggs of a species of this Order

that Zaddaeh, in 1854, wrote a memoir that contributed greatly to the advancement of embryology in insects, a subject that of late years has become almost a distinct branch of natural science.—R. McLACHLAN, Lewisham : *October 8th, 1879.*

Note on Nematus ribesii.—Having a few currant trees in my garden, I made some attempt this season to "stamp out" the complaint caused by *Nematus ribesii*. As soon as the leaves of the currant tree begin to expand, the female of this saw-fly makes its appearance, and between the hours of 7 and 10 in the forenoon, especially in cool weather, may be observed at rest on the leaves or branches and adjacent wall. I noticed it also to have a partiality for the leaves of some rhubarb growing near. At this time of the day the flies may be easily seized and destroyed before they have laid their eggs. Of course some will escape, and the next thing to do is to examine the under-side of the more advanced leaves for eggs laid. These are very plainly visible, being of a whiter colour than the leaves, and may be destroyed by running the thumb over them without removing or injuring the leaves. Some leaves with eggs on them will also escape detection, so that next one has to look out for the numerous small holes made in the leaves by the infant larva, as detailed in the "Letters of Rusticus." It is best to remove these leaves and destroy the larvae. I found the plan to succeed, but it required unremitting attention, as fresh saw-flies kept coming almost every day for three months at least. Owing to some neglect, many larvae got ahead, but still the result was that a good proportion of leaves remained on the trees through the summer, and I have no doubt the latter would have been entirely stripped if no attention had been paid to them. As Mr. Douglas observes (p. 116, *ante*), the black currant-trees were not attacked.—BENJAMIN COOKE, Windsor Road, Southport : *6th October, 1879.*

Note on Aphides.—As regards garden insects, the most remarkable thing I have observed of late is the immense destruction of winged *Aphides*, caused by their being caught in spiders' webs.—ID. : *6th October, 1879.*

Captures of Lepidoptera near York.—On the 25th July, I took a specimen of *Apleta occulta* at sugar, and on the 16th September I found a larva of *Acronycta alni* feeding on mountain-ash in Sandburn Wood, Malton Road, York.—A. H. HIND, Minster Gates, York : *September 24th, 1879.*

Depressariæ feeding on carrot.—With respect to *Depressaria rotundella*, my friend Mr. C. S. Gregson has bred it years ago from carrot, and I have also bred it from that plant, as well as *Douglasella, albipunctella, depressella, purpurea*, and *applanata*. Wild carrot is also the food-plant of *Depressaria capreolella* and *D. Yeatiana*, according to Mr. Hodgkinson, who has bred both.—E. L. RAGONOT, 12, Quai de la Rapée, Paris : *October, 1879.*

Abundance of Chrysocorys festaliella.—The larvae of *C. festaliella* were in thousands up at High Force the other day. The raspberry bushes were bleached in every direction ; they were quite a feature in the landscape.—JOHN SANG, 6, Chestnut Street, Darlington : *September 12th, 1879.*

Review.

A CATALOGUE OF COLEOPTERA FROM THE JAPANESE ARCHIPELAGO. By GEORGE LEWIS. Taylor & Francis: 1879, 8vo, pp. 31.

Our old fellow-worker and contributor, Mr. Lewis, whose continuous and energetic work, by personal collecting and otherwise, has so materially added to the knowledge of the Coleopterous fauna of Japan (to which country he is once more on the eve of departing—Beetles beware !), has now done a most useful thing, by putting together, in orthodox catalogue form, the names of all the *Coleoptera* as yet recorded from the Archipelago, with the more important synonymy and indications of some new genera and species. The total is no less than 2227 species, comprised in 862 genera (92 *Geodephaga*, 17 *Hydradephaga*, 15 *Philhydrida*, 78 *Brachelytra*, 11 *Pselaphidæ* and *Scydmaenidæ*, 104 Clavicorni, 9 *Lucanidæ*, 42 Lamellicorns, 42 *Sternoxi*, 64 Malacoderms, 75 *Heteromera*, 127 *Rhynchophora*, 71 Longicorns, 73 *Chrysomelidæ*, and 42 *Languriidæ*, *Coccinellidæ*, &c.). In some few instances, species receive new names, viz.:—*Notiophilus impressifrons*, Moravitz, 1862, *nec* Chaudoir, 1842, is re-named *niponicus*; *Pæcilius prolixus*, Putz., 1875, *nec* Erichson, 1842, re-named *longulus* (? *Koyi*, Germ., available); *Agriotes ferrugineipennis*, Mots., 1866, *nec* Lec., 1861, re-named *Candezei*; *Rhynchites betuleti*, Mots., re-named *Motschulskyi*; *Alcides albo-lineatus*, Roelofs, *nec* Boh., re-named *Roelofsi*; and *Chrysomela consimilis*, Baly, 1874, *nec* Clark, 1864 (= *subænea*, Mots., 1860, *nec* Suffr., 1850), re-named *lævipunctata*. The insect considered a variety of *Phyllopertha horticola*, L., by Mr. C. O. Waterhouse, is raised to specific rank as *P. yezoensis* (presumably an ultra-pure reading of the specific name *jessoensis* used by the purist Harold), and varieties under the name *niponicus* are respectively attributed to *Opilo mollis* and *Sybaris preustus*.

The aphorism that no man is a prophet in his own country is effectually disproved in this Catalogue, wherein Mr. Lewis receives due specific honour no less than 53 times, in varied guise, from the correct “Lewisi” to the incomprehensible “Lewisa:” to avoid further repetitions, we might suggest that some of the inevitable novelties resulting from his meditated journey may receive inflections of “Ludovicus.”

The great feature of the recorded species as a whole, viz., their representing so many European genera, and in very many cases being indeed specifically identical with European (and even British) forms, has already been urged in these columns by Mr. Lewis himself, and therefore needs no further comment.

As regards the Catalogue itself, its form and type leave nothing to be desired; but such experienced natural history printers as those whose names appear on it might have reasonably been expected not to have passed errors like “*Attelabrus*,” “*Bryophorus*,” “*Lepticinus*,” “*Keisenwetter*,” “*Rhynoncus*,” or “*Apteropoda*”—all well known names, occurring in Waterhouse’s British Catalogue, printed by the same firm. Some few other slips also remain for correction, e. g., *Scaphididæ*, *Colydidæ*, &c. (*Lagriiidæ*, *Languriidæ*, &c., being properly rendered). We are glad to find Mr. Lewis has the courage to follow Roelofs in doubling the aspirated ‘r’ (as in *Ceuthorrhynchus*), except in one accidental case (*Oxyrhynchus*); but *Omalium* still lacks its due ‘H,’ which is misplaced in *Hopatrum*. These, and a few others, are however in all probability owing to the somewhat hurried manner in which circumstances have compelled the publication of the Catalogue, and will doubtless be put right in a second edition, when increased material demands one.

Obituary.

Thomas Chapman. We have, with sincere regret, to record the loss of this distinguished Scottish naturalist,—for, though an Englishman by birth, he for so many years worked north of the Tweed, that his name would almost instinctively have occurred had there been question concerning the best known entomologist of his day of Scotland. Mr. Chapman was born at Nottingham, on 22nd January, 1816; he commenced active life as a student of medicine, but afterwards went into business in Glasgow, where he resided for forty years, until bad health (accelerated, it is to be feared, by the failure of the City of Glasgow Bank, in which undertaking he had the misfortune to be a shareholder) compelled his retirement. From the beginning of the present year he resided with his son, Dr. T. Algernon Chapman, at Burghill, Hereford, where he died on the 27th August last.

Devotedly attached to natural history, and especially to that branch of it which is most favoured by our readers; of active personal habits and a genial and unpretentious disposition; Mr. Chapman probably affords as happy an instance as is possible under ordinary conditions of life, of the true enjoyment to be derived from scientific pursuits. He must have steadily applied himself for many years to the dry details of his business, in order to have secured the means of surrounding himself as he did with costly evidences of cultivated taste; and from the beginning he must also have reaped the advantage of that wholesome relaxation from the comparatively sordid cares of life, which is to be obtained at so cheap a price by a study of the homely phenomena of nature. The fauna of the country of his adoption received at first his special care, and, as is usual with beginners, the *Lepidoptera* attracted him most; but in botany, geology, and other kindred branches of physical science he also became proficient. His kindly temper led him much into the society of his fellow workers in Glasgow (of the Natural History Society of which city he was for many years an active member, being finally one of its Vice-Presidents), and there are probably few southern Entomologists who have visited Scotland without enjoying his hospitality.

Not assuming the position of a scientific naturalist, or caring to take a part in the scramble for priority too often dignified with the name of Entomology nowadays, Mr. Chapman did not publish much: he prepared a list of the *Lepidoptera* of the Clyde district and Western Highlands, which was, we believe, incorporated in Dr. Buchanan White's Catalogue, and from time to time notes from his pen appeared in the Transactions of the Society above mentioned, and in our own columns. He devoted his time chiefly of late years to Exotic *Lepidoptera*, especially those of the West Coast of Africa, and many references to his name in connection with this locality will be found in the works of Hewitson and Strecker. It may be safely presumed that early training under a parent genuinely devoted to natural history has developed in Dr. Algernon Chapman that talent for biological work which has hitherto so eminently characterized his writings.

Professor Camillo Rondani. This celebrated Italian Entomologist died at Parma, aged 72, on the 18th of September last. He was born at Parma, and was Professor of Natural History at the Royal College, and Director of the Technical Institute, in his native city. He was best known as a Dipterologist, his principal work being the "*Dipterologiae Italicae Prodromus*," of which he published six

volumes between 1856 and 1877, though he did not live to complete it. He wrote many papers on *Diptera*, and also some on *Lepidoptera* and *Hymenoptera*, which appeared in different Natural History periodicals, as the Annals of the Entomological Society of France, and in many Italian publications. He described a good many *Aphides*, which do not seem to have been known to Mr. Buckton,* and he also published some erudite articles on "Parasites and their victims," in the 8th and following volumes of the Bulletin of the Italian Entomological Society.

Rondani introduced many innovations and new names in his arrangement of genera and species, which are of doubtful value, and have not been generally accepted; but he possessed a rare talent for the discrimination of species. He seized upon distinctive or characteristic points of structure which others had failed to find, and thus clearly separated many nearly allied species which had been confounded. He also found and described many altogether new species.

His death so closely following that of the still more celebrated Dipterologist Loew, is a sad loss to this branch of Entomology; all the older European authorities on the two-winged insects seem gone.

Rondani's collection, containing many valuable typical species, is for sale.—R. H. MEADE.

Dr. F. Chapuis. Entomology has just sustained a severe loss—Dr. Chapuis died on the 20th September, after an illness under which he suffered for several months, but which only became serious a few days before his death.

Félicien Chapuis was born at Verviers in 1824. His father practiced medicine in that town, and, from the commencement of his education, his son was destined to succeed him. Nevertheless, his tastes directed his attention to Entomology, and at the University, all his spare time was employed in the formation of a collection of the *Coleoptera* of the neighbourhood of Liège, where he then resided. I made his acquaintance at that time, that is to say, in 1847, and, led by him, I relinquished botany and my herbarium in order to search for *Coleoptera* in his society. On the advice of Lacordaire, our professor of zoölogy, we directed our attention more especially to the larvæ, profiting by the rich library of that learned entomologist, and, in 1853, appeared our "Catalogue des larves des Coléoptères connues jusqu'à ce jour." His studies terminated, Chapuis settled at Verviers, and there practised medicine. However, he did not abandon entomology. He undertook the study of *Xylophaga*, and published, in 1865, a Monograph of Platypedès, a considerable work, in which 200 species are described, with figures from his own drawings.

The death of Lacordaire happened in 1870, leaving unfinished the "Genera des Coléoptères." At the solicitation of the publisher, Chapuis undertook the continuation, and, after much assiduous labour, he was fortunate in completing the series, three volumes of that colossal work having been written by him. Chapuis was of sedentary habits: tied by his professional duties, he seldom went out of his native town, and but few foreign entomologists visited him there. Adored by his relations, beloved by his friends, and profoundly esteemed by his fellow citizens, he passed his days quietly in the bosom of his family.

During his latter years he was occupied in arranging his collection of *Chrysomelidae*, and, in anticipation of an intended complete work on the family, he published, in the Annales de la Société Entomologique de Belgique, several short monographic papers, and also a Synopsis of *Xylophaga*. He was a conscientious observer and an assiduous worker, and if death had not arrested his labours, there can be no doubt science would have been favoured with other important memoirs from his pen.—E. CANDÈZE, Glain, Liège: 12th October, 1879.

* "British Aphides," Ray Society.

ENTOMOLOGICAL SOCIETY OF LONDON.—October 1st, 1879. SIR J. LUBBOCK,
Bart., M.P., &c., President, in the Chair.

Mr. P. H. Gosse, F.R.S., of Torquay, was elected a Member.

The President feelingly alluded to the great loss the Society had recently sustained by the death of Mr. W. Wilson Saunders, one of its original Members.

The President announced that Lord Walsingham had (in conjunction with other gentlemen) offered two prizes of £50 each for the best life-history of (1) *Sclerostoma syngamus*, Dies., believed to produce the "gapes" in fowls, and (2) of *Strongylus pergracilis*, Cobbold, the supposed producer of the grouse-disease. The prizes to be open for competition to Naturalists of all nationalities, and the essays might be written in either English, French, or German, and must be sent in on or before October 15th, 1882.

Mr. McLachlan said that, with the greatest respect for the liberality that had induced Lord Walsingham to offer these prizes, he was of opinion that the Council had not sufficiently held in view the objects for which the Society was instituted when they accepted the offer, more especially as the Society was languishing for want of funds sufficient to enable it to carry out the furtherance of the study of Entomology in a proper manner: and he thought, that if this were properly brought before Lord Walsingham, the latter might be inclined to modify the subjects chosen for the prize essays. The subjects named belonged more properly to the Linnean or Zoological Societies. The scope of the Entomological Society was not limited to insects in the narrow sense, but included all that division of the animal kingdom known as *Arthropoda*: in no case, however, could the *Entozoa* named in the announcement come within the province of the Society.

Mr. Stainton fully expected that when he heard an announcement from the Chair as to proposed prize essays, the President would have stated to what Order of insects the subjects pertained, even if only for the information of the younger Members. If the creatures were not within the scope of subjects embraced in the objects of the Society, he could not conceive what the Society had to do with them. The *Entozoa* fell to the province of the Linnean or Zoological Societies, with the latter of which he believed Lord Walsingham was connected. He considered the action of the Council a case of *ultra vires*.

Sir John Lubbock stated, that when the offer was made to him by Lord Walsingham, he did not take upon himself to refuse what appeared to him as an opportunity of extending our knowledge of an obscure group of *Annulosa*, but he fully agreed with Mr. McLachlan and Mr. Stainton, that the subject did not in any way come within the scope of Entomology. Yet he hoped that the Society, by accepting the offer, might be the means of inducing others to offer prizes on subjects that came strictly within its province. He inquired if any Member had any resolution to move on the subject.

Mr. Stainton said he had no intention of moving a resolution, but he hoped that if it were suggested to Lord Walsingham that the subjects were not within the scope of the Entomological Society, his lordship would be willing to transfer the offer to one of the other Societies already named.

Mr. C. O. Waterhouse remarked, that the Society was simply placed in the position of having to award prizes on certain subjects, and at liberty to refer the matter to any sufficiently competent authority.

Mr. McLachlan exhibited specimens of an Hemipterous insect just received from a gentleman residing near Canterbury, and which were stated to be doing great damage to hops, being known to the planters as the "Needle-nosed Flea." The species was *Anthocoris nemorum*, and Mr. McLachlan suggested that it was sought to destroy an insect that was probably of considerable benefit to the hop growers, for, so far as was known, the *Anthocoris* is carnivorous, and feeds on small insects and larvæ. He also exhibited the larvæ of one of the *Embidæ*, forwarded to him by Mr. Wood-Mason, who found them at Jubbulpore in India, chiefly under bricks on the ground. The species was probably *Oligotoma Saundersi*, Westwood. He further called attention to the subject of the sculptured stones on the shores of Lake Léman, a subject he had twice already brought before the Society, on information received from Professor Forel, the latter considering they might be due to the action of certain Trichopterous larvæ. Mr. McLachlan had recently examined multitudes of these stones on the shores of Lake Neuchâtel, and doubted much if the sculptures were due to insect agency. He was more disposed to consider them owing to *Mollusca*, or possibly to several causes, for there was much diversity in the nature of the sculpturing, which might, however, be owing to the different textures of the various stones.

Mr. C. O. Waterhouse stated, that with reference to the injury to hops, he had recently inspected a hop garden in which great mischief had been done by *Evacanthus interruptus*, assisted by a *Lygus*. These punctured the leaves, and holes afterwards formed in them.

Mr. Pascoe exhibited a remarkable species of *Acrydiidæ*, which he had recently found hopping about on the surface of pools at Pará, during his recent visit to the Amazons.

The Rev. A. E. Eaton exhibited larvæ, pupæ, and cases of a Trichopterous insect belonging to the genus *Hydroptila* as restricted by him. He found them in the Valais and in Savoy, frequenting rocks over which dribbling sprays passed; they are at first free, but afterwards form cases of fine mud. He noticed also that *Hydroptila fuscicornis*, Schneider, formerly placed by him in the genus *Phrixocoma*, really belonged to the same genus.

Sir John Lubbock exhibited *Orchesella rufescens*, a species new to Britain, taken in Kent.

Mr. Boscher exhibited coloured drawings of two varieties of the larva of *Smerinthus ocellatus*, feeding on *Salix viminalis* and *S. triandra* respectively. He was not aware that this instance of dimorphism in larvæ had been recorded.

Mr. Wood-Mason communicated notes as to the locality of *Narycius (Cyphonocephalus) smaragdulus*.

Mr. Butler communicated "Descriptions of new species of *Sphingidæ*."

Mr. C. O. Waterhouse read "Descriptions of two new genera and species of *Coleoptera* belonging to the *Tenebrionidæ* and *Cerambycidæ* respectively." He also read a paper on "The affinities of the genus *Polyctenes*, Westwood, with a description of a new species." He considered the genus really belonged to the *Diptera*, and this view he thought was confirmed by the existence of a new genus and species of *Diptera* from Columbia (*Euctenodes mirabilis*), which in being blind, and in other characters, showed affinity with *Polyctenes*, although evidently allied to *Strebla*.

DESCRIPTIONS OF NEW ANTHOCORIDÆ.

BY F. BUCHANAN WHITE, M.D., F.L.S.

Dr. O. M. Reuter having announced (as students of *Hemiptera* will have been glad to observe) his intention of bringing out a Monograph of the *Anthocoridæ* and allied families, I am desirous of publishing *short* descriptions (some of them drawn up several months ago) of certain species which appear to be undescribed.

1. BRACHYSTELES WOLLASTONI, *n. sp.*

Cinnamomeus capillis flavo-brunneis vestitus; capite rufescente; pronoto disco et parte postico, scutello, antennis (articulo 2º excepto) elytrisque plus minus fuscescens; membrana brunneo-fuliginea, basi linea albida ornata. Long. $2\frac{1}{2}$ mm.

Madeira. One specimen taken by the late Mr. T. V. Wollaston, to whose memory I have dedicated the species.

Allied to *B. pilicornis*, Muls., but at once distinguished by its much larger size and greater stoutness, as well as by the somewhat different colour.

CARDIASTETHUS.

This genus is proving to be one of the most interesting in the whole family, on account of its not-altogether expected wide distribution. A few years ago, two European and one North American species were all that were known: since then, species have turned up in several far distant parts of the world, and all in islands or island-groups remarkable for the peculiarities of their faunas. This wide distribution implies great antiquity for the genus, but it is not its only point of interest. The species known to me are separable into two sections, characterised by the different arrangement of the membrane veins. In one the veins are arranged as in the British species *rufescens*, Costa (*testaceus*, Muls.), viz., four free veins, the two middle ones approximating each other at the base. In the other section there are apparently three veins only, but a closer inspection shows that the third or inner vein consists of two, which are free at the base but soon coalesce, leaving a smaller or larger triangular cell, from the apex of which the united veins are continued. This cell is additional to the usual long, narrow, triangular basal cell. It might have been expected that one of these sections would have had a different geographical distribution from the other, but in fact each is equally widely spread. Of the nine species known to me, four belong to one section, and five to the other. Of the four-veined section there are species in Europe, St. Helena, South America, and New Zealand; and of the falsely three-veined section there are species in Madeira, New Zealand, and the

Hawaiian islands. Of the two remaining species, the European *cerinus*, Fieb., and the North American *luridellus*, Fieb., I know nothing personally, but I imagine, from an expression used by Fieber, that the former may perhaps belong to the second or three-veined section. All the species are rather closely allied, hence the following attempt at a tabulation of the species known to me may prove useful :

- 1 (8). Membranae venis 3° 4° que coalescentibus et cellulam parvam formantibus.
- 2 (3). Pronoto sat angusto lateribus sinuatis ; callo lobi antici posterius longitudinaliter impresso ; antennis (articulo 1° excepto) pallidis ; corpore majore, majus piloso, colore dilutiore *mundulus*, B.W.
- 3 (4). Pronoto minus angusto lateribus rectis vel rotundatis ; antennis apicem versus infuscatis ; corpore minore, minus piloso, colore obscuriore.
- 4 (7). Pronoto lateribus rectis vel subrotundatis.
- 5 (6). Membrana venis crassis distinctis ; pronoto lobo postico in medio longitudinaliter distincte sulcato ; corpore minus piloso, majus nitido...
continuus, n. sp.
- 6 (5). Membrana venis gracilibus subindistinctis ; pronoto lobo postico longitudinaliter minus distincte sulcato ; corpore majus piloso minus nitido ..
sodalis, B.W.
- 7 (4). Pronoto sat lato lateribus distincte rotundatis ; callo fovea parva postice instructo ; impressione transversali pronoti mediocri ... *Brounianus*, B.W.
- 8 (1). Membranae venis liberas, haud coalescentibus.
- 9 (10). Pronoto lateribus rectis ; membrana venis (1^a excepta) sat indistinctis ; cuneo externe rosco *consors*, n. sp.
- 10 (9). Pronoto lateribus plus minus rotundatis.
- 11 (14). Membrana venis sat distinctis, in utroque sexu completa.
- 12 (13). Minor ; pronoto nigro nitido *bicolor*, B.W.
- 13 (12). Major ; pronoto rufescente-brunneo, subopaco..... *rufescens*, Costa.
- 14 (11). Membrana venis indistinctissimis.
- 15 (16). Colore obscuriore, opaco ; scutello distincte excavato ; membrana fæminæ subabbreviata *Poweri*, n. sp.
- 16 (15). Colore pallido, nitido ; scutello vix excavato ; membrana in utroque sexu completa *clarus*, n. sp.

The new species mentioned above may be thus briefly described :

2. CARDIASETETHUS CONTINUUS, n. sp.

C. rufescens similis sed angustior, obscurior, majus nitidus et pubescentia minus vestitus ; pronoto lateribus majus rectis ; antennis crassioribus ; membrana venis crassioribus, 3^a 4^aque prope basin coalescentibus et cellulam parvam triangularem formantibus.

Long. 2 mm.

Madeira (Wollaston). Several specimens.

3. CARDIASETETHUS CONSORS, n. sp.

Luteus, capillis longis pallidis vestitus ; capite, pronoto antice et postice, ab domineque dilute rufo- vel aurantio-fuscis ; scutello obscuriore ; cuneo externe late roseo ; elytris plus minus leviter fusco-nebulosis ; antennis articulo 1° ad apicem uscrescente, 2ⁱ parte tertia apicali fusco-nigro, 3^o fusco-brunneo ; membrana dilute

brunneo-fusca venis concoloribus indistinctis, prope basin venæ exterioris macula triangulari parva lutea. Capitis vertice et pronoti disco postico transverse rugulosis, hujus lateribus et margine postico transverse punctatis; scutello subruguloso; pronoto lobi postici disco transverse impresso. Long. 3 mm.

New Zealand (Broun). Three specimens.

Belongs to the section with four free membrane-veins, but, except the outer one, they are indistinct.

4. *CARDIASTETHUS POWERI, n. sp.*

Piceo-brunneus vel piceo-niger, opacus, capillis longiusculis cinereis vestitus; capite antice et postice, pronoto lateribus et postice, scutello saltem ad apicem, embolio ad basin, clavo, corioque ad maximam partem plus minus dilutioribus, interdum leviter rufescens; antennis articulo 3^o fusco-brunneo, 4^o rufescente; macula subrotunda ante basin cunei albido-fusca; membrana dilute fusco-brunnea, nebulis 3 dilutioribus 2 ad basin altera ad marginem interiore notata, venis male definitis; rostro ad basin piceo, apicem versus luteo; pedibus piceo-brunneis, basin versus dilutioribus, femoribus ad apicem, tibiarumque dimidio apicali neonon tarsis brunneo-flavidis; corpore subtus nitido piceo-brunneo, ventre ad medium dilutiore. Capite et pronoto (disco antico excepto) transverse rugulosis; scutello subtiliter punctato-ruguloso; pronoti lobo postico antice transverse impresso vel (♀) fovea parva profunda instructo; membrana fæmina subabbreviata. Long. 1½—2 mm.

New Zealand (Broun). Five specimens.

Belongs to the section with four free membrane-veins, but these are with great difficulty made out, and in fact seem almost obsolete. I have much pleasure in dedicating this species to Dr. J. A. Power, whose researches in the entomology of Britain are so well known. It is the smallest species of the genus known to me.

5. *CARDIASTETHUS CLARUS, n. sp.*

Pallide brunneo-flavus, nitidus, pilis pallidis sparsis vestitus; elytris dilutioribus; oculis fuscis; antennarum articulis duobus ultimis subfuscis. Capite, pronoto scutelloque laeviusculis, elytris subtiliter punctatis; pronoti lateribus ad apicem distincte rotundatis inde subrectis, impressione transversali mediocri; scutello fovea media vix instructo; membrana venis indistinctissimis. ♂ ♀. Long. 2 mm.

Amazon (Trail). Two specimens.

At once distinguished from its allies by its uniformly pale brownish-yellow colour; smooth surface, scarcely excavated scutellum and obsolete membrane-veins, of which only the first is at all (and that scarcely) visible.

Cardiastethus Brounianus, B. W. (Ent. Mo. Mag., xv, 159).—Having seen more specimens of this species, I may state that it varies much in intensity of coloration. Sometimes there is a pale brownish-fuscous spot before the base of the cuneus, more apparent in dark than in pale individuals.

6. TRIPHLEPS TRISTICOLOR, *n. sp.*

Niger, nitidus; antennis (articulo 1^o excepto), embolii 2/3 basali, corio (basis excepta), femoribus anticis et intermediis ad apicem, tibiis anticis et intermediis, tibiis posticis ad basin, ne non dimidio basali tarsorum testaceo-albidis. Pronoto margine postico late sinuato, longitudine media duplo longiore, apice truncato longitudine media nonnihil breviore, lateribus marginatis ad apicem subfortiter rotundatis, inde basin versus sensim rotundatis, disco in medio distincte impresso, postice rude punctato; scutello dimidio apicali depresso, subtiliter ruguloso; membrana albido-hyalina. Clavi margine exteriore, macula albido-testacea ante apicem interdum signata.

Long. 1 $\frac{2}{3}$ mm.

California. Two examples.

Allied to *T. lepidus*, Reut., and *T. rugicollis*, Reut., but distinguished by the coloration, and by the shape of the pronotum.

7. TRIPHLEPS REEDI, *n. sp.*

Niger subnitidus; capite apice piceo-brunneus; antennis articulis 1^o 2^oque brunneo-luteo-testaceis, 3^o 4^oque piceo-brunneis; pedibus luteo-testaceis, femoribus sub-infuscatis; elytris luteo-testaceis, clavo, embolio apicem versus cuneoque plus minus brunneis; membrana pallido-fuliginea. Capite brevi cum oculis longitudine latiore; antennis subcrassis; pronoto disco rude punctato transverse impresso, lateribus marginatis, ad apicem rotundatis, inde subrectis, margine postico sinuato, longitudine medio duplo longiore; scutello transverse rugoso, dimidio apicali depresso.

Long. 2 mm.

Chili. Two specimens taken by Mr. Edwyn C. Reed, to whom I dedicate the species, in testimony of his labours at the Chilian fauna.

In general form and appearance resembling *T. minutus*, L., from which the shape of the head and stouter antennæ at once separate it.

Two species of Chilian Hemiptera—*Xylocoris brevicollis*, Blanch., and *Anthocoris parvulus*, Blanch., are described as also resembling *T. minutus*, but with the short descriptions of neither of these two species do my specimens tally.

Piezostethus formicctorum, Boh.—I have French specimens of this North European species labelled “*Formica pratensis*, Cernay, Nov., 74.” If, therefore, this species occurs in France, it might be worth while to look for it in the nests of *Formica rufa* in the South of England. In my experience, it usually dwells deep down in the nest.

8. ACOMPORIS ALIENUS, *n. sp.*

Niger, pubescens aurea vestitus; elytris flavido-brunneis, clavo, embolii marginibus, corii disco marginaque apicali, et cuneo apicem versus obscurioribus; embolio ad apicem macula dilutiore notato; membrane pallide fusca ad basin venasque albida; pedibus testaceo-brunneis; antennis nigro-brunneis, articulo 2^o late luteo-brunneo annulato, articulis 3^o 4^oque sub-aequilongis.

Long. 3 $\frac{1}{2}$ mm.

Madeira (Wollaston). Two specimens.

Allied to *A. alpinus*, Reut., but a trifle larger; thorax longer, antennæ stouter, and legs and membrane of a different colour.

9. ANTHOCORIS ANTEVOLENS, n. sp.

Elongatus, angustus, niger, nitidus, capillis pallidis vestitus; pronoto lobo postico rufo-brunneo (interdum [♀] nigro-brunneo); claro pallide vel obscure fusco-brunneo, commissuram versus fusco; embolio, corii 1/3 basali, et margine interiore ad apicem clavi testaceo-albidis, corio ad basin interdum fusco-striato; corii emboliique partibus obscuris basin versus piceo-brunneis; embolio ad apicem macula rufo-brunnea notato; membrana fuligineo-brunnea, basi albida; pedibus plus minus piceo-brunneis, femoribus ad apicem tibiis ad basin dilutioribus; clypeo lateribus interdum rufo-brunneis; antennis brunneo-nigris, articulis 2^o ad medium late et 4^o ad apicem luride rufo-brunneis. Clypeo subtiliter transverse rugoso; pronoto, præcipue lobo antica, convexo, rugoso (disco lobi antici excepto), transverse profunde impresso; scutello ad basin subtilissime punctulato, dimidio apicali rugoso; elytris subtilissime punctulatis; antennis capite pronotoque simul sumptis subæquilongis, articulis 3^o 4^oque subæquilongis; rostro coxis anticis paullo superante, articulo 2^o 3^o fere duplo longiore.

Long. 3½ mm.

California. Three specimens.

Variable in intensity of coloration. Two specimens have paler antennæ, and otherwise differ from those described, and may perhaps belong to a different species.

10. DOLICHOMERUS REUTERI, n. sp.

D. elongato, Reut., simillimus, minus oblongus (♂ suboratus), corio ad basin pallido, pronoto breviore latioreque basi minus profunde sinuato, lateribus haud (♂) vel vix (♀) sinuatis, disco postice haud profunde sed late transverse impresso; pedibus testaceis, femoribus tibiisque in medio plus minus late fusco-brunneis.

Long. ♂, 3½; ♀, 4½ mm.

North America (Missouri and Georgia). Three specimens.

I know *D. elongatus*, Reut., by description only, and this species (which I have the pleasure of naming after one of the chief workers in this family) appears to differ from it in the points indicated.

Lyctocoris campestris, Fab.—I have specimens of this from New Zealand, where however it must, I fancy, be an introduced species.

11. DILASIA (?) DENIGRATA, n. sp.

Nigra, nitida, parce pilosa, rostro, pedibus antennisque pallide luridere piceo-brunneis, harum articulo 2^o obscuriore; elytris opacis fusco-brunneis, margine costali saturatiore setulis nonnullis instructo, embolio apice macula pallida notata; membrana brunneo-fusca, ad basin exterius dilutiore. Corpus oblongum; capite longitudo latiore, antennarum articulo 1^o capitidis apice superante, 2^o 1^o duplo longiore, 3^o 2^o breviore quam 4^o longiore: pronoto in medio longitudinaliter sulcato, postice .

rude rugoso, capite paullo longiore, margine postico late sinuato longitudine media fere duplo longiore, angulis fortiter rotundatis, lateribus pone angulas anticas rectis; membranæ venis brevissimis.

Long. 3 mm.

Two specimens. Mauna Kea, Hawaii, at about 3000 ft. (Blackburn).

Perhaps not a true *Dilasia*, but this species and the next may find a place in that genus in the meantime.

12. *DILASIA* (?) *DECOLOR*, *n. sp.*

Dilute brunnea, nitida, parce pilosa; pedibus præcipue tibiis, antennis scutelloque, obscurioribus; elytris fusco-brunneis, embolio apice macula pallida notata; membrana dilute fusco-brunnea, venis indistinctis. Quoad staturam formamque D. denigratæ simillima sed colore diverso, capite latitudine longiore et anterius minus angustato, pronoto ut videter paullo breviore, pilositate parciore tenuioreque, &c., videter distincta.

♀. Long. 3 mm.

Honolulu (Blackburn). One specimen.

I am not quite sure but that this may prove to be only a variety of the preceding.

LILIA, *g. n.*

Corpus oblongo-ovatum, glabrum. Caput longum, productum, collari distincto instructum. Oculi mediocres. Antennæ tenuiter pilosulæ, articulo 1^o apicem capitis attingente, 2^o sursum incrassato, duobus ultimis subfusiformibus. Rostrum coxis anticis superans, articulo 1^o oculos attingente. Pronotum collari distincto instructum; margine antico truncato, lateribus distincte marginatis antice posticeque rotundatis, in medio subsinuatis; margine postico late sinuato; disco longitudinaliter leviter impresso subtiliter ruguloso. Scutellum posterius depresso subtiliter rugulosum. Elytra (cuneo exterius excepto) seriatim punctata. Membranæ venæ indistinctissimæ. Abdomen marginibus subdilatatis, apice pilis longis nonnullis instructum. Femora antica incrassata inferne apicem versus dente instructa. Alarum cellula hamo instructa.

Affinities doubtful. It has, in some respects, more the aspect, at first sight, of a Lygaeid than an Anthocorid, due perhaps to the rows of punctures on the elytra. The membrane-nerves are almost invisible, but there seems to be one springing from the apex of the basal cell, and there are possibly two others.

13. *LILLA DILECTA*, *n. sp.*

Nigro-brunnea, antennis dilutioribus; pronoto lateribus et margine postico, elytris pedibusque brunneo-testaceis; rostro, capite ante antennas, colloque dilute brunnescens; pronoto collari rufo-testaceo; elytris femorumque marginibus anticis fusco-brunneo variegatis; membrana dilute fusca maculis irregularibus obscuris notata; connexivo brunneo-testaceo, segmentis in medio fusco-brunneis.

♂. Long. 3 mm.

Maui, Hawaiian Islands, at about 5000 feet (Blackburn). One specimen.

14. *CARDIASETHUS (?) COLLUDENS, n. sp.*

Fusco-brunneus, setulis longis erectis concoloribus vestitus, antennis, pedibus, hemelytrisque (embolio excepto) paullo dilutioribus, rostro subtestaceo, membrana pallide fuliginea; capite laevi nitido, collo magno convexo instructo; antennis articulo 1^o apicem capitum superante, articulo 2^o sursum sensim incrassato, (reliqua desunt); pronoto laeri nitido postice transverse ruguloso, margine antico leviter sinuato, marginibus lateralibus leviter subrotundatis antice fortius rotundatis, margine postico late sinuato, lobo antico callis 2 latis instructo, inter callos fortiter longitudinaliter sulcato, sulca anterius dilatata, pone callos utrinque subfoveolato; scutello basi anguste elevato-convexo laevi nitido, pone basin depresso opaco transverse ruguloso; hemelytris opacis; antennis pedibusque subcrassis, femoribus anticis reliquis crassioribus; membranæ venis obsoletissimis.

Long. 2 mm.

Brazil (Trail). One specimen.

From the mutilated condition of the specimen (the last two joints of the antennæ and part of the abdomen being absent), I have not ventured to characterize the new genus to which it probably belongs, but have placed it with some doubt in the genus *Cardiastethus*, which it resembles in several respects. The membrane-nerves are almost invisible, but I think I can see the bases of three.

Annat Lodge, Perth :

October 1st, 1879.

REMARKS ON PROF. RILEY'S OBSERVATIONS ON THE PUPATION
OF THE NYMPHALIDÆ.

BY J. A. OSBORNE, M.D.

Prof. C. V. Riley, of Washington, U. S. A., has recently been devoting much attention to this subject, and the results of his observations have been communicated to the Philosophical Society of Washington and the American Association for the Advancement of Science, during the present year. Abstracts of these communications have been published in "Psyche," July, 1879, and the "Scientific American Supplement," Sept. 13th, 1879.* From the latter I make the following extracts: "In the final getting rid of the larval skin and attachment of the chrysalis, there are concerned:

"1st—Certain features belonging to the larva, and cast off with its skin: 2nd—those belonging to the chrysalis; and to intelligibly explain the process, it is necessary to more fully characterize and homologize these parts than has hitherto been done.

"In the former category, in addition to the natural adhesiveness of the moist, mucous, and membranous corium, there are three physi-

* Also in "Nature," vol. xx, pp. 594-595.—EDS.

ological factors concerned: 1st—the *tracheal ligament*, or the shed tracheæ from the last or ninth pair of spiracles, which uniformly become blind or obsolete in the chrysalis; 2nd—the *rectal ligament*, or shed intestinal canal; 3rd—the “Osborne” or retaining membrane (*membrana retinens*), which is but a stretched part of the membranous corium that accumulates around the rectum and in the anal prolegs, and that is intimately connected with the rectal ligament.

“In the second category, we have the structural features of the chrysalis, these are: *First*—the *cremaster* proper, which is the homologue of the anal plate of the larva, and the form of which is foreshadowed in that of said anal plate. . . . This *cremaster* is surmounted at the apex, and sometimes along the ventral ridges, by what may be called the *cremastral hook-pad*, thickly studded with minute but stout hooks. . . .

“*Secondly*—we have the *sustainers* (*sustentores*), two projections which homologize with the soles (*plantæ*) of the anal prolegs, and which take on various forms, but are always directed forward so as to easily catch hold of the retaining membrane. . . .

“*Thirdly*—we have what may be called the *sustentor ridges*, usually connected with the *sustainers*, and embracing them on the outside, and extending backward to the inside of the ventral *cremastral ridges*. . . .

These *sustentor ridges* are homologous with the limb of the anal prolegs, and the exposed edge with the posterior border of said limb. . . .

“*Fourthly*—between them is what may be called the *rectal piece*, consisting of a piece more or less well marked and elevated, especially around the closed rectum.

“It is principally by the leverage obtained by the hooking of the *sustainers* in the retaining membrane, which acts as a swinging fulcrum, that the chrysalis is prevented from falling after the *cremaster* is withdrawn from the larval skin. It is also principally by this same process that it is enabled to reach the silk with the *cremastral hook-pad*. Yet the *rectal ligament* plays a most important part, and, in some species, a more important part even, in my estimation, than the membrane itself. The *tracheal ligaments*, which, from a study of specimens plunged in alcohol when the larval skin was about half shed, I was at first inclined to believe important auxiliaries, are, I am now satisfied, of very little or no service in most cases. The *rectal ligament* is a constant physiological factor, and its importance cannot be ascertained by attempts to sever the membrane at the critical moment, because in such attempts the ligament is more or less drawn out beyond the power of the sphincter muscles in the chrysalis to control it.”

From this it would appear that Prof. Riley's opinions, "based on observations made on species in more than a dozen genera," agree with mine in several points. We are agreed concerning the incorrectness of the old account given originally by Réaumur in 1734. He says "I had long become convinced that the popular accounts [based on that of Réaumur] were crude and inaccurate." We are agreed also that a ligament or membrane is formed out of the lining coat of the larval skin, with attachments as described, which plays an important part in the end of pupation. And I understand also that Prof. Riley has found this ligament likewise in the *Succincti*. We differ, however, as to the co-ordinate importance Prof. Riley gives to what he calls the *tracheal* and *rectal* ligaments. As regards the former, as he finally withdraws their claim, nothing more need be said. The chief point of divergence between us is in the importance which Prof. Riley attaches to the so-called *rectal ligament*, or shed intestinal canal. He goes on to say: "Dissected immediately after suspension and the sub-joint of the larva will be found to be bathed, especially between the legs and around the rectum, in an abundance of translucent, membranous material. An hour or more after suspension, the end of the forming chrysalis begins to separate from the larval skin, except at the tip of the cremaster. Gradually the skin of the legs and of the whole sub-joint stretches, and, with the stretching, the cremaster elongates, the rectal piece recedes more and more from the larval rectum, and the sustentor ridges diverge more and more from the cremaster, carrying with them, on the sustainers, a part of the soft membrane. If a larva be carefully dissected at this stage, the forming membrane may be raised with the point of a needle, and stretched so as to show its connection with the rectal ligament; or it may lifted entirely from the retainers, when, by its elasticity, it contracts and becomes more or less fully absorbed in the rectal ligament. It is at this stage that the strength of the latter may be fully tested, and if the chrysalis, flayed from the larval skin and freed from the retaining membrane, be grasped in the neighbourhood of the rectum, so as to supply the natural holding powers of the sphincter muscles,* the rectal ligament will sustain, as I have abundantly proved, at least ten or twelve times the weight of the chrysalis, while it will support, if held by the larval skin, several times the weight of the chrysalis before separating therefrom."

For my own part I have never been able to see that the shed intestinal canal has any influence on the suspension of the chrysalis

* Are these sphincter muscles supposed to be in the cast-off larval skin?—J. A. O.

during the critical last moments of pupation. And such is also the opinion of Mr. W. H. Edwards, as communicated to me by letter. On September 9th he writes : "I do not believe that the rectum has any especial bearing on pupation. All my observations indicate that the "Osborne" membrane alone supports the pupa, and cutting this, the pupa always falls ; cut the rectum, and no effect is produced, so far as I have seen."

In the cases mentioned by Prof. Riley, when the dissection was made "an hour or more after suspension," I can only suppose that the interference was premature, and the intestinal canal not yet completely disengaged ; but this is not the normal condition towards the end of pupation. In the chrysalis of *V. urticæ*, the last three or four abdominal segments are wedge-shaped, the thin ends of the wedges lying close together on the venter near the knobs to which the ligament is attached. The terminal or anal surface of the last segment has lying on it the ridges which terminate in these knobs, and the tail-piece (with the hooks), making an obtuse angle with the ridges, and forming with them a sort of bent lever—(viewed sideways, not unlike the open jaws of a serpent, having on its nose the hooks for attachment to the silk). The extension and contraction of the abdominal segments, then, cause the tail-piece ("cremaster" of Prof. Riley) to move through the arc of a circle, whose centre is at the point of suspension of the chrysalis from the ligament, which ligament itself is highly elastic. Now, with this mechanism, it is not difficult to conceive how the tail of the chrysalis may work its way out of the pocket of shrivelled larva skin, stretching the elastic ligament as far as necessary, and then be thrust up *around* that shrunk-up packet of old skin so as to reach the silk. But if the exuviated rectum is to be considered as the suspensory ligament, how is this to be accomplished ? In the first place, so much of the rectum must be "paid out" of the anus as will lower the pupa sufficiently to get its tail clear out of the larva skin. But if it is drawn up again, it will be drawn up vertically in the same straight line, and still impinge against the intervening skin. And by what power is it to be drawn up ? For Prof. Riley's views on this point, I must refer to the paper in "Psyche." "The principal means by which the chrysalis holds on, and rises at the critical moment, is a stout ligament, which is, virtually, the shed intestinal canal ; not alone the lining, but the whole organ, which, as we know, becomes subobsolete in the imago state of so many *Lepidoptera*. The ileum and colon are more particularly serviceable, and the ligament holds with such force around the anus of the cast larval skin, that it cannot well

be severed. The rectum of the nascent chrysalis* draws this in or lets it go by peristaltic action of the sphincter muscles, the whole ligament being drawn out as soon as the hooks of the cremaster reach the silk."

A muscular tube capable of *peristaltic* action may be regarded as a succession of sphincter rings piled one on another to form a cylinder; and the peristaltic action of this tube is nothing else than the contraction of these sphincter rings in orderly succession, one after the other. The contraction of the first ring closes the tube at that point, and the successive contraction of the adjacent rings drives along by a *vis à tergo* the fluid or semi-fluid contents of the tube. But it is self-evident that no such effect could be produced on a solid body (ligament) passing completely through the first contracting ring; and this is the condition of things in question. It remains for Prof. Riley to demonstrate and explain by what new structures and mechanism the pupa is drawn up again by means of the "rectal ligament." And I think the same difficulty stands in the way when the rectal ligament is regarded not as a suspensor *per se*, but as an adjuvant to the true suspensory ligament.

Milford, Letterkenny, Ireland :
October, 1879.

NOTES ON UNKNOWN OR LITTLE-KNOWN LARVÆ OF
MICRO-LEPIDOPTERA.

BY E. L. RAGONOT.

Several entomologists of great merit are doing all they can to elucidate the life-histories of the British *Lepidoptera*, and they have already done much in that way, still there are a great many species of which the larvæ seem to laugh at our endeavours to discover them, or to learn their precise habits.

In order to provoke the publication of the life-history of our pets, I purpose to contribute to this magazine notes on the British species of *Micro-Lepidoptera* of which the larvæ are quite unknown, and bringing together all we know of the habits of these, concerning which something has been recorded; for it frequently happens that a clue, however small, leads to the discovery of what we are eager to learn.

I hope that, by drawing the attention of British lepidopterists to this subject, we may learn the first stages of numbers of *Micro-Lepidoptera*, for I feel assured that many entomologists refrain from

* Although, as stated above, it is almost obsolete! Or, is there a special *pupal* rectum for this purpose, left behind at the exclusion of the image? And can it be found in the empty puparium?—J. A. O.

publishing their discoveries because they suppose them already known, or consider the publication of the little they may know of not much importance. Mr. Stainton, with his excellent "Manual," has helped lepidopterology to a wonderful extent, and since 1859 many larvæ have been discovered.

PYRALITES.

Pyralis costalis, Fab. (*fimbrialis*, S. V.).

This larva is still a desideratum. Dr. Rössler says that he has bred the moth from moss and lichens on trunks of trees. Mr. A. Lloyd has found the larva in a rick, and this observation has been confirmed by Dr. Steudel. M. Doumère appears to have found the larva in June, feeding on an exotic plant (*Cobea scandens*), and it resembled that of *Botys urticae*. He gives a short description, but as he is not a reliable authority, we cannot place any trust in his observations. Doumère does not seem to have tried to determine his insects, and imposed new names to all—the species which is supposed to be *costalis* he called *cobalis*. *Costalis* is a garden insect, and I suspect that the larva feeds on fallen leaves, &c., but I have not yet discovered it, although the insect is abundant in my garden during the summer months.*

Pyrausta ostrinalis, Hb.

This has been considered as a variety of *purpurealis*, L., but the larva does not seem to have been published. *Purpurealis* has been bred from *Mentha arvensis* and *M. aquatica*, but *ostrinalis*, most abundant on the Cheshire sandhills, must feed on *Thymus serpyllum* or *Calamintha acinos*. The insect flies in May and August.

Ennychia nigrita, Sc. (*anguinalis*, Hb.).

The larva is still quite unknown; the moth flies in May, June, and August over dry pasture lands.

Ennychia octomaculalis, L.

According to Herr A. Hartmann, the larva feeds in August and September, beneath the leaves of *Bellidiastrum Micheli*, leaving only the ribs; but the larva has not been described. *Octomaculalis* frequents dry meadows from May to July.

Endotricha flammealis, S. V.

The moth seems to be attached to oak, and the larva has been found by Mühlig in August and September, feeding on low oak bushes,

* A detailed account of the habits of this species is given by Riley, in his 6th Report on the Injurious, &c., Insects of Missouri (1874). In America it is considered injurious to clover-hay.—EDS.

but I have not seen any description. Herr Wilde supposes that the larva feeds on *Ligustrum vulgare*, but the moth occurs where there is no privet.

Diasemia litterata, Sc. (*litteralis*, S. V.).

Litterata frequents dry pasture lands and vineyards early in June, but we have still no clue as to the habits of the larva and its food-plant. It appears that there are two broods (see Barrett, E. M. M., xiv, p. 159).

Diasemia Ramburialis, Dup.

Nothing is known about the larva; the perfect insect seems to like marshy places in April and August.

Nascia ciliialis, Hb.

The larva is yet to be discovered; the moth frequents boggy meadows in May and June.

Stenia punctalis, S. V.

Larva still unknown; the perfect insect is fond of dry pasture lands and hill slopes, flying in August.

Botys pandalis, Hb.

The larva seems to be quite unknown, though the moth is common enough in certain localities in June and August.

Botys flavalis, S. V.

The larva has been supposed to feed on bedstraw (*Galium verum*), and certainly the imago affects dry pasture fields where this plant is common; no doubt that, like most of the *Botydæ*, the larva is polyphagous. Möschler says that he has found the larva on nettle (*Urtica urens*), and bred the moth, which flies in July.

Botys hyalinalis.

According to Herr Anton Gartner, the larva feeds in rolled-up leaves of nettles in May and June. Herr Gartner is an excellent observer, yet I fancy there is some confusion with *B. ruralis*, Sc. (*verticalis*, S. V.), whose larva feeds thus. A. Hartmann copies Gartner. The moth appears in July. The larva is still "wanted."

Botys straminalis, Hb. (*stramentalis*, Hb.).

It has been stated that the larva feeds in March, in stems of wheat, and that it is sometimes injurious to crops; the original observation has not come to my notice—the moth flies in June and July, in damp meadows, and may feed in the stems of grasses.

Spilodes verticalis, L. (*cinctalis*, Tr.).

Schrink found the larva on *Sarothamnus scoparius*, but did not describe it. The larva is no doubt polyphagous, for Herr A. Gartner found the larva at the end of June spun up in a leaf of *Atriplex patula*, the moth appearing early in August. Herr v. Noleken has bred it from a handsome larva feeding on *Cirsium arvense*, and gives a good description. Mr. W. R. Jeffrey noticed that the moths frequented *Artemisia vulgaris*. I should be glad to know whether the larva has been found in England.

12, Quai de la Rapée, Paris:
1st October, 1879.

(To be continued). .

DIAGNOSES OF NEW *ELATERIDÆ* FROM JAPAN.

BY GEORGE LEWIS.

TETRIGUS GRANDIS.

Fuscus, parum nitidus, crebre punctatus, pube brunneo-fulva dense vestitus; prothorace quam latitudo sua haud longiore; elytris tenuiter punctatis striatis, apicibus oblique dirarieatis. Long. 16 lin.

Hab.: Nagasaki, two specimens.

The largest recorded *Elater* from Japan; it differs from *T. Lewisi* in its size, by the thorax gradually widening to the base, the more yellow pubescence, and somewhat (though very little) larger punctuation. .

ELATER RYEI.

Ater, nitidus, brunneo-pubescent, thoracee dense punctato; elytris coccineis, interstitiis parum convexis. Long. 5 lin.

Hab.: Taisho.

This species is very close to *E. sanguinolentus*, but is somewhat shorter, rather more clearly punctured on the elytra, and the interstices rather more convex, which give the appearance of deeper striae. Like that species also, it has maculate and immaculate forms.

ELATER RUBRIDORSUS.

Ater, nitidus, fusco-pubescent, capite prothoraeoque crebre fortiterque punctatis, illo in medio joreolato, leviter impresso; elytris sanguineis, minus profunde striatis, striis punctatis. Long. 5 lin.

Hab.: Taisho.

This again is closely allied to the European *E. pomorum*, from which it may be known by the shallow pit in the middle of the head, its somewhat shorter form, and more deeply impressed striae.

ELATER PUNICEUS.

Ater, nitidus, griseo-pubescent; capite confertim, prothorace antice, lateribusque fortius et cebrius punctatis; elytris coccineis, profunde punctato-striatis, interstitiis convexis.

Long. 5½ lin.

Hab.: Awomori Bay, extreme North of Nipon.

This very distinct species is at once recognised by the deeply impressed and punctate striae, of which the two next the suture are relatively less deep, and by the second and third interstices being wider than the others.

ELATER CARBUNCULUS.

Sub-elongatus, ater, nitidus pube cinereo tectus; capite confertim, thorace sparsim, punctatis; elytris punctato-striatis interstitiis sub-rugulosis, planis; antennis longis, sub-serratis.

Long. 3¾ lin.

Hab.: Awomori Bay.

This neat little species comes in the *carbonicolor* group, so far as the puncturing and general sculpture go, but it is more slender, with much longer antennæ.

CRYPTOHYPNUS TELLURIS.

Longiusculus, niger, nitidus, subtiliter griseo-pubescent; capite thorace que punctatis, elytris striatis, interstitiis convexis, crebre punctatis; antennis nigris, articulo secundo tertioque necnon tibiis et tarsis flavis.

Long. 1¾—2 lin.

Hab.: Haagi.

This species is distinct from all others described from Japan: the base of the thighs in the anterior and middle legs is yellow. I am much indebted to Mr. Hiller for my specimens. He found the insect, I believe, in some numbers.

CARDIOPHORUS RAMEUS.

Elongiusculus, parum nitidus, niger, pube brunneo-fulva incondita dense vestitus; elytris punctato-striatis, interstitiis convexis, punctatis, apicibus rufescentibus; abdominis apice subtus rufo; antennis piceis, pedibus brunneis.

Long. 5½ lin.

Closely allied to *C. pauper*, but not quite so parallel, and the punctuation is a degree coarser; the antennæ are longer, and the colour of the pubescence and legs is brown. I had two specimens formerly from an old hedge in Kawachi, but this summer I have received the species in numbers from Kii. *C. pauper* seems confined to the Yokohama district.

MELANOTUS CAUDEX.

Niger, nitidus, grisco-pubescent; prothorace quam latitudo sua haud longiore, punctato, in medio anguste canaliculato, lœvi; elytris punctato-striatis, interstitiis parum convexis; antennis tibiis tarsisque rufo-piceis.

Long. 3¾—4¼ lin.

Hab.: Wakayama.

I received a few specimens of this small species from Kii last June, dug from an old stump. It comes near *M. annosus*, from which its size, dark femora, and greater length of antennæ in the male will separate it.

LIMONIUS ATRICOLOR.

Ater, pedibus concoloribus, opacus, albo-pilosus, prothorace quam latitudo sua longiore, confertim punctato; elytris punctato-striatis, interstitiis subtiliter rugoso-punctatis.

Long. 4 lin.

Hab.: Kii.

Smaller, narrower, and much less convex than *L. vittatus*, the only other species of the genus I know from Japan.

ATHOUS ÆROSUS.

Cupreo-æneus, pedibus rufis, nitidus, griseo-pubescent, capite thoraceque fortius et crebrius punctatis, hoc angulis posticis productis diraricatis; elytris distincte sed subtiliter striatis, interstitiis subtiliter punctatis.

Long. 4 $\frac{3}{4}$ lin.

Hab.: Kii, taken last May, off birch.

There is no other species allied to this in Japan. I do not know *A. subcyaneus*, Mots., but, from the description, that species has the striae deeply punctate, as well as other differences.

CORYMBITES MUNDULUS.

Piceo-æneus, antennis pedibusque rufo-piccis, nitidus, sparse griseo-pubescent; thorace sparse punctato; elytris punctato-striatis, interstitiis subtiliter punctatis, marginibus externis rufescens. Long. 3 $\frac{1}{2}$ —3 $\frac{3}{4}$ lin.

Hab.: Kii and Yamato, not rare in spring.

About the size of *C. puerilis*, but narrower, less convex, more shining, and more finely punctured. The first joint of the antennæ is red, the next three red at the base, the remainder pitchy.

AGRIOTES SEPES.

Elongatus, niger, antennis fuscis, articulo primo, secundo et tertio pedibusque rufis, parum nitidus, pube brunneo-fulva vestitus; capite thoraceque confertim punctatis; elytris striatis, subtiliter punctatis. Long. 4 $\frac{1}{4}$ lin.

Hab.: Kawachi.

Amongst Japanese species nearest to *A. exulatus*, from which its larger size and wholly red legs will at once distinguish it.

AGRIOTES SERICANS.

Sub-elongatus, niger, antennis piceis, pedibus brunneis, nitidus, pube sericeo-brunnea dense vestitus; elytris brunnecis, striatis, piceo-punctatis, interstitiis subtiliter rugosis. Long. 3 $\frac{3}{4}$ —4 $\frac{1}{4}$ lin.

Hab.: Awomori Bay, many specimens (Mr. Moor).

More robust than *A. sepes*, and seems to vary much in size.

DESCRIPTION OF A NEW BRITISH SPECIES OF *EUPLECTUS*.

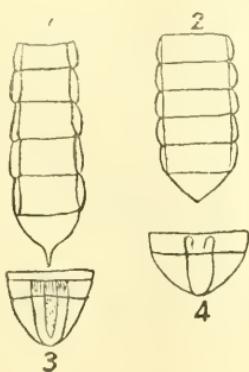
BY THE REV. W. W. FOWLER, M.A., F.L.S.

In June last a species of *Euplectus*, which we could not recognise, was found by Mr. Garneys and myself in considerable numbers among flood refuse on the banks of the Trent.

Not long after their capture, I sent specimens to some of my friends, and among them to the Rev. A. Matthews, who at once recognised that the species was new, at least to the British list; and as it seemed to differ from all the descriptions of the continental species, I provisionally named it *Euplectus Garneyi*. In the meantime, however, a doubt having been suggested as to whether it might not be identical with the *Euplectus minutissimus* of Aubé, I forwarded some specimens to M. Ch. Brisout de Barneville, who very kindly compared them with the types of M. Aubé's species, and has subsequently informed me that they agree, and also that they accord with M. de Sauley's (apparently not yet published) description of *E. minutissimus*. At the same time M. de Barneville admits the incompleteness of Aubé's description, and it is certain that no one who only had the description and figure of M. Aubé to refer to, would ever recognise the two insects as identical: the sculpture of the head and the whole contour seem entirely different, and no mention is made by Aubé of the sexual spine in his original description.

Our insect from the Trent is an interesting and very distinct species. It appears to have been originally noticed by Thomson in his "Skandinaviens Coleoptera," under the designation of *E. ambiguus* var. *duplo-minor*; but with the single exception of the superficial sculpture of the thorax, it has no one character in common with *E.*

ambiguus. Its form, instead of being short, wide, and very convex, like that insect, is long, narrow, and very depressed; its colour, instead of being dark, is decidedly pale; its thorax is of a totally different shape, and its abdomen, instead of showing the short and obtuse form of *E. ambiguus*, is long and selen-



1. Abdomen of *Eup. minutissimus*, Aubé (testa Brisout), ♀. der: again, in *E. ambiguus*
2. *Eup. ambiguus*, ♀.
3. Sculpture of the last two ventral segments of *Eup. minutissimus*, ♂.
4. " " " " " *Eup. ambiguus*, ♂. are nearly equal to one ano-

ther in length, but in this insect they gradually increase in length to the penultimate, which is the longest of all; the apical segment of the female is produced at its extremity into a long spine, while in the same sex in *E. ambiguus* this segment merely terminates in an acute angle (*v. fig.*).

I now give a description of the principal characters of this Trent species, as that given by Aubé for his *minutissimus* is irrecongnisable:

L. c. $\frac{5}{8}$ lin. == 1.25 mm. Linear, elongate, much depressed, castaneous, shining, sparingly clothed with short hairs. Head rather large, triangular, obtuse in front moderately punctured, with two deep foveæ between the eyes, joined by a longitudinal furrow to two smaller foveæ situated above the epistoma: eyes moderate, rather prominent; antennæ moderate, robust. Thorax small, rounded at base, narrower than the head, with the sides oval, with three very deep equidistant foveæ near the base, connected with each other by a straight line; from the exterior fovea on each side proceeds a longitudinal depression, not extending to anterior margin of thorax, and from the middle fovea may be traced an indistinct central channel. Elytra rather long, moderately punctured, much depressed, with the sides nearly straight, with two circular foveæ on each side near the scutellum, a very deeply impressed stria on each side of the suture, and two long indistinct divergent impressions on each elytron behind the middle. Abdomen long, widely and very deeply margined, with the segments increasing in length to the penultimate, which is longest, and the apical segment in the ♀ produced into a long aculeiform point; the apical ventral segment in the ♂ is marked throughout its length with three lines, of which the medial is the deepest, and is deeply grooved on each side for the greater part of its length, while the lateral ones are incurved towards the apex; the space enclosed by these lines is much flattened; the penultimate segment also exhibits at its anterior margin a deep quadrate impression, corresponding with the depressed portion of the apical segment; the ultimate ventral segment in both sexes is of conspicuously lighter colour than the rest of the abdomen. Legs yellow, long and slender, with the tibiæ, especially the intermediate pair, somewhat abruptly dilated near the middle. In the ♂ the inner side of the intermediate tibiae is prolonged beyond the articulation of the tarsus, and curved inwardly in the shape of a hook.

This species may easily be recognised by its minute size, depressed linear form, and the remarkable aculeiform process on the apical segment of the ♀. Fairmaire assigns this "spine" to the ♂, but both Mr. Matthews and M. Ch. Brisout de Barneville (and I believe also M. de Sauley), have recognised independently that it belongs to the ♀, and that the ♂ does not possess it.

The dissections, the figures given above, and the main part, in fact, of the description are due to the Rev. A. Matthews, to whom, as well as to M. Brisout de Barneville, I am exceedingly obliged for their help towards the elucidation of the problem.

Burton-on-Trent:

November 13th, 1879.

Trichopteryx Lætitiae, Matt.—*a species new to Britain; with notes on other Trichopterygidae*.—Among a number of *Trichopterygia*, which I sent to the Rev. A. Matthews for identification a short time ago, were several examples of a species new to Britain, viz.:—*T. Lætitiae*, Matt.,—a full description of which is given by Mr. Matthews in the Ent. Mo. Mag., vol. ix, p. 180. It is allied to *T. fascicularis*, Herbst, but differs from it in its smaller and more depressed thorax, shorter and pitchy-black antennæ, and in its conspicuously smaller size. It was first found in large numbers, unmixed with any other form, by Miss L. Matthews (after whom the species is named) near Spa, in Belgium. I found it by shaking rushes at the side of a pond in Robin's Wood, near Repton, Burton-on-Trent, in May last, and have taken altogether about forty specimens. In company with it I took *T. atomaria*, De G., *T. fascicularis*, Herbst, and *T. lata*, Mots., and one specimen of the rare *T. cantiana*, Matt.

I have also taken the following quite recently in the neighbourhood of Repton, the best of them being from the hot-bed in my own garden: *T. sericans*, Heer (very abundant); *T. anthracina*, Matt. (in some numbers); *T. grandicollis*, Mann.; *T. bovina*, Mots.; *T. Montandoni*, All.; *T. longula*, Matt. (four specimens); *T. thoracia*, Gill. (two specimens); and *T. brevis*, Mots. (two specimens); *Ptilium Spencei*, All., and *trisulcatum*, Aubé; *Ptenidium evanescens*, Marsh. (*apicale*, Er.), and *nitidum*, Heer.

Concerning *T. brevis*, Mr. Matthews writes to me as follows: “of the last mentioned I do not remember ever having seen a British example, except those which ‘I or my brother have taken: one of your specimens is a very remarkable variety:’ ‘it has four very distinct foveolate depressions on the thorax, but among the *Trichopterygia* such markings are by no means conclusive specific distinctions, especially when the normal structure is uninterrupted: I have specimens of *T. brevipennis* and *Ptinella testacea*, which exhibit depressions of a similar kind.’” *T. longula* and *T. cantiana* are species which have been comparatively recently discovered, neither of them appears in Dr. Sharp’s catalogue. The fact of so many good species being taken in one very small district in the heart of the Midlands, shows us how much there yet remains to be done in this interesting group, which is so often entirely neglected by collectors.

I ought to add that the whole of the species above mentioned are given on the authority of Mr. Matthews, to whom I am exceedingly indebted for his kind help, without which I am afraid my names would have been anything but authentic.—W. W. FOWLER, Repton, Burton-on-Trent: October 13th, 1879.

Singular occurrence in a dipterous insect—In the Ent. Mo. Mag., vol. ix, p. 46, Mr. Dale records a case of double coition in a *Molobrus*; and asks if any one has ever before noticed a similar instance. To this the editors append a note, that they do not remember records of this anomaly concerning the *Diptera*, though it has several times been noticed in other Orders.

I can give another example in the *Diptera*. In my Jamaica MS. Journals I find the following, which I have never before published:—

“October 15th, 1845.—I observed a most extraordinary thing. Two males of a ‘small species of *Bibio* (?) were in copula with one female at the same time, both ‘equally firmly fastened.’” I have added, in my Journal, a pen-and-ink sketch of the insects, by which the males are represented as 15 ineh, the female 2 ineh in length. The specimens I did not preserve.—P. H. GOSSE, Sandhurst, Torquay: October, 1879.

Vanessa cardui in Hawaii.—Referring to the paper headed “The recent abundance of *Vanessa cardui*,” in the August No. of this Magazine, it may be of interest to note that I have observed the species in considerable abundance (but not in compact swarms) at various points on the Hawaiian Archipelago, between February and July this year (1879),—though I have not previously noticed it during the three years I have been living on the islands. Its near ally, *V. Huntera*, has occurred in about the usual numbers. The season has been here, probably, as much cloudier and more showery than usual as in Great Britain. *V. cardui* has been previously recorded, I believe, as occurring on the Hawaiian Islands, but I cannot at this moment lay my hands on the authority.—T. BLACKBURN, Honolulu : September, 1879.

Description of the larva, &c., of Botys fuscalis.—For this subject I have again to thank my friend Mr. W. R. Jeffrey, who, some years ago, used to find this larva near Saffron Walden on that local plant *Melampyrum cristatum*; and, while thinking it likely that the more common species of cow-wheat might also prove to be its food, he accordingly sought for it in the summer of 1878 with complete success, taking several of the larvæ, and most kindly sharing them with me.

I received the larvæ on July 25th, some of them nearly full-grown, feeding on the flowers and tender seed-capsules of *Melampyrum pratense*, inhabiting webs or galleries formed with silk, uniting the flowers and capsules to the stalk, and much-covered in parts with frass.

The earliest were full-fed at the end of July, and on the 2nd of August spun their cocoons, the others continued feeding until the 5th, when they also left the plant, and soon after spun themselves up in the angles at top and bottom of their cage, within tough semi-opaline silken cocoons, sufficiently clear, for a long time afterwards, to shew the very pale larvæ through the silk; pupation not occurring before the following spring.

With me the moths emerged from July 8th to 20th, 1879, and with Mr. Jeffrey about the same time, though some of his were bred as late as the end of that month.

The full-grown larva is a little more than half an inch in length, very slightly tapering at either end, but not very fusiform, though *Pyralis*-like, the segments have each a sub-dividing wrinkle across the back, and are well defined, having almost as plump a character as with *asinalis*, the head rather smaller than the second segment, but roundish in form, with the lobes well developed on the crown; the colour of the back and sides is darkish grey-brown, darkest anteriorly, the spiracular region and belly is pale, rather ochreous-drab colour, the head blackish-brown and glossy, also the semi-lunar plate dorsally divided by a fine line on the second segment whose margin of skin next the head is remarkably paler than elsewhere, the dorsal line is darker and warmer brown than that of the back, the folds of skin at the segmental divisions, when they occur, are of an ochreous-drab, the tubercular warty spots blackish-brown and shining, the dorsal anterior pairs largest, becoming rather of a warmer brown on the hinder segments, united on the front part of the thirteenth where they form one large spot, a brown plate minutely freckled with blackish-brown is on the anal flap, the spiracles small, round, and black, below them the spots on the belly are of a light warm brown, and each spot bearing a fine hair.

When full-fed, the larva, like other of its congeners, undergoes a complete change of colour, and becomes uniformly of a pale pinkish-flesh tint.*

* Vide “Zoologist” for 1861, p. 7765, containing, by the late E. Newman, a description of the larva fed on *Rhinanthus crista-galli*, a plant closely allied to the above-mentioned. Heretofore, the only one published.

The pupa is barely three-eighths of an inch in length, of moderate substance, the wing-covers long, the thorax keeled, also the three upper abdominal segments, and on them the spiracles are tumid eminences, as they are also on the penultimate, the last segment ending in a taper, downward curving, flattened point, slightly bifid, and furnished with six excessively fine eury-tipped bristles; the colour is a light warm mahogany-brown, the tips of the wing-covers and abdomen darker brown, the surface generally glistening.—WILLIAM BUCKLER, Emsworth: November 10th, 1879.

Description of the larva of Crambus hortuellus.—Early in March last I found, at roots of grass and moss in one of my fields, a few larvae of a *Crambus* I was uncertain about, but which, at the end of June, produced *hortuellus*.

Length about half an inch, and of average build in proportion; the head has the lobes rounded, and is very highly polished, as is also the horny front of the second segment. Body rounded above, but flattened ventrally; it is of tolerably equal width, but tapers very slightly posteriorly; skin glossy, with a semi-translucent appearance, the segmental divisions well defined; the raised tubercles polished, large, and prominent, and from each of them is emitted a short but moderately stiff hair.

Ground colour dingy purplish-brown; head pale yellowish-brown in some specimens, in others very dark sienna-brown; frontal plate also of different shades of brown in different specimens; and the tubercles in some are of a darker shade of the ground colour, in others quite black; spiracles black. There are no other noticeable markings.

Along with these larvae was one with an olive-green ground colour: it I kept separate, but as it seemed a slightly more robust looking creature, and I failed to rear a moth from it, I cannot be certain that it was a variety of the same species: *culmellus* and *pratellus* occur on the same ground, so it is possible for it to have belonged to either of them.—GEO. T. PORRITT, Highroyd House, Huddersfield: 15th October, 1879.

On the habits of the larva of Phycis subornatella.—The larva of *Phycis subornatella* is noticed by Professor Zeller in the *Isis*, 1846, p. 768 (translated in the *Ent. Ann.*, 1867, p. 144), thus:—"It lives in silken tubes upon the ground amongst the 'plants of thyme, and is pale with some dark longitudinal stripes.' Further than this, I think it has not been noticed or described, and when, in 1877, I met with one or two specimens of the moth on the coast here, the re-discovery of this larva became a special object of anxiety and search, and considering that the moth is scarce here, and that thyme is most emphatically *not* so, it will readily be supposed that the re-discovery was no easy matter. However, in the beginning of June, 1878, I visited a spot about thirteen miles from here, on which one specimen of the moth had occurred, and there on the rocks found large spreading masses of thyme, under which were populous colonies of yellow ants. Here, after careful scrutiny, I found some loose patches of fine silken threads, such as might conceal the retreat of a spider, but connected beneath with a thicker dirty-white loose pouch or passage of silk, in which, if traced far enough, was a dull dark larva. This was a great discovery. My little girl set to work to help me, and we succeeded in extracting about half-a-dozen of these larvae, part of which were immediately sent off to Mr. Buckler for figuring, but from some defect in our mode of treatment, neither of us succeeded in rearing a moth, although Mr. Buckler was tantalized with an ichneumon.

This season (1879) I hardly need say that everything was late, and it was not till June 23rd that I again found larvæ. They were feeding in the plants of thyme on the same rocks, and it was curious to observe that not a larva was to be found except in plants that were crowded with the habitations of the yellow ants. The silken passage of the larva was completely mixed up with the *débris* of the ants' nest, and the abundant ant-pupæ which were brought up to the surface to be warmed by the sun. To make success a certainty, I took up two large turfs of the thyme (containing, of course, plenty of ants and pupæ), and planted them at home in pans. Upon these the larvæ fed very well, filling the whole mass of thyme with web, and almost clearing it of leaves; but although the ants must have been in danger of starvation, not a single larva was ever touched by them. The larvæ continued to feed until the end of July, and in the course of August, a dozen beautiful moths emerged.

The larva is generally very sluggish, and difficult to disturb, but *when roused*, can move quickly enough, and in confinement is restless, and, while young, inclined to wander from its food and get into trouble. It is cylindrical, and, while young, dull dark grey, with slightly darker dorsal line, spots pale grey, very minute, head and both plates dull black, remainder of second segment brownish. When full-grown, dull greenish-grey, more yellowish on the back, with narrow dorsal and sub-dorsal lines dark greenish-grey; the 3rd, 4th, and 5th segments much wrinkled on the back; head and plates still dull black. Living in a loose silken pouch or purse at the end of a passage of loose silk, under a spreading plant of thyme (*Thymus serpyllum*), and coming out at night to feed on the leaves.

Pupa light brown, in a thin cocoon of papery-silk in the silken habitation on the surface of the ground. The moths emerged at about eight o'clock in the morning, and were generally to be found sitting, head upwards, on a blade of fine grass, with the wings wrapped closely round the body.

The larvæ of *Phycis adornatella*, Tr. (*dilutella*, Hüb.), which is common on Box Hill, Durdham Downs, and many other localities on the chalk, and of *P. ornatella*, Schiff., which is not scarce at Folkestone and elsewhere on the South coast, are *both* supposed to feed on thyme. If any one will take the trouble to hunt out these larvæ, and send them to either Mr. Buckler or me, it will give us particular pleasure to describe and (if possible) rear them. I think there would always be some indication in the way of loose aggregations of silken threads among the twigs, to point out the whereabouts of the concealed larva.—CHAS. G. BARRETT, Pembroke: 6th November, 1879.

A Swammerdamia larva on mountain-ash.—While searching the leaves of mountain-ash, at Richmond, for the larvæ of *Nepticula aucupariae*, I was much surprised to find a green *Swammerdamia* larva, not much unlike that of *griseocapitella*, feeding on the leaves. Shortly after another turned up: and, on another visit later on, I found one more, which I sent up to Mr. Stainton for his opinion. It proved to be new to him (if not aberrant *griseocapitella*), and may turn out to be the hitherto unknown larva of *S. lutarea*. In any case it may not be devoid of interest.—J. SANG, Darlington: October 19th, 1879.

The green Swammerdamia larva on mountain-ash.—The larva above-mentioned

by Mr. Sang is extremely interesting in many respects. It does not, however, agree with Von Nolcken's description of his *Swammerdamia* larva on mountain-ash, which he referred to *S. punctella*, H.-S.

Von Nolcken found his larva *in early spring*, as soon as the leaf-buds of the *Sorbus aucuparia* develope towards the end of April (in the Island of Oesel), in small companies of two to four specimens in a loose thin web. The perfect insects appeared from May 26th to the beginning of July, mostly in the first half of June. The larva was dull greenish-yellow, with a pale whitish-orange dorsal stripe, divided by a very fine brownish-orange central line, and reddish-brown sub-dorsal stripes : head pale brownish-yellow. Mr. Sang's *autumnal* feeding larva, as described by me, was—"Green, with darker green dorsal and sub-dorsal lines, spots minute, dark grey; "head black ; second segment above with two grey-green blotches."

Von Nolcken's *S. punctella* larva differs from all others of the genus in passing the winter either as a young larva or in the egg state. All the other species of the genus, of which the habits are known, pass the winter in the pupa state, and the merry little moths gladden our eyes with their gambols in those first warm days of spring, when all nature seems bursting into life.—H. T. STANTON, Mountsfield, Lewisham : November 12th, 1879.

Description of the larva of Gelechia luculella, and its habits.—As I believe the life-history of this insect is very imperfectly known, this note on the subject may not be uninteresting. I believe that hitherto only the hibernating larvæ of this species have been noticed, and the feeding larvæ had escaped observation. I had collected last autumn larvæ of *Stigmonota nitidana* for Mr. C. G. Barrett, when that gentleman, with his usual acumen, wrote me word that he thought I had sent him two kinds. In the meanwhile I had also become alive to the fact that the oak-leaves contained two larvæ that eventually proved to be *Stigmonota nitidana* and *Gelechia luculella*, whose manner of life was so similar, that an inspection of the leaf alone was insufficient to separate them, though the separation was easy enough if the occupant itself were examined, for the two larvæ, as might be expected, are quite different in form and markings. The larva of *Gelechia luculella* then either spins two leaves together, or lives—and this is the more common way—on the under-side of a single leaf that has been previously curved by some summer-feeding species. In the former case it sometimes still further protects itself by a weak gallery of frass, but in the latter, that is, when occupying only a single leaf, the gallery is always present, and is strong and well-developed, reminding one of that of a knot-horn. The larva is whitish-green, with the spots black, prominent, and conspicuous. Head amber-coloured ; plate also amber-coloured, but marked with black spots and streaks, which make it, to the naked eye, appear darker than the head. The larva is hatched probably about the end of August, and is to be found up to the first and even second week in October, but the latter half of September is the most profitable time to look for it.

The firm compact cocoon constructed of frass or débris is generally in confinement placed *in situ*, but in a state of nature, I believe the larva forsakes its old quarters, and in this respect differs from *S. nitidana*, and seeks some other place to make up in. At any rate, the cocoon of *S. nitidana* is commonly found between the leaves it has fed in, but I have never so found *G. luculella*, and the larvæ previously

observed have been found in decayed wood, or in the bark of growing trees. It does not change to a pupa till the spring.—J. H. WOOD, Tarrington, Ledbury : November, 1879.

Occurrence of Atemelia torquatella in England.—I have had the pleasure of finding the larva of this species, hitherto, I believe, only met with in Scotland, in Castle Eden Dene. I found it in the leaves of very small seedling birches, growing among the grass, in September, both this year and last. I also found three or four larvæ on October 17th, this year, at Wolsingham, on small birches growing among the heather. These may be the last survivors of a more numerous stock ; as the leaves, which are so thoroughly cleared out, may have dropped from the bushes some time ago. The mined leaves are, in many cases, so like the work of saw-fly larvæ, that they might be quite easily overlooked. I totally failed to rear the moths last season.—J. SANG, Darlington : October 19th, 1879.

Occurrence of Coleophora ahenella, Wocke (C. Ledi, partim, Stainton), in the New Forest.—In September, 1878, I received from Mr. W. H. Fletcher some *paripennella*-like cases found by him on *Rhamnus frangula*, near Lyndhurst. I suspected at the time that these ought to produce *Coleophora ledi*, but on the receipt of some bred specimens, through the kindness of Mr. Fletcher, I found, on careful investigation, that the *C. ledi* of the 5th vol. of the Natural History of the Tineina is a *pot-pourri* of two different species. This has been pointed out by Wocke in his continuation of Heinemann's Schmetterlinge Deutschlands, &c., and for the polyphagous species, with *paripennella*-like case, but of which the imago has distinctly annulated antennæ, he proposes the name *ahenella* (p. 546), restricting the name of *ledi* to the species with paler, more bronzy and more glossy anterior wings (likewise, however, with annulated antennæ), but with a very different case, placed almost perpendicularly, and feeding, so far as at present known, solely on *Ledum palustre*. *Coleophora ahenella* is an interesting addition to our British list.—H. T. STANTON, Mountsfield, Lewisham : November 15th, 1879.

The larva of Coleophora ahenella.—It was in September, 1877, that I first found a ring of about a dozen old cases of this larva on a stem of *Rhamnus frangula*, when searching for larvæ of *Bucculatrix frangulella*. I found, at the same time, a few young larvæ feeding on the leaves, but these I failed to rear, and I was also unsuccessful with some feeding larvæ which I found in September, 1878. However, being in the New Forest in March and April last, I found a good many cases spun up on the stems of the buckthorn, and from these I have bred a good many of the perfect insects.

The insect seems pretty well distributed all over the Forest inclosures, and though one may take thirty or forty cases in an afternoon, many of them are old ones, as the cases seem to last for several years, so that it is slow work getting cases that are still tenanted.—W. H. B. FLETCHER, 3, Cavendish Place, Eastbourne : November 15th, 1879.

Sugar-cane borers.—At the beginning of last August, I received from the Resouvenir estate of the Porter family, in Demerara, a box of specimens showing the ravages of the borers in the sugar canes. In some of the samples sent, the

interior of the canes had been converted into a mass of ravelled fibres, containing cylindrical cases, about three inches in length, formed by the large fleshy grub of a species of the *Curculionidæ*, which, although perfectly destitute of legs, has the power of turning itself round and round, and by this means, when about to change to the pupa state, it forms a sort of case or cocoon out of the loose fibres of the cane in which it has been feeding. The larva bores downwards through the centre of the cane, completely destroying it. The samples were packed in wheat straw, and some of the grubs, having been shaken out of the canes, formed their out of the straws with which they came in contact. Before doing this, however, they attacked the sides of the wooden box containing them, and although it was constructed of stout deal, five-eighths of an inch thick, gnawed their way nearly through in some places. I opened one of the cases, and found therein a living larva. I was thus enabled to witness its rotatory movements, which were very vigorous, and continued for a long time together. This larva changed to a pupa at the end of August. The pupa was at first very active, rotating itself in the same manner as the larva had done, but it became quiescent after about a fortnight, only moving when roughly handled, and produced a male weevil on the 27th September. I then opened the other cases, and found another living specimen of the weevil, a female, fully developed, in one, but in all the rest the occupants were dead and shrivelled larvae. I sent the first specimen to Mr. E. Janson, who kindly compared it with the various species of *Rhynchophorus* in his own collection, and also with those in the British Museum. He informs me that it did not accord satisfactorily with any species, but that it appeared to be very nearly allied to *R. Germari*, Perty (*noxius*, Gyll.), a species widely distributed throughout the Southern States of the Union, the West India Islands, and Brazil; but that it differed from that insect in its glossy texture, the extraordinary depression of the scutellar region of the elytra, and its rufous anterior tibiae. The latter character was, however, probably due to immaturity as the second specimen had all the tibiae jet-black, like the body. The male has a crest on the rostrum, as usual in this genus. The spines of the tibiae were extremely sharp, enabling the beetle to cling with great tenacity to the fingers, when it was handled, and in so doing, it caused considerable pain.

From the information forwarded to me, it would appear that the weevil is only destructive to the sugar canes in dry seasons, when they are in an unhealthy condition, and sickly from want of moisture. It committed terrible havoc in Demerara last March and April. As soon as the rains commenced in June, it ceased to be so troublesome, and this was attributed to the return of the ants to the cane field, for they destroyed great numbers of the grubs. The weevils usually deposit their eggs in the stumps or stools, left in the ground when the canes have lately been cut, and the grubs bore downwards into the substance of the stumps, utterly destroying them and the young shoots, which should spring from their sides to produce a fresh crop of canes. They also appear to attack the top of the standing canes as well. When the specimens sent were collected on 4th July, many of the beetles were seen flying about in the air.

Besides the canes containing the weevil-grubs, specimens of the small shoots were forwarded to me which had been bored by the larvæ of a moth, probably the *Phalæna saccharalis*, Fab. It has been called *Diatræa sacchari*, Guilding, and *Proceras saccharophagus*, Boyer, at least it is probable that the same insect is meant

by all these names. Only one shoot contained anything, and in that I found a living pupa. This had the power of working itself up and down in its tunnel through the centre of the shoot. It was forwarded to Miss Ormerod, and exhibited by that lady at the September meeting of the Entomological Society, but unfortunately died without producing the imago.—W. S. M. D'URBAN, Albert Memorial Museum, Exeter: *November, 1879.*

Obituary.

Noah Greening, of Warrington, died at No. 37, Derby Square, Douglas, in the Isle of Man, on the 13th of November, 1879, aged 58.

From very early years he was an ardent lover of Natural History, and a keen sportsman; during middle life he devoted himself especially to the study of ornithology and entomology, and formed a collection of British *Lepidoptera*, which, in extent, and for the perfection of its specimens, has no equal in the North of England or probably elsewhere. In later life, when his increasing wealth enabled him to indulge his tastes freely, he reverted to the pursuits of his youth, and became an enthusiastic sportsman, and it was from a neglected cold contracted on one of his shooting expeditions, followed by an attack of pleurisy, that his premature death resulted. His skill as a collector was only surpassed by the generosity with which he shared his captures, and his vast store of acquired knowledge was always at the service of his friends, but it is to be deeply regretted that the humble estimate he had formed of his own literary abilities, rarely permitted him to publish the results of his observations.

He removed to the Isle of Man in June, 1879, for the benefit of its mild climate, but it was too late, he never rallied; and after several months of weakness and suffering, passed quietly to his rest on the 13th November, beloved by all who knew him. He was twice married, and leaves one son and four daughters. He was a member since 1872 of the Entomological Society of London, and a large and generous contributor to the Warrington Museum.—EDWIN BIRCHALL.

NATURAL HISTORY OF *PEMPELIA CARNELLA*.

BY WILLIAM BUCKLER.

For the opportunity of working out the history, hitherto unknown, of this pretty species, I am greatly indebted to my friend Mr. Wm. R. Jeffrey, whose kind exertions in obtaining eggs for the purpose, during two seasons, I here most gratefully acknowledge.

On the first occasion eggs were laid by a female captured August the 5th, and I received them on the 11th, 1877, some adhering to the inner surface of a pill box, others to a leaf of violet, a few on marjoram and leaves of other plants; the parent moth seeming not at all particular on what they were deposited.

To discover the food-plant, Mr. Jeffrey kindly sent me, for potting, three large pieces of turf containing a number of plants, dug from the spot where the insects occurred.

The eggs hatched from 19th to 21st of the month, and the little larvæ were distributed over the potted plants, except two that were confined with a few leaves for a couple of days as an experiment; I found one of these had taken possession of *Helianthemum*, and the other of *Lotus*; in each instance the stem and leaves were spun together with white silk, whereon minute specks of frass were visible; they were then transferred to similar plants in the pots, where, through September and October, I was interested in watching them and some of the others that could be detected, but only on those plants, among various surrounding growths; the tiny creatures extended their webs higher and higher on the small shoots of their chosen sprays, and quantities of frass lay about the earlier portions of web, until the approach of winter, when I saw them no more, for in the following spring their plants could not be found, probably killed by the larval ravages, and the coarser vigorous plants choking them. I found Mr. Jeffrey's experience with a few he had kept for himself corresponded exactly with mine.

Again, in 1878, towards the end of July, Mr. Jeffrey imprisoned some female *carnella*, and their eggs were laid on leaves of *Helianthemum* and *Origanum*, and a single egg on a blade of grass; they began to hatch on 7th of August, and most of them were placed on good growing plants of *Lotus corniculatus*, while four or five were put in another pot on a plant of *Helianthemum vulgare*; signs of the larvæ were soon seen on the plants by leaflets spun together, and minute specks of frass on the threads, becoming plainer through September and October, when some of the leaves and stems were spun to bits of stick, placed there to keep the sprays upright, and prevent their straggling over the margins of the pots.

The plants became very dry, and so remained through an unusually severe winter and spring, until April, 1879, when a few fresh green shoots of the *Lotus*, and, by chance, a few of *Medicago lupulina* and *Trifolium repens* appeared round the outside of the old dry portions of the former plants; but it was as late as the 15th of May when I first found a larva had moved from its winter quarters, in the pot of *Helianthemum*, where there also chanced to be growing a young clover plant, of whose few leaves an unopened one arrested my attention to two minute holes near the top; on examination, a young *carnella* larva was within a web which had held the leaf folded together; soon after this another larva was found feeding on one of the leaves spun against the *Helianthemum*,—facts pointing to a leguminous plant as the proper food. On the same day Mr. Jeffrey examined two or three

dry old leaflets spun together, which I had cut from the *Lotus* and sent to him, and within them he found enclosed, in a tough white silken fusiform hibernaculum, a larva of *carnella*, alive, though accidentally killed during the investigation.

During a gleam of sunshine on May 19th, I had great satisfaction in seeing that the small family on the *Lotus corniculatus* had awaked from their six months' sleep, as evidenced by five separate spinnings of excessively fine glittering silk threads, one on an entirely new stem with leaflets drawn over, hiding the little tenant in possession, the others holding fresh leaflets to old dry stems, with minute specks of fresh frass clinging to them.

In the centre of the pot, old dead stems and leaves were numerous, and amongst them silk threads began to accumulate, and extend to many little new sprays of the plants, so that by the 22nd there were two rather opaque webs thickly besprinkled with grains of frass ; just dimly visible through a portion of the upper web, was a larva evidently about to moult, it remained there motionless until the 27th, when it was no longer in view, but re-appeared occasionally, perceptibly grown ; another larva soon after became visible in the web lower down amongst the same stems.

By the 8th of June, the webs were easier to detect ; I then happened to notice a small one near the earth at the moment the larva in residence came forth, to commence an extension for joining a fresh spray to the despoiled one ; as it crept cautiously along the lower horizontal part of the stem, it enabled me to see distinctly the details of its naked form before many new threads intervened.

From the middle of June, during five days I saw about as many of the larvæ similarly engaged, and afterwards taking up their varied positions between new leaflets, lying more or less one over the other, often feeding on the lowest while covered by the uppermost ; their webs continued to increase in size, density, and whiteness, and had so many old stems and partly consumed leaves blotched with white incorporated with them, as to be rather conspicuous ; soon, too, the threads from one web began to encroach on another above, and they got in some places quite joined together ; at this time the larvæ were remarkably shy and timid, for on the least disturbance of any part of the plant, or even a breath passing over, they rapidly drew back into the recesses of their abodes.

I cut off one of these webs on the 1st of July, to figure the occupant, and was not a little surprised to find three larvæ iuside, the largest being three-eighths of an inch long, the next rather less, and

the smallest no more than two-eighths ; on the 11th, I found one half an inch long, and sent it to Mr. Jeffrey, thinking the usual time for maturity had arrived for some of them.

The *Lotus* soon became ravaged and smothered with web, while the *Medicago* and *Trifolium* had scarcely been eaten, and not much worked up with threads ; I therefore cut away all the tenanted webs and laid them on another fine vigorous plant of *L. corniculatus*, kept in reserve from the previous year until now ; on this they began at once to spin threads in union with their webs, and, on the 25th, seeing a larva full five-eighths of an inch long, I removed it to figure and keep apart on gathered food ; amongst this it soon spun itself up in a close hammock within a quantity of more open threads, which bound the leaves together, and I thought it was about to pupate, but I was deceived, for it moulted on the 28th, and assumed a coat so different that henceforth it was easy to judge of the relative progress of the others.

This individual was restored to the growing plant on the 29th, and made its way to the topmost spray, which was supported by a bit of stick ; here it spun some stout threads, securing the spray to the stick, and then lay stretched out along the stem basking in the sun ; next morning, there was a great increase in the number of silk threads, like the outlines of a long hammock, and in the evening I observed the larva a little beyond them stretched to its utmost extent, biting at a stalk of three small leaflets, which were toppling and presently fell, but the mandibles of the larva held on securely while the leaflets were dragged backwards to the web, and there fixed close to some other leaves, forming a bower-like shelter ; to this it continued daily to spin more and more threads until the 7th August, when some important work seemed going on within the dense interior, for I saw two stout stems, resting on the margin of the pot at a distance below, suddenly lifted up for a moment ; this was repeated three or four times in succession, and by evening I found the stoutest stem had been cut asunder, apparently to stop further growth ; next morning the larva had spun itself up in the hammock.

The remaining larvæ soon afterwards spun up in a similar way, though the last two were as late as August 16th, amongst gathered food and in captivity ; for the fine plant had become utterly suffocated and unable to sprout afresh by the binding of its parts together with great quantities of web : probably one or two larvæ escaped, as I picked up one astray at some distance from the pot.

I do not think it is to be inferred that the larvæ are naturally

gregarious; for although in this instance they were able to conform to circumstances, I did not fail to witness a little testy and resentful behaviour by one larva when intruded on by another. They were lovers of sunshine, and whenever they felt the genial rays, came forth to spin with increased energy.

Five moths in all were bred, on Sept. 13th, 16th, 30th, and Oct. 1st.

The egg of *carnella* when first laid is round, flat and scale-like whitish, then turning yellow, afterwards streaked with reddish, again changing to fawn colour and becoming convex above, and, an hour or two before hatching, showing a dark purplish spot on the upper surface.

The larva on quitting the shell is of a pale drab tint with darker dorsal line, blackish head and collar; its pace is running rather than walking: in four days' time it shows traces of other lines besides the dorsal one, and on the nineteenth day is nearly an eighth of an inch long, of pale pinkish-green tinted body, with numerous dark brown lines along its length, the head and collar dull black.

After hibernation it is nearly three-sixteenths of an inch long, slender, and marked as before with alternate lines, now of green and blackish, a design which continues to be developed, the head and second segment black, and for a time even the pair of legs of that segment are black, all without any gloss, save a slight glistening on the anal flap, the beginning of the green lines on the thoracic segments is quite pale, and the sub-dorsal one is rather conspicuously so, the dorsal is a straight black line, and from it to the spiracles on either side are four black and five green ragged-edged lines, making a total of nineteen lines from one spiracular region to the other; as the larval growth increases to half an inch and more, the green becomes bluer, then more slaty, and the black lines less and less intense; the dingy green belly has two black lines above the legs, a black ring round each ventral leg, and a ventral black line.

The last moult produces a skin which seems for a time to be black, but by degrees, as the larva attains its full growth of seven-eighths or nearly an inch in length, traces of the lines re-appear without much effect of breaking the general bronzy-blackness of the skin; this is rather rough with fine transverse wrinkles, and one much deeper sub-dividing each segment; the body in front tapers a little from the third segment to the head and more behind from the tenth to thirteenth. The second segment and the head having remained deep dull black, begin at the very last to glisten faintly; the papillæ are pinkish-grey tipped with black, parts of the mouth being of the same grey colour with a black streak midway across the upper lip: some parts of the

paler lines are drab or dirty whitish on the thoracic segments, but indistinct behind, though the sub-dorsal is rather more noticeable throughout, as on it are the black tubercular dots minutely ringed with dirty whitish, of which tint also are the minute roundish-oval spiracles, and also the ocellated spot with its centre black and extra long hair, on the third segment; a fine soft hair of light brown colour proceeds from each tubercular dot, several from the head, the second and anal segments; the ventral legs, light shining pinkish-grey, are fringed with black hooks.

The pupa is enclosed in a cocoon spun within the hammock, and composed of a coarse dirty whitish silk reticulation of oval form, five-eighths of an inch long; the pupa itself is seven-sixteenths of an inch in length, of moderate stoutness, broadest across the thorax and wing covers, rounded above and sloped suddenly towards the head, which is but little produced, somewhat flattened beneath, wing-covers rather long and close to the body, the flexible rings of the abdomen taper to a blunt rounded tip furnished with two minute thorny points wide apart; the colour is dark mahogany-brown, darkest on the back of the abdomen, the tip black, the wing-covers and under parts rather lighter brown, the whole surface shining.

Emsworth: October 11th, 1879.

REMARKS ON SOME BRITISH HEMIPTERA-HETEROPTERA.

BY DR. O. M. REUTER.

(Continued from page 15).

ACANTHIA versus SALDA. In the Ent. Mo. Mag., vol. xi, p. 186 (1875), Messrs. Douglas and Scott, in some synonymic notes on *Hemiptera*, have the following on "*Salda versus Acanthia*."—"In the Syst. Entom., 693, 159 (1775), Fabricius established the genus *Acanthia*, the first or typical species being *Cimex lectularius*, L., and he included fourteen other discordant species. In the Ent. Syst., iv, 67, 211 (1794), he preserved the genus *Acanthia* and increased the number of species to forty-five, but still kept *C. lectularius* as the type. But in the Syst. Rhyng., 112, 20 (1803), he restricted *Acanthia* to two species—*lectularia*, L., and *hemiptera*, Fab., and referred the species previously placed in the genus to the new genera *Salda*, *Aradus*, *Syrtis* and *Tingis*; and this arrangement has since been generally followed. Professor Stål, however, in his "Enumeratio Hemipterorum," iii, 148 (1873), has substituted the genus *Acanthia*, Fab., for *Salda*, Fab., but this is certainly in contravention of Fabricius's idea, and therefore

cannot be adopted." I think, nevertheless, that the nomenclature of Stål is to be adopted. Of the above mentioned it is certainly clear that the name *Acanthia* instead of *Salda* is "in contravention of Fabricius' idea;" but before Fabricius (1803) divided his genus, Latreille had already (1797), in his "Extrait d'un Précis des caractères généraux des Insectes disposés dans un ordre naturel," p. 85, separated the species now commonly known under the name of *Salda* from the others which Fabricius had described as *Acanthia*, and for the same he employed just this name. I think that the author *first* making such a division of a genus should have the privilege to employ the name formerly belonging to the entire complex for such of the new genera as he pleases.* For this reason, I think that we must now write *Acanthia* for *Salda*. The name *Salda* is also not quite generally applied by the earlier authors; Latreille (Gen., iii, p. 142), Laporte (Ess., p. 52), Spinola (Ess., p. 76), Curtis (Brit. Ent., xii, p. 547), and the North American Entomologist Say (1859), adopting the name *Acanthia* for *Salda*. The genus with the first name, limited by Fabricius in Syst. Rhyng., is for the rest synonymous with *Cimex*, Linn., Stål, and must therefore disappear from our entomological nomenclature.

ACANTHIA (SALDA) C-ALBUM, Saund. (Syn., p. 633). I remark only that, according to Douglas and Scott (Cat., 54, 6), the *S. c-album*, Fieb., is synonymous with *Acanthia stellata*, Curt.

ACANTHIA (SALDA) PALUSTRIS, Dougl. (Cat., p. 54, 11). I must admit I am not sure in the difficult question concerning this and other species of the genus described by Mr. Douglas; perhaps they are to be regarded as distinct species, perhaps they are only varieties or local forms of others, as Mr. Saunders thinks (Syn., pp. 634, 635).

ACANTHIA (SALDA) VESTITA, Dougl. (Cat., p. 54, 14). This species is regarded by Mr. Saunders (Syn., 635, 14) as being only a variety of *A. saltatoria*, L.; but if it is not a good species, it belongs surely not to *saltatoria*, but to *A. pallipes*, Fabr.† Mr. Saunders says concerning these (p. 635): "between the two species I have admitted I can see no distinguishing structural characters, and the markings vary to such

* This proposition could not be allowed absolutely, or the most arbitrary results might be arrived at; respect should be shown, as a matter of justice, to the intention of the original author. This was clear enough in the present case, and as it is admitted Latreille's conclusion was incorrect, it follows that *Acanthia*, Latr., should not stand for *Salda*, Fab. Neither can *Acanthia*, Fab., give way to *Cimex*, Lin., as is argued, for, as is shown in the "Annals and Magazine of Natural History," April, 1868, the species *lectularius* was especially excepted by Linnaeus from being considered the type of the genus *Cimex*; and in his remarks on this subject in the "Zoological Record," v, 293 (1869), Mr. Dallas says, "*C. lectularius* can never be regarded, on scientific grounds, as the type of a group characterized as the Linnean genus *Cimex*"—J. W. D.

† I compared it with *stellata*, Curt., but said the form is longer oval, and the insect distinguished at once by the dulness of the surface due to the dense pubescence (E. M. M., xi, 12).—J. W. D.

an extent, that it is only on their general style that one can place any reliance." I find, however, one marking very constant, and by which the two species can *at once* be differentiated, although authors seem not to have observed this character, namely, *the marking of the anterior tibiæ*. With respect to this, we could range the small *Acanthia* (of the *saltatoria* group) in two lines :

(1). The anterior border of the anterior tibiæ with an *entire, very distinct*, black line, extending from the extreme base nearly to the apex : *A. pallipes*, Fabr., *A. vestita*, Dougl., *A. palustris*, Dougl., and *A. arenicola*, Scholz.

(2). The anterior tibiæ with the base and apex black, and in the middle a rather short black, sometimes almost effaced, line (the black marking interrupted before the base and apex by a testaceous interval) : *A. saltatoria*, L., *A. marginella*, Fieb., *A. stellata*, Curt., *A. melanoscela*, Fieb., and *A. costalis*, Sahlb.

CORISCUS versus NABIS. I do not know any reason why the name *Coriscus*, given for this genus by Schrank in his "Fauna Boica," p. 46 (1801), cannot be employed (*c. f.* Stål, Enum. Hem., iii, 112). Schrank's description is certainly very short, but not shorter than that of Fabricius, and from the descriptions of the two species (*dauci* = *brevipennis*, Hahn, or *apterus*, Fabr., auct.,* and *crassipes* = *ferus*, Linn. ?), it is also evident that this genus is identical with *Nabis*, Latr., auct. (*Nabis*, Latr., including also *Prostemma*).

CORISCUS (NABIS) POWERI, Saund. (Syn., p. 627, 6). According to the examination of typical specimens, kindly sent to me by Mr. Saunders, his *Nabis Poweri* (Ent. Mo. Mag., xii, p. 250) is synonymous with *N. lineatus*, Dahlb. (Vet. Akad. Handl., 1850, p. 228). Mr. Saunders says, *l. e.*, "It is also allied to *N. lineatus*, Dahlb., a species unknown to me; but, according to Reuter's description, the present species appears to be distinct, especially in the narrow body of the ♀." This narrow body of the female is, however, just characteristic of *N. lineatus*, and I also begin my description (Öfv., Vet. Akad. Förh., 1872, p. 69) by "elongatus," &c. Last autumn I found many specimens of *lineatus* in South Finland, of which the breadth of the abdomen is little variable. The "hami copulationis" of the male in my specimens are formed quite as in *Poweri*, Saund., and there is no doubt of the identity of the two.

* It seems to me not certain whether *Reduvius apterus*, Fabr., is a *Coriscus* or *Coranus subapterus*, De Geer.—O. M. R.

CORISCUS MAJOR, Dougl. and Scott (Cat., p. 57, 5). Messrs. Douglas and Scott have *l. c.* cited *Stalia boops*, Schiödte, as synonymous with this species,* but they are two very distinct species, agreeing only in respect of the black or fuscous apex of the femora. *Stalia boops* differs by its considerably larger eyes, the head not prolonged behind the eyes, the posterior angles of the last abdominal segment in the ♀ obtuse, the dorsum of the abdomen testaceous or ochreous with three black longitudinal streaks, not plainly black as in *major*, the body more robust, and lastly, the wings are destitute of a cell-hook. This species forms at least a very good sub-genus, but to this *Coriscus major* is in no wise to be referred (as Stål has in Enum. Hem., iii, p. 111). *Stalia boops* is found in Denmark (Schiödte), near Stettin (Stål), and in Finland (Karelia, J. Sahlberg, and I have taken it near Helsingfors). *Coriscus major*, Costa, has not yet been observed in Scandinavia, Finland.

(*To be continued.*)

List of Hemiptera-Heteroptera occurring at Pitlochry, in Perthshire.—I have been spending the past season at the pretty village of Pitlochry, and, as the locality does not appear to have been worked before, I give a list of the better *Hemiptera-Heteroptera* that occurred to me. These have been mostly seen by Mr. Edward Saunders. A list of the *Homoptera* will follow in a subsequent number.

The wretched season notwithstanding, I feel pretty sure Pitlochry is a good station for bugs, indeed, to me they seemed to abound there in vastly greater numbers than here in Morayshire.

Gerris odontogaster; *G. aspera*, common, nearly all apterous; *G. Costæ*; *G. rufoscutellata*, rare; *G. lacustris*. *Macrolophus nubilus*. *Harpocera thoracica*, on oaks. *Calocoris striatus*, bred from larvæ on oak and crab-apple; *C. roseomaculatus*; *C. striatellus*, swarming on oaks; *C. bipunctatus*. *Eremocoris plebeius*, rare. *Paeциloscytus Gyllenhalii*; *P. unifasciatus*, common on *Galium*. *Nabis flavomarginatus*. *Orthocephalus mutabilis*. *Megaloceræa ruficornis*. *Rhopalotomus ater*. *Stiphrosoma leucocephala*, on *Galium*. *Dichrooscytus rufipennis*. *Orthotylus bilineatus*; *O. viridinervis*, common on elm. *Macrocoleus hortulanus*. *Plesiocoris rugicollis*, very common on sallow and *Myrica*. *Pithanus Markeli*, macropterous form. *Sehirus bipunctatus*. *Phytocoris tiliæ*; *Ph. pini*. *Berytus pygmæus*. *Gastrodes abietis*, rare, from cones of *Abies Douglassi*. *Derophysia foliacea*, rare. *Nysius thymi*. *Bryocoris pteridis*, in plenty, quite developed. *Psallus lepidus*; *Ps. obscurellus*.—G. NORMAN, Cluny Hill, Forres, N.B.: 30th November, 1879.

Stauropus fagi and *Acronycta alni* in the Forest of Dean.—It may be interesting to record that a fine specimen of *S. fagi* was taken in Dean Forest on the 20th of June last. Also on the 5th October, I found a larva of *A. alni*, feeding on hazel, in a wood near here.—A. E. HODGSON, Coleford, Gloucestershire: December, 1879.

* According also to Dr. Reuter (*in litt.*, 1875), Dr. Puton (Cat., p. 49, 1875); and Mr. E. Saunders (*Syneps.*, iii, 626, 1876) cites *major*, Costa, as the proper name for the species.—J. W. D.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 10.

Cœnozoic Time.

[*On the Insecta of the Miocene Period, and the animals and plants with which they were correlated.*]

In the United Kingdom rocks of Miocene Age are only represented in three or four localities ; but on the continents of Europe and North America, and in Greenland and Spitzbergen, they are largely developed.

*Great Britain and Ireland.**Lower Miocene.*

A few fragments of insects were discovered by Prof. Heer,* about eighteen years ago, in the clays and beds of lignite at Bovey Tracey† in Devonshire, but only one of them was in a sufficiently perfect state to be recognisable ; it consisted of part of an elytron of a beetle, which was described by Heer, and named by him *Buprestites Falconeri*. According to Mr. Pengelly,‡ this fragment furnished the first evidence of animal life discovered in the lignites of Bovey Tracey.

Prof. Judd§ has recorded the discovery of the elytra of two species of beetles in strata of Miocene Age, in the neighbourhood of Bally-palidy in the County of Antrim, Ireland.

*Continental Europe.**Lower Miocene.*

From the lower division of a series of Miocene deposits in Switzerland, lying between the Alps and the Jura, and known as the "Molasse," from the soft nature of a sandstone forming one of its principal members, about 33 species of insects have been determined by Prof. Heer.|| Of these 33 species, 26 belong to the *Coleoptera*, and are distributed amongst the *Carabidæ*, *Dytiscidæ*, *Peltidæ*, *Hydrophilidæ*, *Melolonthidæ*, *Buprestidæ*, *Elateridæ*, *Hælopidæ*, *LamIIDæ*, and *Chrysomelidæ*; the *Neuroptera* are represented by *Libellulidæ* and *Phryganeidæ*; the *Hymenoptera* by one species of *Vespidae*; the *Diptera* by one species of *Tipulidæ*; and the *Hemiptera* by *Pentatomidæ* and *Cicadellinæ*.

From the lignites or "Brown Coal" of Sieblos, Stoschen, Salzhausen, and Rott in the Siebengebirge, about 242 species of insects

* "On the Fossil Flora of Bovey Tracey," Trans. Royal Soc. Lond., 1862.

† The age of these beds is very doubtful ; they were described as Lower Miocene by Mr. Pengelly and Dr. Heer in 1862, but quite recently Mr. J. S. Gardner and Baron von Ettingshausen, in their Monograph of the British Eocene Flora (published by the Palæontographical Society, xxxiii, p. 18, 1879), have referred them to the same horizon as those at Bournemouth (*i.e.*, Middle Eocene).

‡ "The Lignites and Clays of Bovey Tracey," Proc. Royal Soc. Lond., 1860—1862.

§ Quar. Jour. Geol. Soc., vol. xxx, p. 274, 1874.

|| "Recherches sur le climat et la végétation du Pays Tertiaire," pp. 196—197 (the French translation, by Dr. Gaudin, of Heer's "Untersuchungen ueber das Klima und die Vegetationsverhältnisse des Tertiärlandes").

have been enumerated and described by Prof. Bronn,* Prof. Germar,† Dr. Giebel,‡ Prof. Heer,§ Dr. Hagen,|| Herr Carl von Heyden,¶ and Herr Lucas von Heyden.** These 242 species are distributed amongst the existing Orders as follows:—*Coleoptera* (126), *Neuroptera* (16), *Orthoptera* (3), *Hemiptera* (10), *Diptera* (76), *Hymenoptera* (8), and *Lepidoptera* (3). The majority of the *Coleoptera* belong to existing genera of the Families, *Carabidae*, *Hydrophilidae*, *Dytiscidae*, *Hydrobiidae*, *Staphylinidae*, *Buprestidae*, *Scarabaeidae*, *Silphidae*, *Trogositidae*, *Tenebrionidae*, *Cerambycidae*, *Prionidae*, *Lamiidae*, *Bruchidae*, *Byrrhidae*, *Ptinidae*, *Brenthidae*, *Cassididae*, *Elateridae*, *Dermestidae*, *Telephoridae*, *Cantharidae*, *Curculionidae*, *Chrysomelidae*, and *Coccinellidae*.†† The *Neuroptera* belong to the Families, *Libellulidae*, *Termitidae*, *Sialidae*, and *Myrmeleontidae*; and the *Orthoptera* to *Locustidae* and *Blattidae*. The *Hemiptera* are represented by *Nepidae*, *Notonectidae*, *Lygaeidae*, and *Iassidae*. Nearly half the species of *Diptera* belong to the *Bibionidae*; the remainder are distributed amongst the *Syrphidae*, *Culicidae*, *Cecidomyiidae*, *Chironomidae*, *Muscidae*, *Empididae*, *Tipulidae*, *Asilidae*, *Stratyonyiidae*, and *Mycetophilidae*. The *Hymenoptera* are represented by *Apidae* and *Formicidae*; and the *Lepidoptera* include one species of *Tineidae* (*Nepticula fossilis*), and one butterfly, *Vanessa vetula*, which is the only specimen yet obtained from the horizon of the Lower Miocene of Europe.

From the freshwater strata of Auvergne, in Central France, fossil insects have been obtained in several localities, and about 48 species have been described by M. Oustalet,‡‡ and one species by M. Charles Brongniart. §§ Of these 49 species, 31 belong to the *Diptera* (chiefly *Bibionidae*), and 10 to the *Coleoptera* (*Dytiscidae*, *Hydrophilidae*, and *Curculionidae*). The *Neuroptera* are represented by *Libellulidae*, *Myrmeleontidae*, and *Phryganeidae*; and the *Orthoptera* by one species (undetermined). Of the two remaining insects one belongs to the *Hymenoptera*, and the other (*Noctuites incertissima*) to the *Lepidoptera*.

Middle Miocene.

For our knowledge of the fossil insects obtained from the marls of Radoboj, in Croatia, we are indebted to Prof. Unger,||| Herr Von Charpentier,¶¶ and Prof. Heer.*** Heer has described about 311

* *Lethea Geognostica*, vol. ii, p. 811.

† *Fauna Insectorum Europeæ*, &c.

‡ *Zeitschrift für die gesammte Naturwissenschaft*, viii, 1856; and *Fauna der Vorwelt*, ii, 1856.

§ *Recherches sur le climat*, &c., *antea cit.*, p. 197.

|| "Neuroptera aus der Braunkohle von Rott in Siebengebirge," *Palaeontographica*, vol. x, 1861–1863, pp. 247–269.

¶ *Palaeontographica*, vols. iv, v, viii, x, xiv, and xv, 1854–1868.

** *Palaeontographica*, vols. xiv, xv, and xvii, 1865–1870.

†† Space does not admit of my giving a complete list of the Families.

‡‡ "Recherches sur les Insectes Fossiles," *Bibliothèque de l'école des hautes études*, tome iv, art. No. 7, Paris, 1871.

||| *Bull. de la Soc. Geol. de France*, tome iv, p. 459, 1876; and *Bull. Scientifique du Département du Nord*, No. 4, p. 73, 1878.

||| *Verhandl. der Kais. Leop. Akad. der Naturf.*, pp. 412–428, 1839.

¶¶ *Ueber einige fossile Insekten aus Radoboj in Croatién*, 1843.

*** *Die Insekten-fauna der Tertiärgebilde*, &c., 1847–1853: "Ueber die Insekten-fauna von Radoboj," *Bericht*, 32e Versamml. Deutsch. Naturf., 118–121, 1858; and "Untersuchungen ueber das Klima und die Vegetations Verhältnisse des Tertiärlandes," 1860.

species from Radoboj, which are distributed amongst the existing Orders as follows:—*Coleoptera* (42), *Neuroptera* (19), *Orthoptera* (13), *Hemiptera* (61), *Diptera* (83), *Hymenoptera* (85), and *Lepidoptera* (8).

The *Coleoptera* have been referred by Heer to 21 Families, amongst which may be mentioned *Carabidae*, *Dytiscidae*, *Staphylinidae*, *Nitidulidae*, *Peltidae*, *Buprestidae*, *Telephoridae*, *Chrysomelidae*, and *Coccinellidae*. The *Neuroptera* include 8 species of *Libellulidae*, and 10 species of *Termitidae*; and the *Orthoptera* are chiefly *Acriidiidae* and *Locustidae*. The *Hemiptera* are represented by *Pentatomidae*, *Coreidae*, *Lygaeidae*, *Reduviidae*, *Tingidae*, *Cicadellinae*, *Aphididae*, &c. The *Diptera* have been referred to 9 Families, including *Tipulidae*, *Mycetophilidae*, *Asilidae*, *Syrphidae*, and *Muscidae*. Of the 85 species of *Hymenoptera*, 57 belong to the *Formicidae*, and 22 to the *Ichneumonidae*, and the remainder to the *Vespidae*, *Apidae*, and *Sphegidae*. The *Lepidoptera** include 3 butterflies, one belonging to the *Nymphalidae* (*Eugonia atava*), and two belonging to the *Papilionidae* (*Mylothrites Pluto* and *Pontia Freyeri*); and 5 moths, viz., 2 belonging to the *Noctuidae*, 2 to the *Geometridae*, and one to the *Pyralidae*.

Upper Miocene.

To this division of the Miocene Period belongs the celebrated lacustrine formation of Oeningen, in the valley of the Rhine, between Constance and Schaffhausen. Upwards of 5,000 specimens of fossil insects have been obtained from this locality, from which specimens Prof. Heer† has identified and described 844 species, distributed amongst the existing Orders as follows:—*Coleoptera* (518), *Neuroptera* (27), *Orthoptera* (20), *Hemiptera* (133), *Diptera* (63), *Hymenoptera* (80), and *Lepidoptera* (3).

The *Coleoptera* are distributed amongst 59 Families,‡ of which the following may be mentioned as containing the greatest number of species, viz., *Carabidae*, *Dytiscidae*, *Nitidulidae*, *Peltidae*, *Histeridae*, *Copridae*, *Hydrophilidae*, *Melolonthidae*, *Buprestidae*, *Elateridae*, *Telephoridae*, *Cistelidae*, *Prionidae*, *Cerambycidae*, *Lamiiidae*, *Curculionidae*, *Chrysomelidae*, and *Coccinellidae*. The *Neuroptera* include 20 species of *Libellulidae*, besides *Termitidae* and *Phryganeidae*. The *Orthoptera* are represented by *Locustidae*, *Acriidiidae*, *Gryllidae*, *Blattidae* and *Forficulidae*. The *Hemiptera* belong principally to the Families, *Scutelleridae*, *Pentatomidae*, *Coreidae*, *Lygaeidae*, *Reduviidae*, and *Cicadidae*. The *Diptera* are repre-

* "Die Insekten-fauna," &c., *antea cit.*: Scudder's "Fossil Butterflies," pp. 41—51; *Recherches sur le climat*, &c., *antea cit.*, p. 205; and "Lepidoptera Exotica," pp. 127—8.

† Die Insekten-fauna, &c., *antea cit.*; *Die Urwelt der Schweiz*; and *Recherches sur le climat*, &c., *antea cit.*

‡ The *Carabidae* include 54 species, the *Buprestidae* 40 species, the *Elateridae* 27 species, and the *Curculionidae* 72 species.

sented by *Chironomidae*, *Tipulidae*, *Mycetophilidae*, *Astilidae*, *Syrphidae*, and *Muscidae*. The great majority of the *Hymenoptera* belong to the Families, *Formicidae*, *Ichneumonidae*, and *Apidae*; and the 3 species of *Lepidoptera* to the *Bombycidae*.

When we consider that the *Lepidoptera* was undoubtedly the last Order to appear, that the (Eningen formations are more recent than any of those (in Europe) from which butterflies have been discovered, and that from them more fossil insects have been obtained than from all the other localities put together, the rarity of *Lepidoptera*—the entire absence of butterflies—is very remarkable.*

From strata at Parschlug in Styria, belonging to the same division of this Period, Dr. Heer† has enumerated 14 species of insects, viz., *Coleoptera* (7), *Neuroptera* (1), *Orthoptera* (2), *Diptera* (2), and *Hymenoptera* (2).

Numerous specimens of fossil insects were formerly obtained by the Rev. F. W. Hope, Signor Massalongo, and others, from the famous deposits of Senigallia, in the north-east of Italy, but, with the exception of two fossil larvæ of *Libellulidae*,‡ none of them have, I believe, ever been described.

America. §

During the last twenty years several thousands of specimens of fossil insects have been obtained by Prof. Denton, Mr. Richardson, Mr. S. H. Scudder, Dr. F. V. Hayden, Mr. F. C. Bowditch, Dr. A. C. Peale, Mrs. Charlotte Hill, and others, from Tertiary strata in various localities in the United States, especially on the White River at Fossil Cañon Utah; in Chagrin Valley and Florissant, in Colorado; and near Green River Station, in Wyoming. About 30 specimens have also been obtained by Mr. George Dawson from Quesnel, British Columbia. From these specimens, Mr. Scudder|| has already described nearly 200 species, distributed amongst the *Coleoptera*, *Neuroptera*, *Orthoptera*, *Hemiptera*, *Diptera*, *Hymenoptera*, and *Lepidoptera*. The *Coleoptera*

* See Mr. Scudder's remarks on this subject in his "Fossil Butterflies," Proc. Amer. Assoc. for the Advancement of Science, p. 71, 1875.

† Recherches sur le climat, &c., *antea cit.*, p. 197.

‡ Studii Paleontologici, pp. 22 and 23, plate i, figs. 8–13. Verona, 1856.

§ Mr. Scudder, to whom we are indebted for descriptions of all the fossil insects yet described from the American Tertiaries, has not, in any case, stated whether the strata, from which the insects have been obtained, belong to the Eocene, Miocene, or Pliocene Periods. From an examination of the geological maps of the United States Geological and Geographical Survey it appears that the strata, from which the insects were obtained, are, almost without exception, of Miocene Age. It may be, however, that some few of the specimens were discovered in rocks of Eocene Age, and should therefore have been described in the last paper; but, in the absence of precise information as to the horizons from which these fossils were obtained, I have thought it best to refer to all the American Tertiary *Insecta* in one paper.

|| Proc. Bost. Soc. Nat. Hist., x and xi; Amer. Nat., i and vi; Geol. Mag., v; Bull. Geol. and Geogr. Survey of the Territories, vol. ii, No. 1, 1876; vol. iii, No. 4, 1877; and vol. iv, Nos. 2 and 4, 1878; and "Report of Progress," Geol. Survey of Canada, 1875–1876, and 1876–1877. Space does not permit me to give a complete list of the Families and genera of the *Insecta* from the American Tertiaries. An exhaustive work, by Mr. Scudder, containing descriptions and figures of all the known species from the American Tertiaries is about to be published by the Geological and Geographical Survey of the United States.

belong to the Families, *Carabidæ*, *Dytiscidæ*, *Hydrophilidæ*, *Staphylinidæ*, *Bruchidæ*, *Nitidulidæ*, *Cryptophagidæ*, *Elateridæ*, *Ptinidæ*, *Erotylidæ*, *Cerambycidæ*, *Chrysomelidæ*, *Rhynchitidæ*, *Otiorhynchidæ*, *Curculionidæ*, *Scolytidæ*, *Anthribidæ*, &c. The *Neuroptera* are represented by *Libellulidæ*, *Agrionidæ*, *Panorpidae*, and *Phryganeidæ*; and the *Orthoptera* by *Gryllidæ*, *Locustidæ*, and *Forficulidæ*. The *Hemiptera* include *Pentatomidæ*, *Lygaeidæ*, *Reduviidæ*, *Iassidæ*, *Fulgoridæ*, and *Tettigoniidæ*. The *Diptera*, which are very numerous, are distributed amongst the *Culicidæ*, *Chironomidæ*, *Tipulidæ*, *Mycetophilidæ*, *Asilidæ*, *Muscidæ*, *Syrphidæ*, *Helomyzidæ*, *Myopidæ*, *Dolichopodidæ*, *Sciomyzidæ*, and *Cecidomyiidæ*. The *Hymenoptera* are represented by *Ichneumonidæ*, *Formicidæ*, *Myrmicidæ*, and *Chalcididæ*: and the *Lepidoptera* by one species* belonging to the *Nymphalidæ*—*Prodryas Persephone*—the only fossil butterfly yet discovered in the New World, and which is remarkable, not only as being in more perfect condition than any of those obtained from the European Tertiaries, but, “in presenting,† as none of the ‘others do to any conspicuous degree, a marked divergence from ‘living types, combined with some characters of an inferior ‘organization.’”

Arctic Regions.

From a number of fragments of fossil insects obtained from the Miocene formation of Spitzbergen, in the Arctic Ocean, Dr. Heer‡ has determined 23 species, 20 of which belong to the *Coleoptera*, and are distributed amongst the Families *Carabidæ*, *Dytiscidæ*, *Silphidæ*, *Hydrobiidæ*, *Elateridæ*, *Chrysomelidæ*, and *Curculionidæ*. Of the 3 remaining insects, one belongs to the *Orthoptera* (*Blatta hyperborea*), and 2 to the *Hymenoptera* (*Hymenopterites deperditus* and *Myrmicium boreale*).

Dr. Heer§ has also described 7 species of insects from the Miocene formation of Greenland. Of these 7 species, four belong to the *Coleoptera* (*Trogositidæ*, *Cistelidæ*, and *Chrysomelidæ*), one to the *Orthoptera* (*Blattidium fragile*), and two to the *Hemiptera* (*Cercopidium rugulosum* and *Pentatoma boreale*).

Representatives of almost all classes of the Animal Kingdom have been discovered in the rocks of this Period, but as the majority belong to existing types, a very brief notice of them will be sufficient.

* Discovered by Mrs. Charlotte Hill in Tertiary strata at Florissant, Colorado.

† Scudder, in Bull. Geol. and Geogr. Survey, vol. iv, No. 2, p. 521, 1878.

‡ Die Miocene Flora und Fauna Spitzbergens &c., Stockholm, Akad. Handl., viii, pp. 73—78, 1869.

§ Flora Fossilis Arctica, i, pp. 129, 130, 1868; and Kongliga Svenska Vetenskaps-Akademiens Handlingar, xiii, No. 2, p. 25, 1869.

The *Mollusca* are very abundant, and from 15 to 30 per cent. of the species are identical with those of the present age.

The *Pisces* are numerously represented, and, in addition to the remains of numbers of species belonging to the *Telostei*, teeth of several extinct species of Sharks of gigantic size have been discovered.

The *Amphibia* include *Salamandridæ* and *Ranidæ*; and the *Reptilia* are represented by *Crocodilia* and *Chelonia*.

The *Aves*, although all of extinct species, belong, without exception, so far as is known, to existing Groups.

The *Mammalia* are abundant, and include representatives of all the existing Orders except *Bimana* (man).

The Plant* life of this Period was of a very varied and luxuriant character, but as the majority of the species belong to existing groups† they call for no special notice. The geographical distribution of the species was, however, widely different from that of the present day, and the Miocene flora of Europe includes a remarkable intermixture of forms, many of which are now characteristic of tropical or subtropical countries.

The Avenue, Surbiton Hill, S.W.:
November, 1879.

Capture of a Dufourea in Hants, a genus of Hymenoptera new to Britain.—On the 12th of August last, while sweeping among wild camomile flowers and low herbage along the undercliff near Chewton, Hants, I took a species of *Dufourea*, one of the short-tongued bees, which Thomson, in his "Hymenoptera Scandinaviae," has united with *Rhopites*, a genus of long-tongued bees (*lingua pectus fere superante, l. c., ii, 117*) ; which fundamental differences in structure and habit, together with others in the alary venation, he reduces to sectional characters.

Lepeletier de St. Fargeau, in defining the genus *Dufourea*, from Latreille's collection (having never taken it himself), mentions that the females have a large head like *Panurgus*, while the males, in general form, closely resemble those of *Halictus*.

My specimen is a male, coinciding with St. Fargeau's description of *D. minuta*, excepting in having the legs and antennæ black throughout; but, as depending upon a single example, and in the absence of a female, I can only regard this as a variety of the aforesaid, with which it corresponds in size, namely, about $4\frac{1}{2}$ lines.

A foreign specimen of the female of *D. minuta* is in the British Museum; and a male (from Switzerland) apparently identical with mine, but under a wrong name (*Andrena lucens*, ♂, Imhoff), has recently been transferred to the Museum collection from that of the late F. Smith.

Rhopites was first added to the British Fauna in 1877, the *R. quinquespinosus* having been taken in that year by the Rev. E. N. Bloomfield at Guestling, near Hastings (Proc. Ent. Soc., 1877, p. 32); and again in August, 1878 (Ent. Mo. Mag., xv, p. 113).

The genus *Dufourea* is new to Britain.—S. S. SAUNDERS, Gatestone, Upper Norwood: December, 1879.

* Many Miocene Plants belong to existing species, but the great majority are extinct.

+ Angiospermous *Exogens*, and *Monocotyledons*.

List of insects observed in Tresco, Scilly Isles, in August, 1878.—The following list contains several names of insects which, so far as I am aware, have not yet been recorded as occurring in the Scilly Isles; but, for all that, it must be a very meagre list, for the weather was particularly unsuitable for finding insects. More or less rain fell every day during the fortnight in which the observations were made, and, worse than that, the most delicious mixture of brown sugar, treacle, and rum, not only failed to attract^o the commonest things, but seemed to positively drive all things (except one *A. oculata*) away from it. One bed of *Senecio jacobaea*, well sugared, produced only the above named exception; sugared tree trunks—nothing; whilst another bed of *Senecio jacobaea* showed wild sport with several species of *Lepidoptera* during the same night. The blossom, which was sugared, was, I thought, in the choicest spot in the island, viz., between the Abbey gardens and the lake, on an open bit of heather, well sheltered and completely surrounded by trees, shrubs, and dense beds of sallow, reeds, &c. The tree trunks which were sugared in vain were on the other side of the gardens, near the attractive blossom. A huge lamp (of three meteor burners), lighted on a marshy spot near the lake, failed to account for anything but a few “micros.” The abundance of larvæ, excessive in proportion to the very few imagos seen, and the decidedly omnivorous habits of almost all the larvæ observed, also tend to produce the impression in my mind that a worse August could hardly have been chosen for the purpose, nor a worse fortnight in that month. I was taking *Triphæna orbona* just before I visited Seilly, and continued to see it in abundance after that visit ended, but neither the type form nor the variety occurred there during that visit. In the following October my usual mixture of sugar, treacle, and plenty of rum proved very attractive, especially within a yard or two of the best lot of ivy bloom I ever saw (but that was in Bedfordshire). I feel sure that an entomologist may find many insects in Tresco, even in August, that have not yet been recorded as having occurred there. *Deilephila euphorbiae* did not reward my patience, though I have reason to think its larva has been taken there, on the sea-spurge, by the present gamekeeper.

COLEOPTERA.—*Pterostichus cupreus*, *Calathus mollis*, *Dromius linearis*, *Broscus cephalotes*, *Phalacrus corruscus*, *Geotrupes typhæus*, *mesoleius*, *stercorarius*, and *vernalis*, *Aphodius rufipes*, *Serica brunnea*, *Cetonia aurata*, *Heliopathes gibbus*, *Otiorhynchus atroapterus* and *sulcatus*, *Haltica ericeti*, *Coccinella 11-punctata*.

DERMAPTERA.—*Forficula auricularia* (var. *forceipata*).

ORTHOPTERA.—*Periplaneta orientalis*, *Acrida viridissima*, *Stenobothrus* — ?

HYMENOPTERA.—*Mellinus arvensis* (♀), *Vespa sylvestris* (♀), *Halictus cylindricus* (♀) and *albipes* (♂), *Andrena Afzeliiella* (♂), *Bombus Smithianus* (♀ and ♀) and *lapidarius* (♀), *Apathus vestialis* (♂), *Apis mellifica* (♀, var.), *Henicosipilus ramidulus*, *Probolus alticola* (♀), *Pimpla instigator* (♂ and ♀).

NEUROPTERA.—*Hemerobius humuli*, *Ischnura elegans* (♂ and ♀), *Libellula striolata* (♂ and ♀), immature (♂).

TRICHOPTERA.—*Limnophilus marmoratus* (var.).

LEPIDOPTERA.—*Pieris brassicæ* and *rapæ*, *Hipparchia Janira*, *Cynthia cardui* (and larvæ on burdock), *Vanessa Atalanta* and *urticæ*, *Chrysophanus phœas*, *Anthrocera* — ? (two on the wing, and three pupa cases), *Macroglossa stellatarum*, *Cerura vinula* (one larva), *Porthesia auriflava*, *Arctia caja* (larvæ abundant), *Phragmatobia fuliginosa*, *Spilosoma menthastris* and *lubricipeda* (larvæ in abundance),

on *Mesembryanthemum*), *Callimorpha jacobææ* (larvæ abundant), *Bryophila glandifera*, *Acronycta rumicis* (larvæ abundant), *Xylophasia polyodon*, *Cerigo cytherea*, *Luperina testacea*, *Mamestra brassicæ*, *Apamea oculea*, *Miana furuncula* or *strigilis* (too old to be identified), *Agrotis puta* (*suffusa*, *segetum*, and *tritici*, sent to me from St. Mary's or St. Agnes after my departure), *Triphæna janthina*, *Noctua plecta*, *c-nigrum* and *rubi*, *Phlogophora meticulosa*, *Euplexia lucipara*, *Hadena chenopodii* and *pisi* (larvæ), *Abrostola urticae* and *triplasia*, *Plusia gamma*, *Cucullia?* (*Verbascum thapsus* desfoliated apparently by *C. verbasci*), *Rumia cratægata*, *Ephyra porata*, *Acidalia promutata*, *Cabera exanthemaria*, *Hypsipetes elutata*, *Eubolia mensuraria*, *Melanthis ocellata*, *Melanippe subtristaria* and *galiata*, *Camptogramma bilineata*, *Herbula cespitalis*, *Endotricha flammealis*, *Botys verticalis*, *Scopula ferrugalis* and *hybridalis*, *Aphomæa colonella*, *Crambus culmellus* and *geniculellus*, *Hyponomeuta cognatella*, *Plutella cruciferarum*, *Depressaria heracliana* or *olerella*, *Ecophora pseudospretella*, *Pterophorus lithodactylus* and *pterodactylus*.

HEMIPTERA.—*Piezodorus lituratus*, *Stenocephalus agilis*, *Ptyelus spumarius*.

APHANIPTERA.—*Pulex (irritans ?)*.

DIPTERA.—*Tipula oleracea*, *Chrysomyia formosa*, *Anthrax hottentotta*, *Eristalis arbustorum* (♂ an ♀) and *tenax* (♂ and ♀), *Platychirus manicatus*, *Sarcophaga carnaria*, *Scatophaga stercoraria*, *Machærium maritimæ*.—FRANK NORGATE, Sparham: November, 1879.

Coleoptera taken in the Forest of Dean and neighbourhood during 1878 and 79.
—The Forest of Dean cannot be reckoned a tempting spot for entomological work, being characterized by a very poor flora, an absence of undergrowth, and trees whose lower branches have been removed by the elements or other agencies, and above which tower here and there chimneys emitting ever and anon volumes of smoke, the blackest of the black. Here one misses the luxuriant hedgerows, the lichen covered trunks and pales, and the alternation of heath, bog, and woodland, so familiar to the frequenter of Brockenhurst and other places in the New Forest, and the visitor finds a tract of land, the uniformity of which soon makes a ramble become wearisome, even though the eye may be relieved by pretty pieces of landscape in some parts, due to the undulating nature of the ground, but too often somewhat marred by unsightly rubbish heaps and other evidences that quarrying, colliery works, and the iron trade form the staple industries of the district. In these mining operations a quantity of timber is used, and possibly to supply this want, and to furnish bark for tanning purposes, the majority of the trees (principally oak) in the Forest are cut down years before they would reach maturity. A few of the stumps thus caused, are left in the ground long enough to become rotten, and from the dark coloured decayed oak stumps I have extracted *Scydmaenus Sparshalli* and about eighty *Elater pomorum*; from the fungoid growths in or on them, three of the four *Boletobii*, *Quedius lateralis*, *Philonthus splendidulus* and *puella*, *Baptolinus alternans*, *Scaphidium 4-maculatum*, *Onthophilus striatus*, and *Rhizophagus cribratus*; from the moss or bark, partly covering them, *Agathidium seminulum*, *Megacronus alternans*, *Carabus arvensis*, *Harpalus latus*, *Paromalus flavidicornis*, *Liodes orbicularis*, *Silpha obscura*, *Cerylon histeroides* and *ferrugineum*, and *Cytillus varius*. During the spring and summer months, *Calosoma inquisitor* and *Silpha 4-punctata* occurred on trunks or *Pteris*; *Corymbites cupreus*, *pectinicornis*, and *holo-*

sericeus, *Sericosomus brunneus*, and *Campylus linearis* on the bracken; *Priobium castaneum* on holly trunks, the solid wood of which has plainly nourished many previous generations; *Rhyncolus gracilis*, the three *Rhinosimi*, *Acalles ptinoides*, and *Cænopsis Waltoni*, in a like situation: on oak, beech, or chestnut, *Balaninus pyrrhoceras* and *turbatus*, *Rhynchites pubescens*, *Elleschus bipunctatus*, *Polydrosus micans*, *Trypodendron quercūs*, and *Telephorus alpinus*; *Dinarda Mærkeli* from a nest of *Formica rufa*; *Clytbra 4-punctata* from sallow bushes, swarming with a species of *Aphis* and the wood-ant; *Melasis buprestoides*, *Trachodes hispidus*, on felled trunks. Under firs and beech bark: *Ditoma crenata*, *Ips 4-punctata* and *4-guttata*, *Agathidium nigripenne*, *Hylurgus piniperda*, *Hylobius abietis*, and *Epuraea (probably immunda)*; *Staphylinus fulvipes* from sheep droppings. During the autumn *Prionus coriarius* has occasionally been met with. *Pterostichus oblongo-punctatus* is common under stones in the winter months.

The woods near the banks of the Wye being within a five mile walk may be fairly considered as part of the neighbourhood, and have yielded a good number of species. The most noteworthy of these are *Lithocharis brunnea*, *Bythinus Curtisi*, *Cephennium thoracicum*, *Colon Zebei*, *Telephorus translucidus* and *alpinus*, *Orobitis cyaneus*, *Gymnetron beccabunga* and *melanarium*, *Orchestes avellanæ*, *Barynotus mærens*, *Clytbra 4-punctata*, *Lamprosoma concolor*, *Cryptocephalus morœi*, *Chrysomela varians* and *didymata*, *Crepidodera rufipes* and *atropæ*, *Thyamis lurida*, *Mniophila muscorum*, *Pogonocherus dentatus*, *Pachyta 8-maculata*, and *Orchesia undulata*, principally by sweeping.—A. E. HODGSON, Coleford, Gloucestershire: December, 1879.

Re-occurrence of Phosphænus hemipterus at Lewes.—Two females of this species have just been brought to me for determination, one of which is now in my collection. They were taken by Mr. Michael Ward, of Dukinfield, a Lepidopterist, whilst sugaring; his attention had been attracted by the phosphorescence, which was visible as a narrow belt across the abdomen; probably the ♂ might be taken by sweeping.—J. CHAPPELL, 89, Bonsall Street, Hulme, Manchester: 8th December, 1879.

[Some of our readers will remember the record of the occurrence of this glow-worm at Lewes, in vol. v, pp. 44 and 70, of this Magazine. Its possible introduction with ferns from Jersey is there mentioned (p. 70). Even if this were the case, the insect appears to have thoroughly established itself, as eleven years have elapsed since the former record.—EDS.]

Silvanus bidentatus and *Stenostola ferrea* in Dunham Park.—Two years ago I had the pleasure of capturing a specimen of *Silvanus bidentatus* in Dunham Park, under the bark of the fallen branch of a gigantic oak. For several years I have succeeded in taking one or two examples each season of the rare *Stenostola ferrea*, by beating *Tilia europæa*, in the same locality.—ID.

Note on Sciomyza (Colobæa) bifasciella, Fall.—A single specimen of this very distinct and pretty Dipterous insect was taken by my father at Cosmore quag on August 11th, 1855. The quag, which was situated in the next parish to this, has since been drained, and several rare plants and insects have thus been destroyed. *Colobæa bifasciella*, which was named by the late Mr. Haliday, for my father, is

briefly included by name only in the addenda and corrigenda of Mr. Walker's "Diptera Britannica," vol. iii, xiv. The following is Zetterstedt's description of it: *Pallide testacea, nigro-lineata; alis albidis, nigro-bifasciatis, pedibus flavis, antecorumb femoribus, tibiis et tarsis, posteriorumque femoribus macula apicali, nigro-fuscis.* ♂ ♀. (Long. $\frac{3}{4}$ —1 lin., raro ultra).—C. W. DALE, Glanville's Wootton: 15th December, 1879.

Protective resemblance in pupa of Pieris rapæ.—Thrice in 1878 I met with pupæ of *Pieris rapæ* attached to leaves of plants, and in each case the pupa very closely simulated the colour of the leaf. The first was on the under-side of a leaf of swede turnip, the second on the upper-side of a leaf of horse-radish, and the third was on the upper-side of a privet-leaf. The difference in appearance between these and those found on fences, &c., was most striking.—J. E. FLETCHER, Happy Land, Worcester: December, 1879.

Vanessa cardui in Arabia.—In Mr. Wilfrid S. Blunt's account, at a meeting of the Royal Geographical Society, of his recent journey in Central Arabia, he mentions the fact of his having observed a specimen of the painted-lady butterfly, renowned, as he says, for long flights, sunning itself on the rocks of Aalem, in the great sand desert of Nefud. This insect, he further observed, could not have been bred at any nearer point than the hills of Syria, 400 miles off—a statement somewhat at variance with his account of the unexpected luxuriant vegetation of the Nefud, in which it can scarcely be doubted that so persevering and hardy a plant as the thistle would be found. At all events, the penetration of this butterfly into the centre of Arabia seems worth recording.—E. C. RYE, 1, Savile Row, W.: December, 1879.

Re-occurrence of Ennomos alniaria (autumnaria, Wernbg.) at Gosport.—I think I may now claim for *E. alniaria* the designation of a British insect. Your readers may recollect my announcement of the capture, in 1877, in this neighbourhood, by a young entomologist, a pupil at the Royal Naval Academy here, of three specimens of *E. alniaria*. The season of 1878 proved a blank so far as this species was concerned to me. This year I have taken over a dozen specimens in an out-of-the-way part of the suburbs, and in a very circumscribed area—a district I do not think I visited last year. The insects probably belonged to the same brood, as I took them by twos and threes each evening for about a week.

As an instance of the irregular occurrence of certain species I may mention that last year I took a long series of *Anthocelis lunoa* on two or three gas lamps in this road, whereas this year I have not taken a single specimen.—E. F. HEATH, Brooklands, Bury Road, Gosport: December 10th, 1879.

Acronycta alni in Dunham Park.—Two larvæ of *A. alni* were taken last season: one by myself, beaten out of lime when about 4" in length; it fed up on lime, and is now a pupa: the other was taken by Mr. Thomas Thorpe, of Bowdon. The clavate hairs only appear with the last moult.—J. CHAPPELL, 89, Bonsall Street, Hulme, Manchester: 8th December, 1879.

Capture of Laphygma exigua, &c.—On August 11th I captured a specimen of

L. exigua in the Isle of Purbeck ; it flew out of a furze bush. I also met with *Ebulea verbascalis*, *Pempelia genistella* = *Davisella*, Newm., and *Æcophora lambdella* at the same place ; and *Aphalara artemisiæ* in plenty on *Artemisia absynthium* in the Isle of Portland during the months of August and September. The past has been the worst season for collecting I have ever known, and almost every species was at least a month behind time. The middle of May arrived before I saw a single butterfly, and *Bibio Marci* did not make its appearance before the 1st of June. *Eupithecia irriguata* was out as late as June 10th ; *S. Hyperanthus* as late as September 8th ; and *S. Tithonus* as late as the 22nd of September ; but I was the more astonished at meeting with *L. Adonis* and *Corydon* on the 2nd of October at Dover. —C. W. DALE, Glanville's Wootton : December 15th, 1879.

Food-plants of Tortricodes tortricella.—Twice have I reared this insect from a lot of larvæ collected in the busy season of July, and which, through press of occupation, had not been overhauled. Some twenty years since I bred two males from larvæ on lime, and in 1877 I bred a ♀ from oak.—J. E. FLETCHER, Happy Land, Worcester : December, 1879.

Occurrence of Tischeria gaunacella in Essex, a species unrecorded as British.—In the month of May, 1878, I bred three specimens of this insect from sloe-leaves collected the previous October, somewhere in this neighbourhood. I was not aware until quite recently of the rarity of the insect I had bred. Whilst collecting some mines of *Lithoclellis spinicolella*, I observed some peculiar brownish blotches on some of the sloe-leaves, having a tendency to turn up the edges of the leaves. I could not, however, recognise the larva forming the blotch, nor could I ascertain from the works at my command what it was. I believed it to be a *Tischeria*. I therefore kept the leaves with the *L. spinicolella* mines, trusting to be able to breed one or two of them in the following spring, and thus identify them. The mines were stowed away during the winter in a glass bottle, tightly corked, and placed in a large tin box in the garden. They were brought indoors on the 27th April, 1878, and then kept in a room without a fire ; no forcing was applied in any way. I very much regret now that I made no sufficient note of the precise locality where I found the leaves containing the blotches, as I understand that some of the species of *Tischeria* are extremely local, and will occur in plenty in one lane and nowhere else in the neighbourhood. The reason I had not ascertained the name of the insect until recently arose from the fact that I was unable from pressure of other matters to give much time to entomology during the season of 1878, the consequence being I had at the end of that season only two or three little things that I was unacquainted with, and these I retained, trusting to do something more in 1879, and then get my 1878 captures identified.—W. D. CANSDALE, 4, Guithavon-terrace Witham, Essex : December 17th, 1879.

Trifurcula pallidella; a species new to Britain.—During the last week in August, whilst sweeping for *Ochsenheimeria bisontella* near my country house at Dutton, near Ribchester, I swept a small pale yellow moth, which I saw at first glance was not *Elachista subochreella*, in fact I caught it twice over, as it was so difficult to see it in a white net ; when I got home and pinned it I saw its woolly head,

and then I thought it might be a *Tinea*; however, it had not the long body or under-wings of a *Tinea*, so off it goes to my friend Mr. Stainton, to whom we all have recourse in our difficulties, and he writes to me, thus: "your insect is *Trifurcula pallidella*, Zeller; my specimens are from Vienna; it seems to be a rarity on the continent."—J. B. HODGKINSON, 15, Spring Bank, Preston : December 9th, 1879.

Occurrence of Ephestia passulella in Lancashire.—During the month of November I have been setting a number of an *Ephestia* new to me, but as I thought my friend Mr. C. G. Barrett had once sent me specimens like those I was taking, I pinned a few and sent them to him, and he named it as above, and was glad I had turned it up in another locality.—ID.

Elachista monticola in Lancashire.—I have turned up this species in plenty at Dutton ; now comes the question, has it to be *alpinella* of Edleston, or *monticola*? It appears to me *alpinella* will go a long way back, if any one will look at Morris's figure of *alpinella* by Gregson they will soon see it is the veritable *monticola*; I may add C. S. Gregson made the drawing from Edleston's specimen.—ID.

ENTOMOLOGICAL SOCIETY OF LONDON.—November 5th, 1879. H. W. BATES, Esq., F.L.S., &c., Vice-President, in the Chair.

Mr. T. R. Billups, of Peckham, was elected a Member.

Mr. Stainton read letters from Lord Walsingham, in which the latter explained that it was purely with a wish to aid the Society that he had offered the prizes for essays on the life-histories of certain *Entozoa*, through it. He considered the other societies named in Mr. McLachlan's and Mr. Stainton's remarks at the last Meeting were able to afford to offer such prizes without extraneous aid. Moreover, it was possible the parasites might, in an intermediate stage, live in the larvæ of insects.

Mr. Stainton thought that Lord Walsingham had simply been led into an error of judgment, and compared the present case to that of some one, actuated by a desire to further science, offering a prize for an essay on chlorine to the Royal Astronomical Society, instead of to the Chemical Society.

The Chairman said the Council had not considered it necessary to alter its decision.

Mr. McLachlan said it had become necessary that he should again refer to the "sculptured" stones on the shores of the Swiss Lakes, in consequence of a communication received from Prof. Forel, who distinguished several kinds of sculptures, but mainly concentrated in two forms, on stones covered with chlorophyllous and incrusting *Algæ* respectively. On the former the markings due to the agency of Trichopterous larvæ occurred, on the latter the sculpturings were much deeper, and owing (in his opinion) to the continued action of insect-larvæ, worms, mollusks, &c., by forcing pathways through the *Algæ*.

Prof. Westwood exhibited drawings of the egg-masses and young larvæ of a Trichopterous insect, deposited on leaves, in connection with Mr. McLachlan's notes in the November No. of the Ent. Mo. Mag.; also of various Heteropterous *Hemiptera* in the Hope collection. With reference to Mr. C. O. Waterhouse's remarks at the last meeting, on the affinities of *Polyctenes*, he said that the structure of the mouth-organs, &c., proved that the insect was Hemipterous, as also did the metamorphoses.

Mr. C. O. Waterhouse did not admit the force of the arguments used by Prof. Westwood as proving that the insect could not be Dipterous.

Prof. Westwood entered into an explanation of the terms under which the Hope collection was bequeathed to the University of Oxford, and the Professorship of Invertebrate Zoology established there, with an analysis of the extent and value of the collection as it now existed, through accumulations from donations and purchases of the most important nature. The Oxford Commissioners now proposed that when the chair should become vacant, it should become united with a Readership in Invertebrate Zoology, making it equivalent to the chairs of Human and Comparative Anatomy, as now existing. Against this suggestion the widow of the late Rev. F. W. Hope* had protested, as opposed not only to the spirit of the bequests made by her husband, but also to the clause of the deed under which the Professorship was held.

Mr. McLachlan said that entomologists should feel grateful to Prof. Westwood for having brought this subject before the Society : it was greatly to be desired that the chair should continue to be held by an entomologist, both as carrying out the wish of the founder, and as a guarantee that the magnificent collections would be cared for, and made available for the purposes intended by the Rev. F. W. Hope.

Mr. Jenner Weir exhibited ants (apparently of the genus *Atta*) which he had found at Pisa, and which accumulated round their nests the shells of two species of *Helix*, all of which were empty when he found them. Also a specimen of a moth (apparently the ♀ of *Orgyia antiqua*) which had been placed in his hands as an instance of transformation, without having passed through the pupa-state.

Mr. W. C. Boyd exhibited an example of *Cidaria tristata*, in which both posterior-wings were congenitally absent, a singular variety (or aberration) of what was apparently *Aspilates citraria*, and a *Noctua* that might be a melanic form of *Hadena dentina*; the latter from North Devon.

Mr. Distant communicated "Notes on the habits of various Indian *Hemiptera*," on the authority of a correspondent of Mr. F. Moore.

Dr. Fritz Müller communicated a photograph and notes on the transformations of a Brazilian Dipterous insect, especially remarkable for the dimorphism exhibited by the females, one set of which had the mouth-organs fitted for honey-sucking, as in the males, in the other set they were fitted for blood-sucking.

Dr. Buchanan White communicated the first part of a paper on the *Hemiptera* collected on the Amazons, by Prof. Trail.

Mr. F. Bates communicated "Descriptions of new species of *Tenebrionidae* from Madagascar."

Mr. C. O. Waterhouse read "Descriptions of new *Coleoptera* from East Africa and Madagascar."

Mr. Butler communicated a paper (illustrated by an exhibition of preserved larvae from Lord Walsingham) "On the affinities of the British moths usually placed in the genus *Acronycta*." He referred these to various old (mostly) Hübnerian genera, and the result of his analysis was as follows:—*A. rumicis* and *auricomata* should be transferred to the *Arctiidae*, *leporina* and *aceris* to the *Liparidae*, *megacephala*, *psi*, *tridens*, *strigosa*, &c., to the *Notodontidae*, whereas only *alui* and *ligustri* remained in the *Noctuidae*.

* The death of the widow of the Rev. F. W. Hope has since then appeared in the "Times" obituary.

NOTES ON BRITISH TORTRICES.

BY C. G. BARRETT.

(Continued from vol. xv, p. 249).

Antithesia postrema, Z. This beautiful species was discovered, as already recorded (vol. xv, p. 14), by Mr. J. B. Hodgkinson in Westmoreland, and I am indebted to him for a full grown larva, of which it may be well to give a description: cylindrical, plump, rather wrinkled, colour pale primrose-yellow, spots of the same colour, raised and shining, and with minute hairs, head and dorsal plate shining black, anal plate small, brown.

In a stem of the wild balsam (*Impatiens noli-me-tangere*), feeding on the cellular substance, and hollowing the lower part of the stem quite out down to the root, afterwards constructing a wall of silk and excrement across the upper part of the burrow, and living below, moving actively up and down the chamber thus formed. Full fed in the middle of September. Apparently it would have remained in this chamber until spring, but my specimen was destroyed by mould in the winter. Mr. Hodgkinson, however, rears them from the old stems in June.

Probably the larva varies slightly in colour according to age, for von Heyden describes it (most likely from a younger larva): "thick, "nearly of equal breadth, rather flattened, shining, *dirty greenish* (like "the inside of the stem of the food-plant), with flat shining little "warts, each bearing a short hair; head little narrower than the "thoracic segments, shining black-brown; thoracic plate shining black- "brown, with the front edge and a faint central line greenish. In "August in the stems near the roots of *Impatiens noli-me-tangere*." Kaltenbach says that it feeds in the stem in the autumn, and afterwards goes lower into the root, *but leaves the plant when full fed*.

Antithesia marginana, Haw. (*oblongana*, Haw.). A sort of mystery has long hung over the economy of this species, which is, I hope, now cleared up.

The larva is described by Guenée as feeding in seed-heads of *Dipsacus*, and Heinemann says in seeds of *Dipsacus sylvestris*. This has been repeatedly confirmed; Dr. Wood says: "I breed it commonly "from teazle-heads collected in the woods, and the specimens are "always finer than those I meet with in the fields." Lord Walsingham says: "bred from teazle, *but also taken where there is no teazle*;" and herein was the difficulty: there was no doubt about it sometimes feeding in teazle-heads, but most emphatically was there no doubt of

its being very far commoner in marshy meadows and marshy or boggy heaths, where there was not a teazle plant within miles. I thought I had the required clue when I received a note from M. Ragonot to this effect: "some time since I was quite surprised to see appear out of some heads of *Scabiosa succisa* a *Penthina marginana* (*oblongana*). I had expected to breed *fractifasciana*." Will it be wondered at that I spent long hours and much valuable patience, in a meadow where *marginana* had been common, in examining the far too abundant flower and seed heads of the common devil's bit scabious?

On September 10th, 1878, I received from Dr. Wood, of Ledbury, a larva feeding in a seed-spike of *Stachys betonica*, with an enquiry as to its probable species! This was an instant revelation—the *Stachys* was most abundant in the marshy meadows where *marginana* occurred, and on September 16th I found the larva in its flower or seed-spikes in plenty.

It is nearly cylindrical, but with the segments plump and much wrinkled, colour pale amber, spots very minute, blackish with short white hairs, head and dorsal plate large and strong, deep black, anal plate round, dark brown. Inhabiting a silken gallery along the central stalk of a seed-spike of *Stachys betonica*, eating out the seeds and sometimes hiding in an empty calyx.

It remains in an active state in this habitation in the seed-spike all the winter (sometimes even until May or June), but ultimately spins its cocoon in one of the terminal calyces, in which it becomes a light brown pupa, which protrudes from the calyx when the moth emerges. In this late spring the first appeared on May 25th (but it is commonly observed a week or fortnight earlier), and they continued to emerge slowly through June, and *very* sparingly in July, while one or two appeared as late as August 20th, from which it seems clear that there is but one brood in the season, and that I, and doubtless others, have been in error in supposing that the late summer specimens were the offspring of those that appeared in May. I think that *Stachys betonica* will prove to be the ordinary food-plant of this species in this country, and I see that Hofmann records it as feeding in seed-vessels of *Galeopsis* and *Euphrasia odontites* in mountain districts.

Antithesia fuligana, Hüb. (*ustulana*, Haw., *carbonana*, Dbl.). The only continental record of the larva of this species which I can find seems to be an error. Mühlig says: "in autumn, in dry stems of "*Impatiens noli-me-tangere*, bred with *postremana*." I suspect that Mühlig's specimens were all *postremana*.

As already recorded (*ante* vol. ix, p. 129), Lord Walsingham reared a very beautiful and variable series of *Antithesia fuligana* some years ago from larvæ found feeding in stems of *Stachys palustris* in the Cambridgeshire Fens, and early in October, 1878, his lordship paid a visit to the same Fens for the purpose of looking for this larva, and to his kindness I am indebted for the opportunity of describing it.

It is exceedingly long and slender, with segments deeply divided and much wrinkled, colour delicate pale green, with the internal dorsal vessel distinctly visible, of a reddish-brown, and forming within the eighth segment a double bar, head bright chestnut, dorsal and anal plates greenish. In stems of *Stachys palustris*, eating out the pith, and leaving the space partly occupied with excrement, but not so much so as to prevent it from moving rapidly up and down the burrow. From examination of the dead and dry plants, I think that it does not enter the roots, as they seem to contain no frass. It remains in the larva state in a stem until the spring, when it spins a silken cocoon just beneath one of the joints of a stem (not always the stem in which it has fed), and then changes to a bright brown pupa, which pushes through a small hole in the joint when the moth emerges. My specimens emerged, very slowly, between June 15th and July 8th.

Sericoris euphorbiana, Z. I am much indebted to Mr. W. Purdey, of Folkestone, for his kindness in sending me larvæ of this species in 1877 and 1878, of which larvæ I have drawn up a description. Cylindrical, active, colour dark green, slightly paler beneath, spots of the same green colour, with short bristles, head very pale brown, dorsal and anal plates black, anterior legs black. In shoots of *Euphorbia paralias*, drawing together the terminal leaves into a bundle, eating the heart completely out, burrowing down into the stem of the shoot, and also forming a chamber, much lined with frass, among the young leaves. Full fed at the end of July, when it leaves the shoot and spins a delicate flat white cocoon of papery-looking silk between two dead leaves of the spurge, in which it becomes a light brown pupa. Some of the moths emerge from the middle to the end of August, the rest (the majority generally) remain in pupa during the winter, and emerge in the following June, but I strongly suspect that the June brood is reinforced by the descendants of the moths which emerge in August, since there is no reason to believe that the moths hibernate. There must in this case be larvæ feeding in September or October, but I have not received any at this period. Mr. Purdey says that the

species is double brooded, but this may refer only to the times of appearance of the perfect insect.

Gartner describes the larva of this species as "grey-green with "bright yellow head, dorsal plate similar, divided, jaws darker, anterior "feet brown-green. In May in a web on *Euphorbia amygdaloides*, "lucida, and *aquatica*, boring into the stem. To become a pupa it "leaves its habitation and goes into the earth."

This does not agree very well with our larvæ. I hear, however, from Dr. Wood, that *S. euphorbiana* is found in the woods of Herefordshire, where its larva feeds on the wood-spurge (*E. amygdaloides*).

Sericoris littoralis, Curt. (*littorana*, Dbl.). There appears to be no record by any continental writer of the larva of this species. Mr. Wilkinson simply says that it feeds on the common thrift, and it has been reared from that plant by Mr. Hodgkinson and others occasionally, but I think that no accurate description has been published.

In April, 1878, I found, on the coast-cliffs a few miles away, large tufts of thrift (*Armeria vulgaris*), in which some of the leaves were drooping and turning brown. A careful search enabled me to find the larvæ feeding in the hearts of the little shoots which grow close together to form the tuft, or sometimes in a tube of silk among the green or brown leaves.

This larva is very active, wriggling violently when disturbed, cylindrical, colour dull pale greenish-grey, still paler when full grown, spots hardly visible but with distinct hairs, head light brown, jaws blackish, dorsal plate black, anal plate indistinct.

Pupa light olive-brown, spun up among the leaves of the thrift close to the eaten shoots, emerging in June. This summer (1879) I again reared it from large tufts of thrift, generally found in sheltered corners under the rocks at the top of the cliffs, and easily discovered by the patches of dead leaves.

Before Mr. E. Meyrick left England, he sent me a memorandum of the rearing of this species in 1876 by Mr. Jenkinson, a most energetic young entomologist, who stated that his larvæ fed in the flower-heads of the thrift, that they were dark chocolate-brown, and that they spun the florets of the flower head all together in a mass, and assumed the pupa state in a vertical cocoon, placed head upwards, in the spun-up head. This appears circumstantial, and also perplexing, for I have not found the larvæ in the flowers at all, but it may possibly be the habit of a second brood, which I know occurs on some coasts, but which I have not seen here.

Sericoris rivulana, Scop. (*conchana*, Hüb.). On June 21st, 1878, I found in a marsh a blossoming plant of *Orchis maculata*, of which the upper portion of the spike of flowers had withered, and, on examination found that a larva had bored into the stem in the middle of the spike, and was feeding among the flowers, which had been caused to droop. This larva was very active, cylindrical, dirty yellowish-green, spots hardly visible, but with the usual hairs; head and dorsal plate black, anal plate inconspicuous. It fed up and formed its cocoon within the flower-spike, becoming a light brown pupa, and produced a fine ♂ *S. rivulana* on July 24th. Soon afterwards I reared another specimen from a larva in a flower-spike of *Genista tinctoria*.

Madame Lienig describes the larva as brown, and feeding on alder between united leaves; but I think there must be an error, either in observation or in species, and I know of no other record of this larva. Hartmann, in his "Die Kleinschmetterlinge der Umgegend Münchens," quotes Lienig, and adds the months of the occurrence of the larva (May and June), which Madame Lienig had not mentioned; but his only personal allusion to the larva is "not found here."

Sericoris urticana, Hüb. Larva active, cylindrical, except that the extremities are slightly attenuated. Dark liver-colour, without markings or visible dots, but with the usual hairs. Head and both plates jet-black. Found in June, drawing together the terminal leaves of *Vaccinium myrtillus*, and eating out the young shoots. Pupa light brown, with dark brown wing-cases, spun up among rubbish.

I cannot find that any description of this larva has been published in this country; but Hofmann gives a very careful description from Treitschke: "somewhat broad and compressed, very active, "chestnut-brown, with small somewhat shining raised dots and light "brown hairs. Head small and flat, dorsal and anal plates shining "black, abdomen paler. In May, polyphagous on bramble, bilberry, "birch and willow, in spun-together leaves. Pupa light or dark "brown."

It is a very polyphagous larva, but has, I think, a preference for hard-wooded plants, and a most particular liking for *Vaccinium*. Wilkinson says that it feeds on nettles and *Epilobium*, but that is not the case in my experience. Mr. Machin tells me that it screws up leaves of birch; Mr. Dunsmore that he has reared it from honeysuckle; and Mr. Warren reared a lot of the white northern form from dwarf honeysuckle growing in a wood near Doncaster. Strange to say, when fresh out they were of a beautiful pink. Those from the moors about

Sheffield were grey. Here in Pembrokeshire they vary from grey to deep red-brown.

Sericoris lacunana, Schiff. This species, which is so far variable in the imago state as to have been split up into several species (*herbana*, *rupestrana*) in this country, has a larva which is an actual nuisance and torment, from its protean colourings and the mistakes thereby caused. It is a cylindrical larva, rather elongated, and very active. When young, I have found it pale yellowish, or semi-transparent greenish, with visible intestinal canal, spots small and black, head and dorsal and anal plates pale brown, at other times liver-coloured with black head and plates, or the dorsal plate dark brown with a whitish collar.

When full-grown it is commonly smoky-brown, smoky-black, or liver-coloured, with head and both plates shining black, but sometimes it is pale grey, bluish, whitish, or even yellowish, with head and plates light brown, or with head and dorsal plate black and anal plate brown, or yellow with a brown dot. The anterior edge of the dorsal plate is sometimes whitish. It feeds on all manner of bushes and low plants, drawing together their terminal leaves, or screwing up the young shoots and feeding in the heart; but occasionally I have found it feeding in blossoms of *Chrysanthemum*, *Ranunculus*, &c., and once (a bright yellow larva) in a blossom of *Rubus idaeus*.

Mr. Sang found a lot of larvae on a single dwarf sallow at High Force, all of which were green. There were none on the larger sallows around. Mr. Warren found them in Wicken Fen feeding on comfrey, yellow loosestrife, &c., of a grass-green, *with paler sub-dorsal stripes*. Nothing but *lacunana* emerged from them. Wilkinson simply says that the larva is of a dark brownish-black, with a black head, and this is undoubtedly one of its commonest forms.

The pupa is shining dark brown or blackish, in a slight cocoon among dead leaves or rubbish. The larva always seems to leave the shoot on which it has fed before spinning up.

The variations in the larva state do not seem to correspond at all with those of the perfect insect, in fact, all the most extraordinary larvae hitherto noticed have produced the *typical* form of the moth.

Dichrorampha politana, W. V. I have found some difficulty in ascertaining certainly the larva of this species, feeding as it does along with that of *Petiverella* in the spring, but I think that I separated it satisfactorily last spring. The species is not sufficiently abundant here to give a fair opportunity, so my friend Mr. F. D. Wheeler very

kindly obtained and sent me some large roots from one of my old localities at Norwich, and from these I reared a good number of specimens. The larva is cylindrical, moderately slender, colour yellowish-white, with reddish internal dorsal vessel, head bright light brown, plates both faintly brownish. It feeds in May in the root-stocks of *Achillea millefolium*, generally preferring a large old plant with spreading roots, in which a number of larvæ live. Each is solitary in its burrow under the bark of the root-stock, which burrow is closed by a tough web, and here it changes to a light brown pupa, the moths emerging from the beginning to the middle of June. When they emerge, the pupæ force themselves out of the burrow, and project just above the surface of the ground.

I believe that this species is known as *alpinana* on the continent (our *alpinana* being there called *quaestorianana*), and, indeed, I am not sure that this is not the true *alpinana* of Treitschke. At any rate, I feel certain that Gartner's description of the larvæ of *alpinana*, Tr., appertains to this species: "naked, slender, fat, white, with through-'shining intestinal canal, and clear-shining hair-bearing raised dots. 'Head small, shining, honey-brown, dorsal plate faintly brownish. 'In October, under the bark of root-stocks of *Achillea millefolium*, 'often joining two pieces together. Pupating in June. Pupa light 'yellow-brown." Nothing can correspond more accurately than this!

Dichrorampha alpinana, Tr. (?). This species—with broader fore-wings than *politana*, and a broad rounded dorsal blotch—was reared from roots of tansy growing near Victoria Park, London, by Mr. Machin, at least ten years ago, but the locality has been built upon long since, and I am now indebted to Mr. W. H. Grigg for larvæ, which he found feeding along with those of *D. tanaceti* near Bristol. The roots were actually dug by him from *under the snow* last winter.

The larva is very sluggish, cylindrical, but with the segments slightly swollen, colour shining pale yellow, with a broad dark purple internal dorsal vessel, visible through the whole length of the body, spots small, blackish, without hairs, head bright chestnut, jaws brown, dorsal plate pale yellowish-brown, anal plate blackish.

Found burrowing in November in the root-stocks and lower part of the old stems of *Tanacetum vulgare*, eating out the pith. At this time they appear to be full-grown, but they remain in the burrow (perhaps feeding a little) all through the winter and spring, and assume the pupa state in the same place; the moths emerging late in July and in August.

(*To be continued.*)

IRRUPTION OF *VANESSA CARDUI* AND *PLUSIA GAMMA* INTO DEVONSHIRE.

BY R. C. R. JORDAN, M.D.

My holiday was this year passed at Teignmouth, where I remained from the 16th to the 31st of October. The chief facts of entomological interest learnt in my visit were connected with the sudden appearance of *Vanessa cardui* in the early summer, and of *Plusia gamma* in the early autumn; the last was so remarkable as to have attracted the notice of even the most unobservant. We know so little of the migrations of insects, that every fact on the subject is worth recording; I have, therefore, sent you the following extracts from the journal of my brother, Mr. Jordan, of Teignmouth; he says:—

“August 12th, 1879—I had seen very few *gamma*-moths before this date, when they suddenly appeared in myriads everywhere. I was out from 9 to 11 a.m., every little patch of garden ground, the churchyard, the streets, the sands by the sea-shore, all seemed alive with them; though lingering on every blossom so that I saw one hundred around a head of the large garden *Veronica*, yet there was a general tendency to move on in a decided stream towards the west. My son, who walked to Bishopsteignton (two miles), said, they were in equal profusion during the whole route, he also counted fifty *Vanessa cardui*; other insects were very scarce. The day was very fine and bright, though there was a strong east wind on the night of the 11th. I was informed that swarms of these grey moths were seen out at sea about three miles from the shore. As a general rule the moths were in fine condition, large, and well marked.

“August 13th—a shower in the morning, fine in the afternoon; comparatively few moths seen.

“August 15th—a fine bright morning; at 10 a.m. I passed through West Teignmouth churchyard, where, on the 12th, there had been two or three *gamma*-moths on every head of trefoil; now there was not one to be seen. Before this period the larvæ and pupæ were not so common as usual, and the autumn flight of the moth has not been abundant.”

So far from my brother's notes: from these and other data, I feel convinced that there has been an actual migration of *Vanessa cardui* and *Plusia gamma* during this year, and that the movement in both cases began on the mainland of Europe, and that a portion of the emigrants in both cases reached our island. These concerted (?) movements of *Lepidoptera* are not in the least understood by us, but

they seem *for the most part* undertaken by species of wide geographical distribution. In the *Colias Edusa* year of 1877, I spent some time in the Eifel region, and only saw one *C. Edusa* in a district which, from its nature, ought to have had this species in abundance. Of course when at Teignmouth I turned my particular attention to the two migrants : *Vanessa cardui* was abundant in the larva state, but I only saw one perfect insect, a splendid specimen, which settled on a head of ragwort blossom close by me, when I was seeking for larvæ ; these last were in every stage, full grown and free, or quite young in webs on the thistle leaves. I sent many to my friend Mr. Geo. Baker, of Edgbaston, for him to describe and rear ; he sent me the following description of the full grown larva :

About $1\frac{1}{2}$ inches long, velvety-black, inclined to a slightly greyer tint along the centre of the back, with a marked primrose-coloured stripe just above the legs ; spiny, sub-spiracular spines decidedly smaller than the others, and encircled by a tuft of exceedingly fine hairs ; the 3rd and 4th segments have each four spines, the 5th to the 12th inclusive have each seven, and the 13th only two spines, these last almost horizontal in direction ; each spine arises from a pinkish coloured bulb. The belly and ventral legs are golden-umber.

This description, it will be seen, has an almost exact agreement with that of the winter form of larva described by Mr. Buckler in the Ent. Mo. Mag. (vol. v, p. 279) in 1869. At the present date (Nov. 14th) all the larvæ sent (having been kept by my young friend in a well-warmed greenhouse) have changed to pupæ ; with the exception of one not yet full-grown, only one perfect *Vanessa cardui* has appeared, this was on November 9th, its duration in the pupa state was sixteen days.

Of *Plusia gamma* I saw but little, a few of the perfect insect now and again crossed my path, certainly a smaller number than are usually met with in Devon at this time of the year ; I found one cocoon and one full-fed larva, both on plants by the sea shore. These have become perfect insects. Other *Lepidoptera* were scarce, and this rarity extended even to the larvæ of the Micros ; *Lithocletis trifasciella* was not to be found, and *L. Schreberella* was very rare. Much perseverance on my part was, however, rewarded by the capture of *Heliothis peltigera* asleep on the 24th of October, and by taking *Dasy-campa rubiginea* at ivy blossoms on October 30th, my last night in South Devon.

INTRODUCTORY PAPERS ON FOSSIL ENTOMOLOGY.

BY HERBERT GOSS, F.L.S., F.G.S.

No. 11.

Cœnozoic Time.

[*On the Insecta of the Post Tertiary, or Quarternary Period,* and the animals and plants with which they were correlated.*]

The numerous detached and generally superficial deposits of more modern age than the most recent formations of the Pliocene† Period—the next in order of chronological succession to the Miocene, and the highest division of the Tertiary Age—are generally known as Post Tertiary, or Quaternary formations.‡

From the nature of these formations, and their limited superficial distribution, it might have been supposed that fossil remains of the *Insecta* of the Period would not be abundant; but the entire absence from these formations of representatives of any Order of this class, except the *Coleoptera*, is certainly surprising. It must be remembered, however, that, from the hard and almost indestructible nature of their elytra, the *Coleoptera* are capable of fossilization under much less favourable conditions than is requisite for the preservation of insects of most Orders, and the absence of remains of insects of such Orders as the *Neuroptera*, the *Diptera*, the *Hymenoptera*, and the *Lepidoptera*, and of the wings and other delicate parts of insects of other Orders may, probably, be explained as due to the unfavourable nature of the formations of this Period for their preservation; but the absence of the harder parts of insects of such Orders as the *Hemiptera* and the *Orthoptera* in those deposits in which elytra of *Coleoptera* have been found so frequently, seems unaccountable.

Great Britain. §

From the Boulder formation or drift of the Norfolk cliffs, in the neighbourhood of Mundsley, elytra of *Coleoptera* have frequently been found. Some of the first discovered specimens from this neighbourhood were submitted to the late Mr. Curtis,|| who identified several of them, including *Elateridæ* (*Elater*), *Carabidæ* (*Harpalus*), *Scarabeidæ*

* Sometimes called the "Diluvial Period;" it is distinguished from the Pliocene, which immediately preceded it, by the similarity of its flora and marine fauna with those of the present age.

† No remains of Insects have been discovered in the rocks of the Pliocene Period.

‡ From the nature of their animal remains, these formations are classed in two divisions—(1) The Post Pliocene, in which the majority of animals belong to existing species, but some of the Birds, and many of the Mammals, are extinct; and (2) the Recent, in which all the animals belong to existing species.

§ In a letter to me, written in June, 1878, Dr. Buchanan White alluded to the then recent discovery of remains of *Coleoptera* in some interglacial deposits in Scotland; but no particulars were given, nor have I since been able to obtain any.

|| Proc. Geol. Soc. Lond., vol. iii, p. 175, 1840.

(*Copris*), and two species of *Donacia*, which last he considered as probably identical with some existing species.

In 1862, the Rev. Osmond Fisher* obtained from peat and brick-earth at Lexden, near Colchester, a vast number of elytra of *Coleoptera*, the majority of which were in a very fragmentary condition. Mr. T. Vernon Wollaston, to whom these fragments were submitted, determined about eleven species, the majority of which belonged to the *Chrysomelidæ*, *Curculionidæ*, *Cassididæ*, and *Tenebrionidæ*, though a few specimens were doubtfully referred to *Buprestidæ* and *Carabidæ*.

Mr. Wollaston was of opinion that none of the fragments which he examined belonged to species identical with any of the existing British forms, and from the size and brilliant metallic hues† of many of the elytra he concluded that a much warmer climate, than is at present enjoyed, then prevailed in Great Britain.

Continental Europe.

Several fragments of *Coleoptera* were obtained, in 1838, from beds of peat, in the neighbourhood of Elsinore, by M. E. Robert,‡ who identified a few species, including *Aphodius fossor*, several *Galerucidæ*, and two species of *Buprestidæ*.

From the lignites and clays of Utznach§ and Dürnten, in Switzerland, remains of *Coleoptera* have been found in abundance. According to Prof. Heer,|| these remains consist chiefly of the elytra of species belonging to the genus *Donacia*, and they are said to be so abundant as to be found by hundreds in some parts of the lignite, their metallic blue and green colours rendering them very conspicuous objects. From the form and configuration of their elytra, Prof. Heer has identified two species of the genus *Donacia*, which he considers identical with species now living about the Swiss lakes and marshes viz., *Donacia discolor* and *D. sericea*; he has also described from Dürnten an extinct species of *Hylobius* (*H. rugosus*) nearly allied to *H. Pineti*, one species of the genus *Pterostichus* (allied to *P. nigrita*), and two species of *Carabidæ* (*Carabites diluvianus* and *C. cordicollis*), which cannot be referred to any living forms.

From a lignite formation at Chambery and Sonnaz, in Savoy,

* See a paper "On the Brick Pit at Lexden, near Colchester," Quar. Jour. Geol. Soc., vol. xix, pp. 393–400, 1863, by the Rev. O. Fisher, M.A., F.G.S., and T. Vernon Wollaston, M.A., F.L.S.

† "The existence in abundance of a large metallic *Curculio*, or anything else so gorgeously cyaneous, as to have transmitted even a respectable tint to our times, is certainly more suggestive of a warm climate than of a cold one."—T. V. Wollaston, in the paper last cited, p. 299.

‡ Bull. Soc. Géol. de France, tome ix, p. 114, 1838.

§ M. Brullé has, also, recorded from these localities remains of several species of *Coleoptera*, including one species allied to *Feronia leucophthalma*, another similar to *Callidium fennicum*, and an *Elater*.

|| Die Urwelt der Schweiz (1st edit.), pp. 481, &c., 1865.

similar to that of Utznach and Dürnten, a few elytra of *Coleoptera* have been obtained by M. Pillet, from which Dr. Heer* has determined *Donacia discolor* and *menyanthidis*, and a few small *Carabidae*.

Several elytra of *Coleoptera* have recently been discovered† by Herr Nathorst and Prof. Wartha in the glacial strata of Schwerzenbach, in the Canton of Zurich. From these elytra Dr. Heer‡ has determined about twelve species, including *Harpalus laevicollis*, *Otiorhynchus§ montanus*, *O. alpicola*, *O. rugifrons*, *O. fuscipes*, *Pterostichus nigrita*, *Gyrinus natator*, *Silpha dispar*, *Donacia sericea*, *Melolontha hippocastani*, *Carabus arvensis*, &c.

A few elytra of *Coleoptera* have also been obtained in the drift at St. Jacob, on the Birs, in the Canton of Basel, and have been identified by Dr. Heer|| as belonging to the genera *Gyrinus*, *Hydrophilus*, *Pterostichus*, *Donacia*, and *Elater*.

America.

From remains of *Coleoptera*, discovered in cave deposits at Port Kennedy, in Pennsylvania, Dr. G. H. Horn¶ has identified about nine species belonging to the genera *Cychrus*, *Cymindis*, *Chlaenius*, *Dicelus*, *Chæridium*, *Phanæus*, *Aphodius*, and *Pterostichus*. In 1877, Mr. Scudder** described two species of *Carabidae* (*Loricera glacialis* and *Loxandrus gelidus*) from interglacial deposits at Scarboro' Heights, near Toronto, Canada.

Elytra of a few other species of *Coleoptera* have been obtained in the most recent formations of this Period; but as they are all identical with species now existing, it will be unnecessary to enumerate them, and, with a few observations on the flora and fauna of this Period, I shall bring this series of papers to a conclusion.††

The Plants belonged exclusively to existing species, and, with the exception of many of the Birds and the majority of the Mammals, almost all the animals were identical with those now living.

Of the Invertebrates, all the known forms of the *Mollusca*, with the exception of a few of those from the oldest deposits of the Period, belong to species now existing, especially in Northern or Arctic latitudes.

* Die Urwelt der Schweiz (1st edit.), pp. 481, &c., 1865.

† " " (2nd edit.), p. 581, Zurich, 1879.

‡ Dr. Heer states that the species of this genus were identified by Dr. Stierlin, *op. antea cit.* (2nd edit.), note on p. 581.

|| *Op. antea cit.* (2nd edit.), 1879), p. 532.

¶ Trans. Amer. Ent. Soc., vol. v, pp. 241—245, 1876.

** Bull. United States Geol. and Geog. Survey, vol. iii, No. 4, art. xxx, 1877.

†† I have to express my thanks to Prof. Heer, Dr. Goldenberg, and Mr. Seudder for several valuable communications made to me whilst engaged in the preparation of these papers.

Of the Vertebrates, the Fishes, Amphibians and Reptiles, have been referred, without exception, to living forms.

The Birds, although belonging to existing Groups, include a large number of extinct species, many of which were of gigantic size.*

The Mammals were represented by a vast number of species, many of which are remarkable for their great size. Not only were there such colossal animals as the *Megatherium* and the *Mammoth*, but many of the *Carnivora* of the earlier portion of the Period were far larger than those now existing in any part of the world.

Lastly, in formations belonging to the later portion of the Post Pliocene,† or first division of this Period, have been discovered the earliest remains of the highest Order of Mammals—Man—with whose appearance, “the system of life in progress through the ages reached ‘its completion, and the animal structure its highest perfection.’”‡

The Avenue, Surbiton Hill, S.W.:
December, 1879.

NOTES ON SOME EXOTIC *HEMIPTERA*, WITH DESCRIPTIONS OF
NEW SPECIES.

BY W. L. DISTANT.

HETEROPTERA.

HALYOMORPHA VIRIDESCENS, Walk.

Atelocera viridescens, Walk., Cat. Het., i, p. 215, 19 (1867).

Beyond the typical form and variety, described by Walker under the name of the extremely divergent genus *Atelocera*, both of which I have received from East Africa, I also possess two specimens of an extreme form of the species collected by Mr. Cotterell at Nyassa, which are of an almost uniform dark bluish-green without being mottled with testaceous, as is the case with Walker's type although not so described. The species has a constant character in the sub-triangular testaceous spot on each lateral border of the pronotum. The species of this genus appear generally to vary in this manner. The same thing may be seen in *H. scutellata*, Dist., and *H. picus*, Fab. Mr. Walker has also added to the already surcharged synonymy of the last species, as under—

Halyomorpha picus, Fab. (*Cimex picus*), Fab., E. S., 4, p. 115, 138 (1794).

Stål, En. Hem., 5, p. 75, 1, 1876 (incl. syn.).

Dalpada remota, Walk., Cat. Het., 227, 22 (1867).

* Such as *Dinornis giganteus*, see “The Ancient Life-History of the Earth,” by Professor Alleyne Nicholson, M.D., p. 346, 1877.

† See ante note † on p. 198.

‡ Dana in his “Manual of Geology,” p. 578 (2nd edit.), New York, 1874.

[NOTE.—Although I have above stated that this paper concludes the series, I propose, at some future time, to communicate a supplementary paper on Insects in Amber.]

GYNENICA AFFINIS, n. sp.

Above brown, thickly and coarsely punctured. Head thickly punctured with black, with a central longitudinal fulvous line, broadest at base. Central lobe almost reaching apex of head, the lateral lobes very slightly passing it in front. Antennæ fuscous; basal joint not reaching apex of head, second joint slightly shorter than the third, fourth longest, fifth and third sub-equal. Pronotum with the posterior half thickly punctured with black, the anterior portion fulvous; lateral angles produced into strong acute black spines, slightly directed forwards. Scutellum fulvous, sparingly covered with black punctures, except at the base, where there is a large central black closely punctured spot. Corium agreeing in colour with the posterior portion of pronotum, very thickly punctured with black; membrane fuscous. Body beneath luteous, thickly and finely punctured, slightly tinged with green; legs fulvous. Rostrum greenish, with the tip black.

Long. 10 mill. Exp. pronot. ang., 6 mill.

Hab.: Bombay; Calcutta.

Allied to *G. marginella*, Dall., from which it differs, by the shorter head, and central lobe not passing the lateral lobes; the pronotal angular spines are smaller and not directed upwards as in that species, the colour of the scutellum is also different.

Dallas had no locality for the type, which, though from Mr. Children's collection, appears to be South African. A specimen from that locality, collected by Mr. M. Weale, agreeing exactly with the type, is in my own collection. The above appears to be the Indian form of the genus.

STENOCEPHALUS ORIENTALIS, n. sp.

♀. Pale fuscous, very thickly and coarsely punctured; lateral margins of the pronotum, corium, and membrane impunctate and luteous. Antennæ strongly pilose; first joint robust, about as long as the head, dull fuscous, second joint about as long as the fourth, third and first sub-equal; the second joint is pale luteous, obscure fuscous at base, and more broadly so at middle and apex, third joint obscure fuscous-luteous at base, fourth pale fuscous-luteous at base. Head and anterior portion of pronotum somewhat darker than other portions of the upper surface, and less strongly punctate. Legs luteous; fore and intermediate femora lightly fuscous at apex, hind femora broadly and distinctly so; apex and base of tibiæ and tarsi fuscous.

Long. 12 mill.

Hab.: Bombay; Madras.

Allied to *S. agilis*, Scop., but apart from other characters may be at once distinguished by the marginal luteous border. It appears to be the Indian representative of the genus.

NOTE.—I have, since writing the above, seen the ♂ of this species, which appears to differ from the ♀ by its smaller size, the second

joint of the antennæ only fuscous at base and apex, fore and intermediate femora uniformly pale luteous, and apices of tibiæ fuscous only. Apex of the scutellum finely luteous. Long. 11 mill.

HOMOPTERA.

TETTIGONIA ASSAMENSIS, n. sp.

Head pale yellow, with a black fascia occupying the space between the ocelli. Pronotum creamy-white, with the lateral margins carmine, and six black spots situated transversely, two smallest near anterior margin and four largest across disc. Scutellum pale yellow, with three black spots, two basal and one sub-apical. Tegmina pale creamy-white, with a broad longitudinal sub-costal carmine fascia, commencing near base and extending to about middle; a black narrow oblique fascia nearly crossing tegmina at base and at commencement of the carmine fascia, and five dark fuscous spots situated, one in centre of carmine fascia, three wide apart, longitudinally on disc, and one at marginal apex of coriaceous portion. Wings dark fuscous, with the apical borders broadly creamy-white. Abdomen above pitchy. Under-side of body pitchy; legs luteous; tarsi pitchy. Face orange-yellow, with a large crescent-shaped black fascia about its centre, and a small black spot at base. The head is rounded in front, much broader than long, and transversely channelled on disc.

Long. 13 mill.

Hab.: Assam.

1, Selston Villas, Derwent Grove, East Dulwich :

January 3rd, 1880.

ON CALOPTERYGINA FROM THE ISLAND OF SUMATRA, COLLECTED BY HERR CARL BOCK.

BY R. McLACHLAN, F.R.S., &c.

Herr Bock recently forwarded two collections of *Odonata* from the Mountains of Paio in Sumatra. They were not rich in species, but the number of individuals was very considerable. As so little is yet known of the Odonate-fauna of this island, the following notes on the few *Calopterygina* may prove useful.

NEUROBASIS CHINENSIS, L.—Several males (but no ♀). According to De Selys (4^{mes} Additions, p. 14) females from Sumatra, seen by him, belong to the typical *chinensis* and not to the race *florida*; Hagen, as is proved by the presence of the pterostigmal indications in the posterior wings. In the males seen by me the nodal sector originates from the nodus, as in typical *chinensis*.

VESTALIS LUGENS (Albarda), De Selys (4^{mes} Additions, p. 15, 1879).—Probably more than 100 examples (mostly ♂). Those ♂ in which the wings have coppery-brown reflections (as noticed in the

description) are unusual; probably they are *extremely* adult; ordinarily the metallic reflections are absent, or slightly bluish. The ♀ has the wings strongly tinged with yellow (much more strongly than in the ♀ of *luctuosa*), and the lateral lobes of the labium are yellow (as is noticed by Albarda). This species, at first sight, is extremely similar to *V. luctuosa*, so common in Java, but the ♂ can be at once separated by the body not being metallic, and the ♀ by the yellow lateral lobes of the labium, and the more strongly tinged wings.

De Selys (*l. c.*) compares it with *V. melania* of the Philippines rather than with *luctuosa*, and thinks it may be only a local race of the former. To me it appears distinct from either, but most closely allied to *luctuosa*. I do not detect the apparently small increase in the breadth of the wings (mentioned in the original description) as compared with *luctuosa*.

EUPHLEA BOCKI, n. sp.

♂ (adult). Length of abdomen, 34 mm. Length of posterior wing, 28 mm. Breadth of anterior and posterior wings, 6½ mm. Length of pterostigma, 3 mm.

Wings narrow, the posterior not dilated: both pairs slightly tinged with oliveaceous: the apex of the anterior pair from slightly after the commencement of the pterostigma, and of the posterior from slightly before, suddenly blackish-brown, this apical dark space straight internally: on the posterior wings (only) the dark colour is continued in the area between the median nervure and the principal sector (but not in the costal area, excepting towards the pterostigma) up to within part of the cellule after the nodus; this continuation is darker in colour than the apical portion, and has brilliant steel-blue reflections both above and beneath (wanting in the apical portion). Pterostigma black, surmounting 7—9 cellules. Nodus placed midway between the base of the wing and the end of the pterostigma. 21—24 ante-cubital nervules and 21 post-cubital in the anterior wings; 18—21 ante-cubital and 19—23 post-cubital in the posterior: quadrilateral not reticulated (perhaps accidentally) in all the wings. Nodal sector commencing half a cellule before the nodal nervule.

Head black; clypeus and labrum shining, the latter with two very large yellowish (perhaps bluish in life) spots bearing only a median band, and the margins, black; on the face the margin of the eyes, as far as the insertions of the antennæ, are broadly yellowish (or bluish?).

Prothorax black, with a large oval brown swelling on either side.

Thorax black; the sides and breast yellowish spotted with black, one spot continued as a line half way along the metathoracic lateral lobe. Interalar space spotted with yellowish (or brownish). Legs black; femora yellowish (or brownish) internally.

Abdomen black, slightly bronzy: a yellow line along the sides of segments 1—5 (becoming very narrow on 5), interrupted at the sutures; the dorsal crest on segments 2 and 3 very finely yellowish, interrupted at the suture; the posterior genital piece on segment 2 very large, produced on each side into a conical tooth

(much less acute than in *E. variegata*). 10th segment (viewed in profile) scarcely elevated at its end. Appendages much as in *E. variegata*, but the dilated portion is more quadrate if viewed in profile; the upper edge with fine denticulations.

♀ unknown.

Mountains of Paio in the island of Sumatra (*Carl Bock*); 1 mature ♂.

It is evident that this species is closely allied to *E. Aspasia*, De Selys, which is from the same island, and which is known from only 2 ♂ (cf. Synopsis, p. 52, 4^{mes} Additions, p. 28). One of these is said to be adult, the other immature. Putting on one side certain differences in the yellow markings of the head, thorax and sides of the base of the abdomen, and in the number of ante- and post-cubital nervules, I note the following discrepancies in the coloration of the wings. In the original adult ♂ of *Aspasia* the tinting of the wings is said to pass insensibly into blackish-brown at the tips, without, however, becoming opaque, and this dark colour is prolonged up to the nodus in the anterior and somewhat less in the posterior. In the immature ♂ there is apparently no trace of the dark apical portion; the anterior wings have a dark shade along the costal margin; in the posterior this shade commences near the quadrilateral, and ends suddenly midway between the nodus and the pterostigma.

In the type *E. Bocki*, the blackish apical portion is opaque (or nearly so), limited internally in a sudden and straight manner (as in the posterior wings of *impar*, only less extended). In the anterior wings there is no trace of costal darkening, in the posterior there is a dark line from the pterostigma nearly up to the nodus. Thus, unless *Aspasia* prove a very variable insect, *Bocki* is either distinct, or forms a strongly-marked local race.

EUPHLÉA VARIEGATA, Rambur.—Many ♂, and a few ♀. The colours are absolutely the same as those of typical examples from Java, yet the posterior wings are appreciably narrower. Taking an example from each island in which the length of the posterior wings is 28 mm. in both, I find the breadth in that from Java is 9 mm., whereas in that from Sumatra it is barely 8½ mm.

RHINOCYPHA ANGUSTA, De Selys.—An amended description of this, after mature examples, appears in the 4^{mes} Additions, p. 44 (1879). I have 8 ♂ and 2 ♀ before me. No two of the males agree precisely in the form of the vitreous spots of the posterior wings. In all of them there is a discrepancy in the length of the basal vitreous line above the median sector. In the description it is said to commence

after the quadrilateral, and to consist of about twenty cellules; in my examples it commences *before* (in one *at*) the end of the quadrilateral, and consists of about twenty-five cellules. The individuals vary much in the extension of the dark portion of the posterior wings; in some the median oblong spot of the inner vitreous series is perfectly enclosed in the dark ground, but ordinarily its inner end remains free from dark surroundings. It may be considered certain that *angusta* of Sumatra, *biseriata* of Borneo, and *biforata* of Malacca and Birmah, are only local forms of one species.

Lewisham: September, 1879.

NATURAL HISTORY OF *NOLA CENTONALIS*.

BY W. H. TUGWELL.

On the 15th of last August, I had the good fortune to capture in Kent two female *Nola centonalis*, and as nothing was known of the life-history of this rare moth, risked spoiling my specimens by keeping them for eggs. Both of them deposited small batches, but only one lot proved fertile; these (36 in number) soon showed signs of vitality. When they were first deposited, they were pearly-white, beautifully striated, and somewhat hemispherical in form, *i. e.*, convex above, flattened beneath; in two or three days, a small dark grey central spot appeared, which increased in intensity till the time of hatching, which took place on August 27th. I had a difficult problem to solve, as I had no knowledge of the food plant, so I collected portions of twelve different plants that grew near the spot of capture; these were enclosed in a wide-mouthed bottle with the eggs, as soon as they commenced to hatch: being so small, little or no signs of frass could be detected, and I began to fear all were lost, till the fourth day, when the contents of the bottle were carefully inspected on a sheet of white paper, and I was pleased to find that three different plants had been eaten. This gave hopes, and enabled me to clear away a lot of useless plants; carefully replacing the young larvæ into the bottle, with fresh portions of the attacked, *viz.*, *Potentilla anserina*, *Lotus corniculatus*, and *Trifolium procumbens*, I again left them four days, and then repeated inspection. Now the preference for the *Leguminosæ* was most decided, the favourite being evidently *Trifolium procumbens*. I continued to give them this food for a short time; but, finding it difficult to keep up a fresh supply, as I could not find the plant growing near Greenwich, substituted *Trifolium minus* and *Medicago lupulina*, both of which they ate freely. In their early stages they ate the leaves

only, but after the fourth moult, I noticed they fed on the flowers also so, as the season of these two annuals was well-nigh over, being *mid October*, I tried them with the flower-heads of the common red clover (*Trifolium pratense*) ; this seemed to suit their taste admirably, and they fed up well on it, and spun up the first and second week in November. Doubtless, this abnormal time of pupating was induced by being kept in a warm room, and well supplied with fresh food, as in nature they would certainly hibernate. This is shown by six larvæ I had sent to Mr. W. Buckler when in the second moult; these were treated like mine, only in a cold room ; they, after moulting the fifth time, refused to go on feeding, but went to sleep for the winter ; two of my smallest larvæ did so too. Luckily, by my forcing treatment, the risk of losing them in hibernation was avoided, and enabled me to send Mr. Buckler a full-fed larva, and thus secure its portrait by his able pencil.

The young larvæ are pale brownish-yellow, hairy, and sluggish, a character they retained through life ; if touched or irritated, they drop from their food, and roll into a ring, and remain so for some time. They moulted five times, at pretty regular intervals, viz., first, September 6th to 8th ; second, September 16th to 18th ; third, September 24th to 26th ; fourth, October 12th to 14th ; fifth was completed by October 26th ; and full fed from November 1st to 15th. No great change of coloration takes place till the fourth moult, when the fleshy tubercles become darkly spotted, and a fulvous-yellow dorsal line appears ; on the fifth moult, this line is brighter and better defined.

The full fed larva, when extended, is from half-an-inch to five-eighths of an inch long, moderately stout, somewhat thickest in the middle, attenuating slightly both anteriorly and posteriorly, the head is small, dark blackish-brown, the general ground colour is a semi-translucent brown-pink, a narrow but well-defined yellow dorsal line, and on each of the segments, which are well developed, are six small fleshy tubercles, arranged in rows, three on either side of the dorsal line, and from which spring tufts of short brown hairs (the dark spots on the tubercles seem lost on the expansion of the larva by becoming full fed). The spiracle line is not very apparent, the belly and claspers are nude, and of a semi-transparent brown-pink.

When the larva is about to spin its cocoon, it selects a grass culm or other stem, and having spun a little pad of silk on it, commences to nibble off portions of adjacent stems, and with them builds out two side pieces like an open boat, the grass culm forming as it were the keel. It is most curious to watch this construction going on ; the

larva stretches itself out as far as it can reach, without leaving its hold of its work, in order to gather this building material, which it collects and, so to speak, with it builds up plank by plank its house. One larva had commenced to spin up its cocoon on the side of the bottle, and it happened (possibly by the shifting of the bottle) that this necessary material was not within its reach, it had spun its silken pad and commenced on the side pieces, but then it came to a stand for want of material. I watched it thus for two entire days, but it could not proceed with its work; I then placed some dried grass roots within its reach, and the cocoon was then in due time completed. As soon as these side pieces are finished (an operation which occupies some thirty-six hours' labour), it commences at the lower end to draw over the two sides so that their edges just meet, and spins them thus firmly together, working in this manner steadily upwards till nearly closed in, the larva then enters the cocoon, draws over the top or head piece, and lines the interior with silk; when completed, it is neat and compact, something like the cocoon of *Nola albularis*, except that it is obtusely blunt at the top, whilst *albularis* has it pointed at each end, like that of the *Zygænae*.

By keeping my pupæ in a warm room, the imagos commenced to appear December 10th, and came out at intervals until December 28th, in all twenty perfect specimens; my treatment of them had been most successful, not losing one by death. The perfect insect varies very much indeed: the typical form is almost white; some are a pure white, without a mark on the wings, save the raised button-like scales; others are grey, with a darker central grey band; two or three have the usual lines of the superior wings strongly marked, but no central shading; in all of them (*that are lined*) the most distinct lines are those next to and parallel with the hind margin.

3, Lewisham Road, Greenwich :

December 30th, 1879.

Sericoris littoralis.—I bred this species last season from flower heads of thrift, but I am not prepared to say that the larvæ had fed up in the heads, as they might possibly only have entered them for the purpose of pupation; be this as it may, I was unable to find a single larva among the leaves, though I examined many tufts of the plant with the view of so doing, but from a large number of the flowers which I gathered in June, and which I supposed to contain *Sphaleroptera ictericana* larvæ only, I obtained imagines of both species, the proportion being one of the former to twelve of the latter.—RICHARD SOUTH, 13, Bonchurch Villas, Ealing: January 6th, 1880.

Description of the larva, &c., of Scopula prunalis.—During October, 1876, Mr. Wm. R. Jeffrey drew my attention to some very juvenile larvæ such as he had before found at that time of year on *Galeobdolon*, *Lamium*, and a few other plants, but I was unable to name the larvæ then, or to find any description giving a clue to their identity or to rear them, hence as an enigma to be solved, their identification stood over to the following season.

For this purpose in 1877 my good friend, again in October, found and kindly sent me five examples of these little larvæ, when I was prepared with a potted plant of *Galeobdolon luteum* for a better attempt to rear them to maturity, and this, greatly to my satisfaction, I was just able to do, and breed the moth on June 18th, 1878.

In October the larva varies in length from three to four or five sixteenths of an inch, is slightly fusiform with a very pale translucent faintly greenish body, the head black, a small black mark on each side of the collar or second segment; it is found in a silken spinning under the turned-down edge of a leaf.

The larvæ were placed openly on the plant and left to take care of themselves; they moulted during November and then showed very faint whitish subdorsal stripes, and, apparently without feeding, soon spun up in white silken hibernacula securely attached beneath the edges of the leaves.

As January, 1878, proved comparatively mild, and the plant was kept sheltered in a window, I was not at all surprised to see one or two of the larvæ occasionally on the under-side of the leaves nibbling little channels out of the lower cuticle, causing a change of colour on the upper surface and betraying their situations; but as much colder weather set in during March not one could be observed for many days until near the end of the month, when I detected one feeding, and soon after found another laid up in a slight web between two leaves waiting to moult, though it failed in the operation eventually and died; while the other, the only one left on the plant, soon left its shelter under a large leaf after eating a couple of holes through the substance, and took possession of the under-side of a smaller and fresher leaf; it was now from a quarter to three-eighths of an inch long, the head black as in autumn, the body paler; here it began to draw down part of one side of the leaf with a few threads and occasionally feed on the opposite side, eating a hole quite through: after two or three days it began to eat away a narrow open channel through one side of the leaf near the stalk, for the purpose of turning the part under from the cut to make a covered-in abode, and as this progressed the larva went at intervals to feed on the opposite half of the leaf, which became pierced with many holes by March 24th; and as no fresh holes appeared then for a day or two, I turned up the leaf to see what had occurred, and found a part of it had been rolled completely round the larva, which lay hidden within, but on tearing back a small portion the larva could just be discerned in a web, lying with its head coiled round waiting to moult, and getting over this operation on the 30th, it deserted the leaf and wandered about over several others before again settling down to feed.

After this moult the skin was much more translucent and the head only partly black on the lobes of the crown and on the cheek behind level with the ocelli, the characteristic black mark on each side of the second segment now very distinct, rather like that of *ferrugalis*, yet with the round dot behind not separated but forming part of it, somewhat after the fashion of a dumpy ninepin with projecting knob at the end.

The last moult occurred on the 25th of April, when these black marks disappeared

and left but mere specks of brownish-grey where they had been. Of course, now in its last stage, I could be sure it was my old acquaintance *prunalis*, which I had long ago figured and found in this state on elm, honeysuckle, and dogs-mercury ; as if to impress these facts upon me, ere April closed, Mr. C. G. Barrett found several nearly mature larvæ on *Stachys sylvatica* and *Teucrium scorodonia*, which he kindly forwarded, and reported meeting with more on *Lychnis* and Marjoram, while here one was found on elder.

It will suffice to say the larva I had carefully wintered differed in no respect at last from any of those, and that when full grown it measured seven-eighths of an inch in length, and tapered a little at each end, the segments plump, especially on the belly, subdivided on the back by a deep wrinkle ; the head of an opaline tint, had the mouth and tips of the papillæ brown with dusky traces of former marks, similarly also on the second segment, the colour of the back as far as the spiracular region of a bright and deep transparent green, relieved by two broadish brilliant opaque-white subdorsal stripes, on these the transparent tubercular warts are partly situated and consequently show half white and half green, each with a whitish hair, the whitish tracheal thread being visible and along it the minute round cream-coloured spiracles, below them the pale side and legs faintly tinged with watery translucent greyish-greenish, and like all the rest of the skin, brilliantly glittering ; when seen from beneath, the alimentary vessels showed green at the segmental divisions.

To prevent escape, towards the last this larva was placed in captivity with a few gathered leaves, and amongst them it, in a few hours, cut from the edge of one in a semicircular direction to near the midrib, then turned itself round and commenced a similar cut in the opposite direction about an inch distant from the first, though not going this time so near the midrib ; the edges of the cut portion were then drawn together with silk threads and formed a leafy puparium of the pasty-like form of *nemoralis* and others ; the interior lining was afterwards found to be a very coarse openly-wrought reticulation of silk threads, wherein the pupa lay as in a hammock, its tail attached to one end where the threads converged.

The pupa itself, half an inch in length, has a rather slender character, tapering from the thorax to the well-produced head with prominent eye pieces and more towards the tail, the wing covers long, also the antennæ and leg cases, the back of the abdomen keeled on the four upper segments and having a row of minute raised dots on either side, the spiracles prominent, the tip furnished with two small curly-topped spines crossing each other near the ends : the colour of the head, thorax, and wing covers pitchy-black and glossy, the abdomen quite dull, black above, brown on the sides and belly and ringed with orange-ochreous at the divisons.—WILLIAM BUCKLER, Emsworth : January 12th, 1880.

Description of the larva of Stilbia anomala.—On the 13th March last I received two very distinct forms of the larva of this insect from Mr. G. C. Bignell, of Stonehouse, Plymouth, to whom they had been sent from Torquay.

Length, about an inch, and of proportionate bulk ; nearly uniformly cylindrical ; head rounded and polished, about the same width as the second segment ; segmental divisions well defined ; skin soft and smooth, but not glossy.

Var. I has the ground colour a warm pale chestnut-brown ; head greyish-brown,

thickly freckled with dark brown : two purplish-brown lines (black at the divisions of the hinder segments), enclosing a yellow line between them, form the dorsal stripe ; sub-dorsal stripes yellow, very finely edged with a darker shade of brown than the ground colour ; spiracular stripes greyish-white, edged above with smoke colour ; spiracles black, those on the 2nd and 12th segments very large and distinct. Ventral surface, legs, and pro-legs uniformly dingy chestnut-brown.

Var. II has the ground colour bright pea-green, with just a tinge of yellow ; head of the same colour, but thickly freckled with brown ; two lines of a darker green than the ground, enclosing between them a white line, form the dorsal stripe ; sub-dorsal stripes white, finely edged with a darker green than the ground colour : spiracular stripes white, edged above with smoke colour ; spiracles black as in Var. I. Ventral surface, legs, and pro-legs uniformly of the same colour as the ground of the dorsal area. Feeds on grass.—GEO. T. POERRITT, Highroyd House, Huddersfield : December 2nd, 1879.

Captures near York.—The following insects have fallen to my share during the past season : *Coleophora ibipennella* ; I was fortunate in taking four cases of this species off birch, on the 4th of June, from which I bred two imagos. *C. currucipennella* ; several cases of this species I found upon sallow, and was glad to see three specimens emerge. I have also taken six of the black pistol-formed cases of *C. anatipennella* from apple, and have bred three imagos. *C. vimenetella* ; plentiful on sal-lows ; *C. fuscedinella*, on alder. *Phtheochroa rugosana* ; a single specimen of this beautiful species was taken flying along a hedge, although a southern insect, it seems to occur down here. *Hedya Paykulliana* put in an appearance also, along with *Spilodes sticticalis* and *Nemotois minimellus*, making this an intermediate locality for the latter species. Being out during the months of June in search of larvæ, my attention was directed to the leaves of *Angelica sylvestris*, which were drawn together by the larvæ of a *Depressaria*, which I afterwards found to be *angelicella*, of which I collected a goodly number, and reared about twenty imagos. During the month of October I have been successful in finding *Coleophora fuscocuprella* cases on nut leaves. To make sure that I was correct in supposing them to be that species, I sent a description of them to Mr. Hodgkinson, of Preston, and he replied that they were *C. fuscocuprella*, and that I was by all means to turn them out of doors in a flower-pot, so as to give them every chance of wintering well. The same month also I picked off some aspen trees a number of leaves which were tenanted by larvæ, making blotches close to the footstalk of the leaf, and which I make out to be *Nepticula argyropeza*. I have also collected during the season seventy species of *Diptera*, about forty of *Tenthredinidæ*, and a number of *Ichneumonidæ* ; but am unable to give their names, not having any descriptive work on any of these Families. —THOS. WILSON, Holgate, York : December 15th, 1879.

Occurrence of Stenopsocus stigmaticus, Imhoff, near Worcester.—I was so fortunate as to beat two specimens of this insect from a hedge at Broadheath, on October 20th, one from hawthorn, the other from maple. The left superior wing of one specimen has a supplementary vein under the pterostigma, producing three instead of two marginal cells.—J. E. FLETCHER, Happy Land, Worcester : January 2nd, 1880.

Observations on insects at Worcester in 1879.—The gorse (*Ulex europaeus*) showed very strikingly the ill effects of the winter: two-thirds of it was killed down to the ground, and what remained alive was but poorly supplied with blossoms, and very few of them expanded at the beginning of May. As a consequence, it was useless to spend time beating or searching that plant, the result of five hours' work being less than could be obtained in half-an-hour in an average spring. Rain, producing frequent floods, rough winds and gloom predominated through the summer time; but the autumn brought better weather, and collecting became profitable.

The following remarks are merely founded on my own experience. The district traversed was small, being almost confined to a tract of some sixteen square miles on the west of the town.

Excepting a weak nest of *Formica nigra* and one of *F. flava*, I did not see twenty ants during the year. Very few social wasps occurred, and only three species, *Vespa sylvestris*, *vulgaris*, and *germanica*. Twenty-three *Odyneri* were taken in the garden, but only one (*O. sinuatus*) was captured elsewhere. *Bombi* and *Apathi* were as numerous, in species and individuals, as usual. Symptoms of spring occurred at end of March, bringing out *Anthophora acervorum*; but wintry weather again set in within a few days, and the bee disappeared till the end of April, thenceforth flying, when days were tolerable, throughout May. *Andrenæ*, *Halicti*, and other solitary bees were scarce throughout the year. Only four specimens of *Anthidium manicatum* were found, the first on July 15th, the others on August 25th—then quite fresh looking. As this species occurs at my own door, I had the best of opportunities for observing it. Of Fossores, under twenty individuals were found, all small black species. Not more than ten specimens of *Chrysidae* were seen. Ichneumons were less numerous than usual; and *Oxyura* and Chalcids were notably few. The galls of *Cynipidæ* were rather commoner than during 1877—8, but few insects were bred from them, except in the case of *Andricus albipes*, every gall of which yielded up its tenant. Few species of saw-flies were seen. *Athalia rosæ* was uncommon, though in the summer of 1878 it was so plentiful as to be troublesome to the collector. *Selandria serva*, on the other hand, was far more abundant than I ever before witnessed. Larvæ of some species were commoner than usual, e.g., *Nematus ribesii* (far too common), *Cladius Brullæi*, *rufipes*, *padi*, *Fenusæ melanopoda*, and *Phyllotoma vagans*; whereas, those of *Fenusæ betulae* and *pumila* were extremely scarce.

Water was too prevalent to allow of much beating, sweeping, or searching on the ground, consequently not much was done in *Coleoptera*; but *Cryptorhynchus lapathi* was noticed as much commoner than usual, so were some Elaters. *Melolontha vulgaris* was uncommon, and first seen on June 13th; *Rhizotrogus solstitialis* was not seen at all. Larvæ of some of the leaf-mining *Rhynchophora* were noticed as fully as numerous as usual.

The *Panorpidae* were not uncommon; but *Chrysopa* was only represented by one example; and of *Hemerobius* only three specimens were taken. No *Coniopteryx* was seen. Of *Sialis lutaria* only one was found, but three of *S. fuliginosa* were caught.

Psocidæ were common in the autumn, though few traces of them were found earlier. *Perlidæ*, *Odonata*, and *Ephemeridæ* seemed as common as usual.

Few *Orthoptera* were seen: the only earwig met with being *Forficula forcipata*, and that, fortunately, was uncommon.

Very few species of butterflies were seen: no fritillary, no *Thecla*, no *Graptia*

c-album, no *Leucophasia sinapis*. The *Satyridae* were scarce, except *Satyrus Janira*, which was abundant, and active through the continual rains; it was out far into October. *Pyrameis cardui* was common, the hibernated specimens bravely facing out the storms, and starting up as one approached, nearly into the dusk of evening. *Lycæna Icarus*, and that scarce, was the only species of its genus seen. *Pieris brassicæ* was scarce, and its larva not seen; but *P. rapæ* was abundant, its larva doing much damage to the cabbages. *Liparis auriflava* was abundant, but late, continuing visible to end of September. Larvæ of *Mamestra brassicæ* were numerous and proportionately injurious; and *Plusia gamma* was in great force. *Abraxas grossulariata* was more abundant in lanes and thickets than usual, and, withal, below the average size, many specimens remarkably so. In the *Lepidoptera*, but in the *Geometrina* especially, I noticed that the great majority of specimens, however recently out of pupa, were scratched and torn—the result no doubt of the frequent violent winds. To the same cause it was owing that the foliage of most plants, not of very humble growth, was bruised and torn during what ought to have been summer, and it was quite a common thing for branches to be torn from trees. Larvæ of the species of *Tischeria* were very scarce, only four of *angusticolella* and one of *dodonæa* being found. Those of *Lithoclellis* were, in some species at least, commoner than usual—*torminella*, *comparella*, and *stettinensis* for instance.

Of *Trichoptera*, no species of *Phryganeidæ* occurred to me, nor any of *Stenophylax* or *Micropterna*, though these latter are usually the most obtrusive of the tribe.

Among *Diptera* the species of *Bibio* were scarce: of *B. Marci* only three were found, the first on May 26th. Many of the not uncommon species of *Syrphidae* were not met with at all; but of *Helophilus trivittatus* five occurred—until then I had only one. The *Sarcophagæ* were scarce, not a dozen specimens being seen throughout. *Musca domestica* was less common than usual, and, though carefully looked for, was not seen before August 1st.

The *Hemiptera* noticed were fewer than in other years; but the *Psyllidæ* were obtained commonly by beating in autumn. Aphides were troublesome on black currant, broad bean (especially so), apple, strawberry, chrysanthemum, and rose.—ID.

List of Hemiptera-Homoptera occurring at Pitlochry in Perthshire.—In a former communication, p. 175, *ante*, I gave a list of the *Hemiptera-Heteroptera* which I took at Pitlochry; the present is a similar list of the *Homoptera*. Messrs. Douglas and Scott have kindly verified most of the species; had the season been an ordinary one, I feel sure the country about Pitlochry would have furnished better results, if carefully worked.

Cixius nervosus, L., *C. cunicularius*, L., *Liburnia pellucida*, Fab., *L. mesomela*, Boh., *L. discolor*, Boh., *L. limbata*, Fab., *L. guttula*, Boh., *L. perspicillata*, Boh., *Dicranotropis hamata*, Boh., developed, *D. sp.* allied to *hamata*, *Stiroma albomarginata*, Curt., *Aphrophora alni*, Fab., *Philænus spumarius*, L., in more wonderful variety than in Morayshire, *Ph. exclamationis*, Thunb., *Ph. lineatus*, L., *Centrotus cornutus*, L., *Ulopa reticulata*, Fab., *Megophthalmus scanicus*, Fall., *Strongylocephalus Megerlei*, Fieb., *Acocephalus albifrons*, L., *A. rusticus*, Fab., *A. histrionicus*, Fab., *A. bifasciatus*, L., *Macropsis lanio*, L., *Idiocerus populi*, L., *Bythoscopus alni*, Schr., *B. fruticola*, Fall., *Agallia venosa*, Fall., *Tettigonia viridis*, L., *Euacanthus inter-*

ruptus, L., *E. acuminatus*, Fab., *Alebra albostriatella*, Fall., *Cybus smaragdulus*, Fall., *Chlorita apicalis*, Flor., *Dicranoneura variata*, Hardy, *D. sp.* undetermined, *Typhlocyba 10-punctata*, Fall., *T. geometrica*, Schr., *T. nitidula*, Fab., *T. tenerrima*, II.-S., *T. ulmi*, L., *T. alneti*, Dahlb., *T. quercūs*, Fab., *T. blandula*, Rossi, *Eupteryx Germari*, Zett., *E. pulchellus*, Fall., *E. vittatus*, L., *E. stachydearum*, Hardy, *E. notatus*, Curt., *E. urticæ*, Fab., *Gnathodus punctatus*, Thunb., *Cicadula 6-notata*, Fall., *C. frontalis*, Scott, *Thannotettix tornella*, Zett., *T. melanopsis*, Hardy, *T. virescens*, Fall., *T. 4-notata*, Fab., *T. cruentata*, Panz., *Athysanus obsoletus*, Kirschb., *A. griseascens*, Zett., *A. subfusculus*, Fall., *A. sordidus*, Kirschb., *A. obscurellus*, Kirschb., *A. striola*, Fall., *A. piceus*, Scott, *A. brevipennis*, Kirschb., *A. prasinus*, Fall., *Allygus mixtus*, Germ., *Deltocephalus striatus*, L., *D. pulicaris*, Fall., *D. oculatus*, Salh., *D. punctum*, Flor., *D. abdominalis*, Fab., *Arytæna genistæ*, Latr., *Psylla pineti*, Flor., *Ps. pruni*, Scop., *Ps. spartii*, Guér., *Ps. cratægicola*, Först., *Ps. sylvicola*, Leth., *Ps. peregrina*, Först., *Ps. buxi*, L., *Ps. Försteri*, Flor., *Trioza viridula*, Zett., *T. urticæ*, L., *T. hæmatodes*, Först., *Aphalara polygoni*, Först., *Rhinocola ericæ*, Curt., *Livia juncorum*, Latr.; *Orthezia Signoreti*, under débris of heather. And, in addition to my former list of *Heteroptera*: *Berytus minor*, *Corixa concinna*, *C. venusta*, —GEO. NORMAN, Cluny Hill, Forres, N.B.: 31st December, 1879.

Gastrodes abietis in Morayshire.—Since the announcement in this Journal (p. 175 ante) of my captures at Pitlochry of *Gastrodes abietis* in the cones of *Abies Douglasi*, I have tried for the insect here in Morayshire, and have just found fourteen specimens in the fallen cones of *Abies excelsa* or common Norway spruce. As the insect seems hitherto to have been rare or local in Britain, I give this information in order to direct others to examine the cones during the winter months. For the last three years I have beaten the spruce trees in vain, during the summer months for this insect.—ID: 24th December, 1879.

Imperfect development.—In the January number of the Entomologist's Monthly Magazine, p. 188, is given an instance (probably *Orgyia antiqua* ♀) of probable transformation without having passed through the pupa state. The subject seems so extraordinary, and yet so interesting, that the members of this Society would be glad if you could give some further explanation, or, at least, an Editorial opinion.—East London Entomological Society, 333, Mile End Road: D. PRATT, Secretary: January 20th, 1880.

[We were not able to examine this specimen critically; in all probability the larval skin was never thoroughly thrown off. We have seen an almost similar instance in *Pieris rapæ*. Many instances of otherwise perfect insects still apparently bearing the larval head have been recorded; of course these went through the usual pupal change, excepting that, for some reason or other, the larval skin was never entirely discarded.—Eds.].

Reviews.

HEMIPTERA GYMNOCEPTRA EUROPÆ. HÉMIPTÈRES GYMNOCRÉATES D'EUROPE, DU BASSIN DE LA MÉDITERRANÉE ET DE L'ASIE RUSSE, décrites par O. M. REUTER. Tome deuxième, avec 5 planches. Helsingfors: Imprimerie de la Société Finlandaise de Littérature. 1879. pp. 193—312. 4to.

We noticed the first volume of this magnificent work last year (vol. xv, p. 19), and have now briefly to announce the appearance of the second volume. It contains the second Division of *Capsina—Oncotylaria*, Reuter,—comprising the characters of twenty-two genera and descriptions of eighty-two species, and is illustrated by five plates, namely, one of generic details from the author's designs, and four of coloured figures of thirty-one species, beautifully engraved in Paris, from Fieber's inimitable drawings, by Debray and Guinemand. The creation of many new genera based on slight structural differences (a practice now very general with entomologists in all the Orders of insects), when viewed in the light of evolution is, and will hereafter be more, open to question. We say this, however, without in the least degree wishing or intending to detract from the value or importance of Dr. Reuter's work, which fully sustains his growing reputation, and is in every respect admirably done from his point of view.

THE BUTTERFLIES OF NORTH AMERICA, second series, pt. viii, by W. H. EDWARDS. Boston : Houghton, Osgood, and Co.; London : Trübner and Co., 1879, 4to.

This part (with three exquisite plates) treats upon *Limenitis Arthemis*, Drury (including its form *Proserpina*, Edwards), *Chionobas Invallda*, Mead, and *Grapta rusticus*, Edwards. It is utterly impossible for us to enter into an examination of the details given by Mr. Edwards for each species, and the mere fact that a *Grapta* is one of those under consideration is sufficient excuse for declining to do so. Every thorough-working Lepidopterist possesses this work, and can form his opinions on the many pregnant questions raised. Mr. Mead's reproduced narrative of his experiences in breeding *Limenitis Arthemis* are sometimes amusing, as well as (always) instructive. We are informed how to keep breeding females "in good health and spirits," and how over-feeding killed others, and prevented the laying of eggs from "excess of fat." All is perfectly legitimate, and no doubt very true; yet, somehow or other, our ideas got "mixed," confused between thoughts on butterfly-breeding and stock-rearing.

INDEX ENTOMOLOGICUS, pars i, qua continentur nomina Entomologorum Europæ (exceptis Galliæ Coleopterologis), Societatum Aectorumque entomologicorum. Edidit Dr. F. KATTER. 12mo, pp. 1—124. Putbus a Rügen : Aug. Dose; Paris : L. Buquet; London : West, Newman, and Co. 1880.

All British entomologists who desire to emancipate themselves from the narrow groove of insular prejudices, and to enter into friendly and profitable correspondence with their brothers of continental Europe generally, will find this little book (compiled by the Editor of the "Entomologische Nachrichten") very useful. It purports to be a list of all the entomologists of Europe, with their addresses (arranged geographically and politically), and an indication of the special branches of entomology attended to. (Why the French Coleopterists are purposely omitted, we know not.) The editor has undertaken a gigantic task, and has succeeded fairly well for a first attempt; it would not be just to be analytically critical over so laudable an endeavour. The British list occupies 19 pages, and enumerates nearly 500 names and addresses: of these probably two-thirds have never before been heard of by their continental fellow-workers. The list concludes with the names of a few North American entomologists, and an enumeration of entomological societies and periodicals. Altogether there are probably nearly 2500 names and addresses.

ENTOMOLOGICAL SOCIETY OF LONDON, 3rd December, 1879.—J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the Chair.

Mr. H. Vaughan exhibited a series of varieties and aberrations of *Lycæna Corydon* from Dover; one ♀ had the wings on one side suffused with blue on the upper surface; in another example the pupils in the spots of the under-side were mostly wanting, thus showing a parallel with the case of *L. Artaxerxes*, as compared with *L. Medon*.

Mr. Distant exhibited a remarkable variety of *Danais Plexippus (Archippus)* from Antigua, the ground colour of which was dull pale testaceous. Another similar specimen had been received from the same island, but as all the others were ordinary, he did not consider these represented a local form.

Mr. C. O. Waterhouse mentioned a remarkable instance of tenacity of life in a specimen of *Curculio cleonus*, which had resisted the action of a laurel-bottle and two immersions in benzine, the second of which continued through the whole of one night. The insect was finally killed by means of hot water.

Mr. Billups exhibited *Pseudopsis sulcata* from Box Hill, *Agathidium nigrinum* from Caterham, *Anisotoma grandis* from Box Hill, *Leptinus testaceus* from Burford Bridge, and the example of *Carabus auratus*, taken alive in London, recorded at p. 15 of this vol. of the Ent. Mo. Mag.

The Rev. H. S. Gorham read a paper entitled "Materials for a revision of the *Lampyridæ*." In his introductory remarks he alluded to the mimetic resemblance of certain Longicorns with *Lampyridæ*, the light-giving segments of the latter being paralleled in the form, though not phosphorescent. He alluded also to the correlation of the length of the antennæ, and the amount of phosphorescence in *Lampyridæ*, the one being in an inverse ratio to the other. Mr. Bates confirmed the mimetic analogies alluded to, and said that the observations on the antennæ and the amount of phosphorescence, were of great physiological value.

Mr. J. W. Slater communicated a paper on "Certain minute characters in insects with reference to the theory of evolution."

Mr. P. H. Gosse communicated a life-history of the rare *Papilio Homerus*, from the observations of the Rev. J. Leslie Mais and his sons, resident in Jamaica.

Mr. Roland Trimen communicated a paper on some hitherto undetermined South African Butterflies.

21st January, 1880. J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the Chair. *Anniversary Meeting.*

The following were elected Members of Council for 1880, viz.: H. W. Bates, F.L.S., W. Cole, W. L. Distant, J. W. Dunning, M.A., F.L.S., F. du Cane Godman, F.L.S., F. Grut, F.L.S., Sir J. Lubbock, Bart., M.P., V.P.R.S., &c., R. Meldola, O. Salvin, F.R.S., E. Saunders, F.L.S., H. T. Stainton, F.R.S., &c., S. Stevens, F.L.S., and J. J. Weir, F.L.S.

The following Officers were subsequently elected, viz.: Sir J. Lubbock, President; E. Saunders, Treasurer; F. Grut, Librarian; R. Meldola and W. L. Distant, Secretaries.

In the absence of the President, an Address was read by J. W. Dunning, Esq., V.P., and the Meeting terminated with the usual vote of thanks to the Officers.

WHAT IS MEANT BY THE TERM "SPECIES"?

BY J. W. DOUGLAS.

The late G. H. Lewes wrote, "The *thing* species does not exist; the term expresses an *abstraction*, like Virtue, or Whiteness; not a definite concrete reality, which can be separated from other things and always be found the same. Nature produces individuals; these individuals resemble each other in varying degrees; according to their resemblances we group them together as classes, orders, genera, or species. There is a reality indicated by each term—that is to say, a real relation; but there is no objective existence of which we could say, This is variable, This is immutable. . . . When zoologists have maintained that species are variable, they have meant that *animal forms are variable*; and these variations, gradually accumulating, result at last in such differences as are called specific. . . . Every new form becomes established only through the long and gradual accumulation of minute differences in divergent directions."* Now, I do not contend, nor do I know it ever has been contended, that a species has a definite objective existence in the sense indicated, yet I hold with Cuvier that "species" expresses a reality, and not merely an abstraction—a formulated idea of characters believed to constitute a species; that is to say, that when individuals are so related that, whatever the range of variation among them may be, they breed together consecutively, they are *thus* a real species. A. R. Wallace says, "a species may be defined as a group of individuals of animals or plants which breed together freely and produce their like."† Within this limit individuals may, and do, vary to a vast extent in colour, marking, size, and structure, according to, and as a result of, the conditions in which they live. This has been proved by the breeds of animals under domestication; and among insects—notably *Lepidoptera*—it is incontestibly demonstrated that individuals reared with others from the same batch of eggs have differed so much, in colour especially, that in former time, when breeding was little practised, such would, if captured at large, have been deemed to belong to different species. Thus Stephens says,‡ "I conceive that where an insect differs from its nearest congener by some trifling variation of form, combined with a diversity of sculpture, dissimilar bulk, or prevalent discrepancy of colour, either in the disposition of particular markings or in a universal change, we are perfectly justified in considering such examples as distinct species, unless we are enabled by experience to show incontestibly that such is contrary to nature." He,

* "Studies in Animal Life."

† "Nineteenth Century," January, 1880.

‡ "Systematic Catalogue of British Insects," Introduction, p. xvi.

however, afterwards quotes from Kirby—"As we do not know the value and weight of the momenta by which climate, food, and other supposed fortuitous circumstances operate upon animal forms, we cannot point out any certain diagnostic by which in all cases a species may be distinguished from a variety; for these characters that in some are constant, in others vary."

I believe that continuous interbreeding of individuals during a succession of generations affords a true test of what constitutes a species. Unfortunately, from the conditions of the existence of insects this test is of very limited application; and we have then only analogy, experience, and observation to guide us. And seeing that by rearing insects we have discovered not only that species, or rather the individuals constituting them, vary *inter se* to a vast extent through all their stages, but also that two species in their ultimate form are so much alike as to present scarcely an appreciable difference, although known to be derived from larvæ of entirely distinct structure, habits, and origin, it concerns us not hastily to decide from the imago state alone that an insect is, or is not, specifically distinct. Under the breeding-test, colour, marking, and size have been proved to have no regular specific value in any stage of the existence. Dimorphism in form of wings has been found to exist contemporaneously in the same species (*Lepidoptera*); in more than one Order one sex is winged and the other apterous; or there are macropterous and brachypterous forms of each or either sex; and there is good reason to believe that the form of the thorax differs greatly in the same species, being correlated with alary development (*Hemiptera*). In *Hemiptera*, Dr. Puton maintains that another structural difference exists in the same species, and if he be correct in his hypothesis, many so-called species will have to be ranked, at the most, as races induced by special circumstances, and which may or may not endure, and be established eventually as true species, not breeding with other forms.

Dr. Puton contends* that pilosity, in certain insects at least, is not a specific character, although it has been used to make species. Thus, he says, that in the genus *Salda*, *pilosella*, Thoms., is only a pilose form of *S. pallipes*, Fab.; *S. Cocksi*, Curt., a northern hispid form of *S. geminata*, Costa; *S. elegantula*, Fall., the brachypterous hispid form of *S. cincta*, H.-S., which is macropterous and glabrous. "It is true," he continues, "that *S. cincta* has the antennæ notably thinner than *S. elegantula*, but perhaps there is in this a relation between the thickness of the antennæ and development of

* Bulletin Soc. ent. France, 1879, p. 205.

the organs of flight. This may be decided by future observation. I think, therefore, it is perfectly demonstrated that in the genus *Salda* the presence or absence of raised hairs, if not conjoined with other characters, is not sufficient to separate species. This observation induces me to believe that the same thing may exist in other families, and I am disposed to regard *Scolopostethus pilosus*, Reut., only as a hispid variety of *S. affinis*." All this is at present in the region of possibility or probability, scarcely "parfaitement démontré." Time will show. A certain bias is given to the probability by an analogous variation, often observed in plants under altered conditions; thus De Candolle, writing on the influence of climate, soil, elevation, &c., on species, says, among other remarks, "If a plant accustomed to water is found to live on a drier soil, it becomes covered with hairs, remains smaller than usual, and acquires greater hardness."

In view of the great range of variation ascertained to exist in many undoubted species, and which is indeed an essential character of a species, it appears very questionable if the slight differences of form, size, sculpture, puncturation, or clothing, on which great numbers of species have been founded, in *Coleoptera* especially, will prove to be real specific characters. Failing the breeding test, which must in most cases happen, the best criterion of species is in the form of the genital segments and their armature, but it is not always easy to determine this, nor even, if ascertained, to know absolutely how far it is decisive of specific difference; yet it affords the best known means of approximate certainty.

The question of the origin of species has been intentionally avoided, as not within the scope of the present paper.

8, Beaufort Gardens, Lewisham :
January 14th, 1880.

POSTSCRIPT.—Since writing the foregoing I have read Professor Huxley's new work, "The Crayfish," in which I find the following about species :—

"The word 'species' in Biology has two significations; the one based upon morphological, the other upon physiological, considerations.

"A species, in the strictly morphological sense, is simply an assemblage of individuals which agree with one another, and differ from the rest of the living world in the sum of their morphological characters; that is to say, in the structure and in the development of both sexes. If the sum of these characters in one group is represented by A, and that in another by A + n, the two are morphological species, whether n represents an important or unimportant difference.

"The great majority of species described in works on Systematic Zoology are merely morphological species. That is to say, one or more specimens of a kind of animal having been obtained, these specimens have been found to differ from any previously known by the character or characters *n*; and this difference constitutes the definition of the new species, and is all we really know about its distinctness. But, in practice, the formation of specific groups is more or less qualified by considerations based upon what is known respecting variation" (p. 291).

"It follows that the species, regarded as the sum of the morphological characters in question and nothing else, does not exist in nature; but that it is an abstraction, obtained by separating the structural characters in which the actual existences agree, from those in which they differ, and neglecting the latter" (p. 243).

"In the physiological sense, a species means a group of animals, the members of which are capable of completely fertile union with one another, but not with the members of any other group." (p. 296).

These extracts give the basis of the ideas of species fully set forth in Prof. Huxley's work, which exhibits close reasoning and induction, and should be studied by all who desire to be learners in the great school of Nature.—J. W. D.

NOTES ON TENTHREDINIDÆ AND CYNIPIDÆ.

BY P. CAMERON.

A short time before his death, the late Mr. F. Smith was good enough to examine for me one or two species of *Tenthredinidæ* in the Linnean collection, regarding the names of which there was some uncertainty. This examination showed that *Tenthredo viridis*, L., = *T. picta*, Klng.; while *T. mesomela*, L., = *T. viridis*, Klug. The types, therefore, confirm Thomson's determinations made from the descriptions of these two species; and these names may be adopted without hesitation. According to Thomson, *T. nemoralis*, L., = *Lyda pratensis*, Fab., but the type of *nemoralis*, according to Mr. Smith, is a *Nematus*, apparently, from Mr. Smith's description, *N. capræ*, Pz. The type (or, rather, what now stands for the type of *nemoralis*, for it is clear that *nemoralis*, as described, is not a *Nematus*) thus throws no light on the disputed point as to whether *nemoralis* be identical with *pratensis*, Fab., or with *punctata*, Fab., as Zaddach would have it. I believe myself that the last identification is the correct one, for the Linnean words "abdominis segmentis lateralibus albis" fit *punctata* better than they do *pratensis*; for although that species has markings along the sides, yet they are "fulvis" rather than "albis." There is no "*Tenthredo pratensis*" (said by Thomson to be identical with *Dolerus cylanteriae*, Klug) in the collection, nor any named species of *Dolerus*.

In Mr. Smith's descriptions of Japanese *Tenthredinidæ*, published in Trans. Ent. Soc. for 1874, the following errors occur: *Dolerus nigro-cæruleus* and *Dol. fuscipennis* (*l. c.* p. 384) belong to the genus *Emphytus*; *D. fuscipennis* is, I believe, only the ♂ of *nigro-cæruleus*. *Macrophya rexator* (p. 378) and *M. luctifera* (p. 380) likewise belong to *Emphytus*. *Selandria nigriceps* (p. 376) is a *Monophadnus*.

Derecyrta deceptus, Smith (Trans. Ent. Soc., 1876, p. 474, pl. 4, fig. 6), if correctly figured, is not a *Derecyrta*, but probably a *Xiphydria*, for it is figured as having two marginal cellules, while *Derecyrta* has only one (*cf.* Smith, Ann. and Mag. Nat. Hist., 1860, p. 355).

Hartig (Blattw., 369, pl. viii, fig. 9) it may be added has described and figured *Xiphydria* as having only one marginal cellule, whereas it has two.

The British species of *Allantus* known to me may be identified as follows:

A. Antennæ entirely luteous *scrophulariæ*, L.
B. Antennæ black, yellow at the base.

I. Pleuræ entirely black.

1. Head and thorax deeply and distinctly punctured.

a. Fore-wings with a distinct blackish blotch in the marginal and upper part of submarginal cellules; scutellum black, tegulæ yellow.

Fourth abdominal segment with a yellow band, stigma testaceous...
tricinctus, Fab.

Fourth segment without a yellow band, stigma fuscous at the base...
? *4-ciunctus*, Thoms.

b. Fore-wings scarcely infuscated, tegulæ black, scutellum marked with yellow; the 4th and 5th segments black beneath ... *viennensis*, Schr.

2. Head and thorax smooth, shining, unpunctured, the 5th and 6th segments yellow all round; stigma fuscous at apex; tegulæ black, marginal nervure nearly interstitiate.....*cingulum*, Kl.

II. Pleuræ marked with yellow.

a. Wings yellowish, only the hind femora marked with black; hind tibiæ and tarsi luteous *flavipes*, Fourc.

b. Wings hyaline.

Abdomen with two complete yellow bands; posterior tarsi and apex of tibiæ reddish; tegulæ black.

♂. Abdomen beneath black, the apical segments yellow above...
Schaefferi, Kl.

Abdomen with three complete bands; posterior tarsi and apex of tibiæ black; tegulæ partly yellow.

♂. Belly yellow; the apical segments black above.....*arcuatus*, Forster.

C. Antennæ entirely black.

Wings yellowish-hyaline, four front legs partly yellow, pronotum with a yellow border *tenulus*, Scop.

Wings deep violet-black, four front legs violet-black, pronotum without a yellow border *riduus*, Rossi.

The European species of this genus stand very much in need of revision. Much uncertainty exists as to the nomenclature and the limits of the species, which appear to vary a good deal in coloration. In this country most of the species are rare, and more or less confined to the southern counties, and, indeed, the genus is more representative of warm than cold regions. Of our species, *scrophulariae*, *tricinctus*, *viennensis*, *arcuatus*, and *tenulus* are well known and need no remark; but the others are involved in a good deal of confusion. *Schaefferi*, Klug, was recorded as British by Newman (Ent., 1869, 217) on the authority of a specimen taken by him in Herefordshire, and named by Mr. F. Smith. I did not, however, include it in my Catalogue, because the specimen I got from Mr. Smith as *Schaefferi* was not that at all, whatever Newman's specimen may have been. I have, however, since seen a couple of the true *Schaefferi* taken by Mr. E. A. Butler near Hastings, so it will require to be inserted in our lists. It is most nearly related to *arcuatus*, but is somewhat larger, the puncturing on the mesonotum is coarser, and more opaque, the yellow mark on the pleuræ is smaller, &c. The ♂ has the hind tibiæ and tarsi thickened, and they are for the greater part black; the mandibles too are black, instead of yellow, as in the ♀; while the wings appear to be darker than in the other sex; and the band on the 5th abdominal segment is interrupted in the middle.

A. flavigipes, Fourc., is a very distinct species, and may be readily known by its yellowish wings and legs, and by the whole of the abdominal segments being broadly marked with the same colour. The ♂ is easily known from all the other British species by having the abdomen marked with red and yellow.

Two accounts have been published of the life history of this insect. Curtis (B. E., pl. 764) states that the imago appeared in abundance in Battersea fields at the end of June. Wishing to obtain living specimens, he went there, and found two females upon the flowers of *Sinapis nigra*, along with six larvæ, which fed on that plant as well as on *S. alba*, eating the leaves, stalks, and flower. Curtis did not rear these larvæ, but had no doubt as to their identity. The late F. Smith told me that it was he who discovered the insect at Battersea, and reared the perfect insect from the larva figured by Curtis, so there can be no doubt as to the habits of the insect. According to the figure given by Curtis, the larva was of a grey colour, with 10 (?) 11 large black marks over the legs, while above each of these again was a small black dot. The head is testaceous. At the last moult the black marks were cast off.

The other account is given by Kaltenbach (Pfl. Ins., 274). According to him, F. Eppelsheim bred the insect from larvæ feeding in September on the yellow flowers of *Bupleurum falcatum*, but no details are given.

Dr. Rudow, in his revision of the German species of *Allantus* (S. E. Z., xxxiii, 137) expresses the opinion that *dispar* (*flavipes*), *arcuatus* and *Schaefferi* are all varieties of one species, which he would name *marginellus*, Pz. He says that the larvæ of the three species just mentioned are coloured alike, being of a green colour, which varies in intensity. Before pupating they are brownish, often bearing brown spots. He found them on *Alnus*, *Umbelliferæ*, and *Achillea*, but always immediately before spinning up, so that he was in ignorance of their precise habits, and he seems to be even in doubt as to the particular food plants. There can, however, be no doubt that *flavipes*, *arcuatus*, and *Schaefferi* are all good and distinct species, and may, I believe, be readily identified by the characters I have noted in the table.

There seems to be considerable ambiguity about *cingulum*, *zona*, and *zonula*. Rudow (*l. c.*) is of opinion that the last two are not distinct, and he appears to consider the first also as a variety of the same species, which he would name *bicinctus*, Fab. To my mind, however, *cingulum* is quite distinct from *zonula*, *zona* being easily known from them by the blackish tegulæ, &c. I have never seen any specimens that I could refer to *zonula*, but it would seem, from Thomson's description (Hymen. Scand., i, 261, 7), to be a good species, readily distinguishable from *zona* by the 7th abdominal segment having no yellow band, while the four front femora have no black on them. *Cingulum*, again, has the 7th segment banded with yellow, while it has all the femora black. The species I regarded formerly as *zona* must, I think, be *A. 4-cinctus*, Thoms. (Hym. Scand., i, 258, 3). I have, however, no specimens at hand; but, according to the description I made from a specimen I had from Mr. Smith, it had the "head and thorax opaque, punctured," which agrees well with Thomson's description of *4-cinctus*, while it had also the posterior tarsi and apex of tibiæ reddish, while *zona* has these black and the mesonotum smooth. The body-coloration in both species is the same. My impression is that the puncturing was much less rugged than it is in *3-cinctus*, next to which Thomson places *4-cinctus*. I find, too, that I have described the wings in Mr. Smith's specimen as "infuscated at the apex," which is the case with the last mentioned species, and not apparently with *zona*. I appear to have satisfied myself that the *zona* in Stephens' collection was correctly named; but the general coloration of it and

A-cinctus is so great, that it is possible I may be wrong. *A. succinctus*, Lep., is usually quoted as a synonym of *zona*, but the description does not quite agree with that species. It has, for instance, the 4th and 5th segments yellow, the 7th black, and the scutellum yellow. Stephens' description is merely a copy of St. Fargeau's *succinctus* (Mon. Tenth., 93, 266), so, in the absence of specimens, it throws no light on the matter. *Succinctus* probably = *Schaefferi*.

A. viduus is only known as British by a solitary specimen recorded by Newman (Ent., 1869, p. 217). It was identified by Mr. Smith, and is said to have been taken many years before the date it was recorded in the "Entomologist," in Darenth Wood. It is a common species all along the Mediterranean to Greece. It is certainly a southern insect, and one I scarcely expected to occur in Britain. It is easily known by its deep violet-black body and wings, and white band on the abdomen, but this, however, may be absent.

(To be continued).

TRANSITORY OR PROVISIONAL INSECT-FORMS.

BY J. LICHTENSTEIN.

Although generally, and in France more particularly, received with great incredulity, my theory of the biology of plant-lice, and *Pemphiginae* specially, begins to be accepted by reason of its truth.

The cycle of life shows two winged forms very different from each other, the emigrant (*Pseudogynus migrans*) giving birth to an agamous proles, and the pupiferous (*Pseudogynus pupifera*) producing sexuated individuals. Generally the winged emigrant form only has been noticed by authors. Being very easy to find in the large galls which some of them form on our commonest trees, such as poplar and elm, in the north, and *Terebinthus* in the south, they long ago attracted the attention of observers; yet although from the earliest to the latest authors—Theophrastus, B.C. 371, to G. Passerini, 1860, winged gall plant-lice were noticed, they were only the *emigrant* form. I was, I believe, the first to trace in *Phylloxera quercus*, the full biological cycle, including the migration from one plant to another (a fact already noticed by F. Walker, but without discrimination of the difference between the two winged forms). Targioni's observations on *Phylloxera florentina* migrating from *Quercus Ilex* to *Quercus sessiliflora* confirmed my theory, and he acknowledged at once that his *Phyll. Signoreti* was only the second winged form of *florentina*.

It was easy with that insect, whose life-history the able President of the Italian Entomological Society followed from the egg up to the copulation of sexuated individuals, to describe the full cycle of life, the two food-plants being known, and the entire evolution being aerial on the branches or leaves of the oaks. Prof. Targioni did what I had done before for *Phyll. quercus*: he tied a muslin bag round the little oak tree which he had infested with *Phylloxera*, and was able in that way to show to the Italian Entomological Society the whole life-cycle of his *Phylloxera Signoreti*. But this kind of procedure is not always so easy, because there are many gall-lice that migrate to plants yet unknown to us, and, with one exception (*Pemphigus spirothecæ*), all poplar, elm, and pistacia gall-lice are in this position.

This year I followed up with curiosity the existence of gall-lice on *Pist. terebinthus*, a common tree in our parts, which has on it no less than five very different galls, all formed by Pemphigians of various species. All these galls burst in the summer, and give issue to well-known winged lice, namely, *Pemphigus utricularius*, *cornicularius*, *semilunarius*, *follicularius*, and *pallidus*; these forms are all "emigrants," and produce agamous rostrated young ones.

Two months before the time when the emigrants come out of the galls, while watching with care the *Terebinthus* trees, I saw a lot of winged lice arrive, mostly by night, on the stems, and deposit their little sexuated lice, which copulated; afterwards the females hid themselves in the crevices, where they died, keeping in their body the solitary egg, which passes the winter, and in the ensuing spring gives the gall-producing louse. I have no doubt that these winged forms are the pupiferous *Pseudogynæ* of the gall-makers on *Terebinthus*, but none of them look like the "emigrants" which come out of the galls in the autumn.

So, although quite convinced that it is only a form in the evolution of the above-named Pemphigians, I am at a loss to apportion the true pupiferous to its corresponding *emigrant*.

It is also a very singular fact, that of the five different forms which arrive on the stems (a number which corresponds exactly to the galls on the *Terebinthus*) two have only five-jointed antennæ. Thus, according to the actual classification of gall-lice, they do not even belong to the genus *Pemphigus*! yet they are certainly only a phase in the biological evolution of one of the *Terebinthus* gall-lice. The characteristics of the genus *Pemphigus* must therefore be changed, and we must say in future: "antennæ 5-jointed in the *emigrant* form issuing from the galls."

I am, of course, not without some suppositions as to the relations of my pupiferous lice to the "emigrants," and until some entomologist is able, by breeding or otherwise, to demonstrate the true connexions between these insects, I would suggest the following names :

Pupiferous lice arriving on the stems of *Pistacia terebinthus* (from May to July).

1 { Five-jointed antennæ 4.
Six-jointed ,, 2.
2 { Antennæ hairy (I suppose pupiferous form of <i>utricularius</i>) <i>Pemphigus utriculoides</i>	
,, glabrous 3.
3 { The first two neurulations united at the base (of <i>cornicularius</i>) .. <i>P. corniculoides</i>	
,, ,, separated ,, (of <i>pallidus</i>) .. <i>P. pallidoïdes</i>	
4 { Antennæ hairy (of <i>semilunarius</i>) .. <i>P. semilunoïdes</i>
,, glabrous (of <i>follicularius</i>) .. <i>P. folliculoïdes</i>

Of course, these names can only be transitory, and must disappear whenever proof shall be made that my suppositions are well founded. But it is not an easy task to breed such little creatures under the microscope, and perhaps some years will pass before the full history of the *Terebinthus* gall-lice is elucidated.

For our English friends I can say that the poplar and the elm offer the same problems to solve. Six species on elms: *Tetraneura ulmi*, *T. alba*, *Colopha compressa*, *Schizoneura lanuginosa*, *Sch. ulmi*, *Pemphigus ulmi*; and five on poplars: *P. affinis*, *populi*, *marsupialis*, *vesicarius*, *bursarius*. Here it is, perhaps, still more difficult: the emigrants and the pupiferous transpose themselves, and when the first leave the galls, sometimes the second arrive and take up their lodgings in the very same gall left shortly before by the emigrants. I observed pupiferous forms on poplar as late as August, and now, to-day (9th February), in an old gall of *P. bursarius*, I find eggs and dry skins of female lice *without rostrum*; of course they have not been laid by the emigrant forms, as they always produce rostrated agamous young ones (*P. spirothecæ* always excepted).

I must remark that old dry galls very often serve several different kinds of lice to hide their eggs, thus, I have found in the same gall white, red, and green eggs, of which some gave me true *Aphidæ* (long antennæ and cornicles), and some Pemphigians.

I hope to be able next summer to give the full history of some of these Pemphigians of the poplar, while Prof. Kessler, of Cassel, will certainly give us that of some species from the elm tree.

Description of larva of Scopula olivalis.—For opportunities of observing the larva of this species, I have been much indebted to the kindness of the Rev. J. Hellins and Mr. W. Jeffrey, during September and October, 1876—77, and again to the last-named for further examples of the larva in the spring of 1878, from which the moths were bred in the first week of June.

The several food plants consisted of *Sambucus nigra*, *Galeobdolon luteum*, *Stachys sylvatica*, *Mercurialis perennis*, *Urtica dioica*, and *Humulus lupulus*.

In autumn, the young larva resides in the twisted top of a leaf or under a part of the edge turned down, sometimes between two leaves partly spun together with white silk, where it feeds at intervals until its third moult, and is about a quarter of an inch long, of a green colour spotted with black, the spots large in proportion, having all the characters of the adult; it then spins itself up in an opaque white silken oval cocoon-like hibernaculum, firmly and closely attached to part of the under surface of a leaf having the edge turned down, hiding it completely.

In spring, when the plants begin to put forth new leaves, usually in March, the larva wakes up, feeds, and its growth is soon considerable, so that by the end of the month it becomes nearly half an inch long; it continues to draw the leaves tightly together around itself with a few threads, as it eats portions out of them, and feeds secure from observation until about the middle of April or the end of the first week in May, according to the season, when it is full fed, though now, and a little before this period, many a larva is slain by that of an ichneumon emerging from the mere skin, which directly afterwards shrivels up.

The full grown larva measures three quarters of an inch in length, and tapers a little at both ends, the middle segments of the body are rather stout and of plump character, well cut at the divisions especially on the belly, the ventral and anal legs slender; the ground colour of the head and body is a semi-transparent green, sometimes a blackish-green on the back as a dorsal line, but always melting gradually into a paler green on the belly, the skin rather shining; the glossy head is marked just on the crown of each lobe with a short black streak of freckles and more broadly at the sides with two longer streaks of black freckles, two pairs of minute black dots on the face, the mouth brownish, the antennal papillæ tipped with black; the semi-lunar shining plate on the second segment is of the ground colour but boldly defined at the sides with black blotchy freckles, also in front and back with black dots; on the third and fourth segments the glossy black spots form a transverse series, the uppermost roundish-ovate, the next semi-lunar, the lower group of three roundish, and a small subdorsal spot occurs behind each of these segments; the black spots on the other segments are conspicuously large, each dorsal front pair of a rounded-off squarish form, each hinder pair somewhat transversely oval, an extra large spot occurs on the front of the thirteenth, the anal flap bearing a few black dots; along the sides the row of single large spots are of an irregular form, being squarish above and in front and obliquely hollowed in a concavity behind, wherein occurs the small round black spiracle situated exactly on the whitish tracheal thread, which shows faintly through the skin, below are two more rows of single roundish-ovate spots, and below them on the belly on either side of each segment is a group of two or three minute black dots, the ventral and anal legs tipped with dark brown hooks, all the black spots are most minutely wrinkled and furnished with a fine hair, while the rest of the skin is plump and smooth.

When full fed the larva is restless and wanders over the plant till it finds a suitable leaf, and then with silk threads folds or twists it up tightly for a puparium, and makes for itself within by way of cooeoon a very open-worked web of coarse meshes. The pupa is from seven-sixteenths to half an inch in length, moderately slender, the parts of the head well devoloped, the wing covers long, the leg-eases extending beyond them, the thorax well produced and slightly keeled on the back, also on the upper abdominal segments and there the spiracles are a little prominent, from thenee the flexible segments taper gradually, the last two rapidly to a projecting knob, furnished with three or four curled-topped converging spines; the colour is pitchy-black with brown segmental divisions, antenna- and leg-eases; it is rather shining, though most lustre is on the head and thorax.—WILLIAM BUCKLER, Emsworth: *February 11th, 1880.*

[Perhaps the foregoing may enable some friend in Perthshire to find, and send me for figuring, the larva of *S. alpinalis*, which, according to Dr. E. Hofmann, is of clear yellow colour and black-spotted, very similar to *olivalis*; the larva of *alpinalis* was found by him in June, within spun-together leaves of a large species of ragwort (*Senecio*), growing around Swiss cow-huts.—ID.]

Description of larva of Scopula olivalis.—Some larvæ beaten out of Stinging Nettles at Hambleton, near Selby, during Whitsuntide last, produced this species.

Length when full grown nearly an inch, and of moderate bulk in proportion; the head has the lobes rounded, is glossy and about the same width as the second segment; body cylindrical and of nearly uniform width, tapering only very slightly at the extremities; each segment is plump and rounded rendering the divisions distinct, and each has also a transverse depression in its centre, skin rather glossy and semi-translucent; a short hair is emitted from each tubercle.

The ground colour is pale bluish-grey, though some specimens have a strong underground of greenish, head grey much marbled with black, the mandibles brown: the dark green alimentary canal forms the dorsal line, and there is a pale greyish stripe, almost a ridge, along the spiracular region. Its most noticeable feature, however, are the tubercles, which appear as large glossy intensely black spots, four round ones on the dorsal area of each segment, and a row of triangular ones above the spiracular stripe.

The ventral surface and prolegs are of the same colour as the dorsal area; legs highly polished and black: below the spiracular stripe, but adjoining it, is a series of oval black spots, one on each segment; yet lower, is a similar series of spots, but each placed a little further behind than the one above it; and still below these again, indeed, just at the top of each leg and proleg, is another similar but smaller spot; whilst those segments which have no legs nor prolegs (the 5th, 6th, 11th, and 12th), have each three similar transverse spots.

Shortly before spinning up, the ground colour changes to a straw colour; then, in the two leaves spun together in which the larva seems to live when not feeding, a loose cocoon is formed. The pupa is about five-eighths of an inch long, rather slender, and attenuated towards the point; wing eases long, and as are also the eye-sheaths, well defined: there is a sharply defined ridge along the thorax. Colour of thorax, wing-eases, and eye-sheaths, dark chocolate-brown; under-side of abdomen paler brown, the divisions yellow. The inuagos emerged at the end of June and in July.—GEO. T. PORRITT, Highroyd House, Huddersfield: *February 7th, 1880.*

Scopula prunalis.—In addition to the foodplants given for this species in this month's Ent. Mo. Mag., p. 209, may be mentioned the Stinging Nettle (*Urtica dioica*). On June 14th last, I collected the larvæ very freely from this plant in this district, and from them reared a beautiful series of this common species. It feeds here equally freely on *Teucrium scorodonia*.—ID.

[*Urtica dioica* has been already recorded as a food-plant of this species, which is probably not fastidious as to its diet.—EDS.]

Vanessa cardui in 1879.—With reference to the remarks of Mr. McLachlan (*ante pp. 49—51*) and Dr. Jordan (*ante pp. 196, 197*) on the abundance of *Vanessa cardui* in 1879, the following extract from "The Journal of a Naturalist" (London, 1829), may not be without interest :—

"We occasionally see, toward the end of the summer, the painted lady butterfly (*Papilio cardui*) ; but this is a creature that visits us at very uncertain periods, and is vivified by causes infinitely beyond the comprehension of the entomologist, seeming to require a succession and variety of seasons and their change, and then springing into life we know not how. This was particularly obvious in the summer of 1815, and the two following, which were almost unceasingly cold and rainy ; scarcely a moth or a butterfly appeared : and in the early part of 1818, the season was not less ungenial ; a few half-animated creatures alone struggled into being; yet this 'painted lady' was fostered into life, and became the commonest butterfly of the year : it has, however, but very partially visited us since that period. The keenest entomologist, perhaps, would not much lament the absence of this beauty if such cheerless seasons were always requisite to bring it to perfection." It appears from this that there is some connection between the occurrence of *V. cardui* in large numbers and a succession of cold, wet seasons.—H. Goss, Surbiton Hill : February, 1880.

Capture of Heliothis scutosa near Weston-super-Mare.—It is only quite recently that I have learned that a male *Heliothis scutosa* has been captured, in 1877, on the coast near Weston-super-Mare, by a medical student, Mr. A. H. Jones, residing here ; it was taken, he says, "flying at dusk, over a species of clover, one evening between the 16th and 20th August, 1877." As the specimen is now in my possession, I am desirous to place its capture on record.—W. H. GRIGG, 51, Redland Road, Bristol : 21st January, 1880.

Ennomos alniaria.—Mr. Heath, of Gosport, recording the capture of a dozen specimens of this species, writes : "I think I may now claim for *Ennomos alniaria* the designation of a British insect."

He can scarcely be aware that the matter was settled to the satisfaction of most entomologists, so far back as 1865–6, and that the honour of doing so belongs to my friend Mr. Lacy, of Gosport, and Mr. Hellins, of Exeter ; the former having captured two specimens of that species, from one of which he obtained ova, and the latter having reared the larva and perfect insect from the ova so obtained. See Ent. Mo. Mag. for 1865–6, p. 159.—HENRY MONCREAFF, 145, High Street, Portsmouth : February 5th, 1880.

Captures near Portsmouth.—During the past season neither *Coleoptera* nor *Lepidoptera* have been abundant in this district, and many species which, in fine summers, are to be taken in plenty, have not been seen at all.

Gymnancycla canella, which I generally take in abundance in the larval state, has been quite absent. In September I found its food plant just shooting up through the sand, when it ought to have been a large bush, and the larva nearly full-fed. Rather bad for the chance of finding the insect next season. *Crambus alpinellus* was not to be taken in its old locality, although I searched diligently for it.

In June last I kicked up from amongst the grass, near the sea-shore, a specimen of *Heliothis peltigera*, which my son captured. I was rather surprised, as I had worked the locality well for over 20 years without meeting with it. In August I searched the same place for the larva, and succeeded in taking about two dozen, some from rest harrow, and some from *Matricaria*. Those feeding on the white flowers of the *Matricaria* were just as brightly coloured as those which fed on the pink flowers of the rest harrow. In September, I bred a fine series of the moths, varying considerably in colour. I have worked hard for the larva of *Deiopeia pulchella*, but as yet it eludes my pursuit. I have in my collection two fine specimens of the moth, captured in very different localities. The first a fine ♀, apparently fresh from the pupa, was taken by my son from between the deck-planks of Southsea pier; this somewhat favours the blown-over theory. My son tells me that at rest it has its wings close round the body, like a *Crambus*, and resembled a short end of fancy wool, for which at first he mistook it. My second, a rather worn ♂, was captured at Gosport by a young relative of mine, it is in fair condition, but pinned with a crowbar.

My collection has also been enriched by the addition of a fine bred specimen of *Acronycta alni*. I beat the larva from birch in a wood near Waterloo. I have also taken about a dozen of the larvæ of *Cucullia chamomillæ* from flower-heads of *Matricaria*: these are still in the pupa state.

Among the *Coleoptera* the only species worth mentioning are *Odacantha melanura*, from cut reeds, near Gosport; *Telmatophilus brevicollis*, four specimens, and *Oodes brevicollis*, from the same place; and *Anisotoma furva*, sand hole, Southsea beach, one specimen.—ID.

Trifurcula atrifrontella bred.—In June last, an insect emerged from one of my breeding cages, which I did not know, and it unfortunately had so battered itself that recognition was difficult: Mr. Stainton, however, says that it is *Trifurcula atrifrontella*, and, as nothing was in the jar except hawthorn leaves collected the previous autumn for larvæ of *Nepticulæ*, it appears certain that the larvæ of *T. atrifrontella* were feeding in the hawthorn at the same time. I remember noticing two or three blotch-mines which then appeared distinct from the mines of *Nep. pygmaella* or *ignobilisella*, but their number was so few that I thought it best to leave them with the others. The larvæ were collected in October, and it is likely had they been looked for in the previous month, more of the larvæ of *Trif. atrifrontella* would have been found. The time of emergence does not agree with that given in Stainton's Manual.—J. II. THRELFALL, Preston: February 8th, 1880.

Plum-blossoms, &c., attractive to Lepidoptera.—I am aware that plum and dam-

son blossom is not so accessible as sallow bloom to a large, perhaps the larger number of Lepidopterists, but to those who have the opportunity I would suggest that during the season they should try the experiment, feeling assured they will be gratified with results.

At Mill Hill I worked this "attraction" in preference to sallow, as I found that I could get more specimens of all the species obtainable in the district.

I used an umbrella, which I held inverted under a branch, giving the latter a jar with a heavy stick, the striking part of which was covered with list, to prevent bruising the bark; there is no danger of doing harm to the prospective fruit crop, as the blow necessary to dislodge the moths need not be of sufficient force to hazard the chance of a single plum; certainly, some petals will fall, but only those which having performed their part in the economy of nature are prepared to do so, and if not scattered by our stick, would speedily drop of their own accord; indeed, one year when I had been very energetic in the orchard, the stone fruit was unusually abundant; of course I do not pretend this was in any way due to my thumping the trees, but it is a proof that no harm was done.

Moths were very plentiful that spring at the blossom, and perhaps they may have contributed somewhat to the propagation of the large harvest.—RICHARD SOUTH, 13, Bonchurch Villas, Ealing: *January, 1880.*

Lepidoptera at Mill Hill; a reminiscence.—I have had some experience in collecting, but never did I meet with so many species at so small an expense of time and energy as during the years 1874 to 1877, inclusive, when I had the privilege of collecting in the private grounds of Goldbeaters' Farm, Mill Hill, Hendon. These said grounds comprised flower garden, shrubbery, kitchen garden, an old orchard, and one of younger trees, in this latter the grass was allowed to grow, and a crop of hay obtained from it each year; the whole was included in one common area of about three acres, and was bounded on three sides by large elms and oaks, and beyond these were grass meadows; there were no woods of any size in the country immediately surrounding, but as nearly all the fields were bordered by trees of oak, elm, and ash, and the hedges of lanes, &c., had a thick and high growth of hornbeam, maple, dogwood, and various other small timber, it might be described as "woody." In the garden, besides a variety of Conifers, there were small trees of lime, birch, beech, sallow, willow, and some large ones of aspen, also a number of ornamental trees and shrubs, and many herbaceous plants.

Having thus given some idea of the botanical features of the locality, I will proceed to a synopsis of the work done there during the period named, taking each Family separately, with notes on particular species.

DIURNI, 20 species.—*Colias Edusa* was bred from larvæ found June, 1877, on *Melilotus* ——?, the perfect insects were common that year. *Arge Galathea*, 2 larvæ found at night on grass in new orchard, 1876, and 11 perfect insects taken there same year, this species was not uncommon about a quarter of a mile off. *Thecla rubi*, a larva beaten out of oak.

NOCTURNI, 29 species.—*Smerinthus ocellatus*, larvæ common on apple trees; also a few larvæ of *S. populi* on aspen; and *S. tiliæ*, elm. *Chœrocampa porcellus*, 2 came under porch in the evening. *Sesia myopiformis*, on trunks of old apple trees.

Zenzena æsculi and *Cossus ligniperda*, not uncommon, the latter at sugar; *Hepialus sylvinus* and *Nudaria mundana*; *Chelonia villica*, larvæ sometimes common in new orchard; *Arctia fuliginosa*, once at rest on gravel path; *Trichiura crataegi*, larvæ on hawthorn hedge.

GEOMETRÆ, 74 species.—*Epione apiciaria*, a few; *Pericallia syringaria*, larvæ on privet hedge; *Phorodesma bajularia*, 2 specimens netted; *Hemithea thymaria*, larvæ common; *Asthenia luteata*, sometimes; *Acidalia imitaria*, plentiful, larvæ on privet; *A. emarginata*, occasionally; *Timandra mataria*, *Eupithecia subfulvata*, *E. exigua*, and *E. isogrammata*, all fairly common, and a few *E. coronata*; *Melanippe rubiginata*, abundant most seasons; *Anticlea rubidata* and *A. derivata*, the latter freely; *Phibalopteryx lignata*, a ♀ once taken in June deposited eggs, from which I obtained imagines in August much smaller than the parent, but with the markings sharper and darker, fed on clematis; *P. vitalbata* (2), *Scotosia dubitata* and *S. rhamnata*, one specimen of each; *Cidaria miata*, at plum blossom in the spring; *C. corylata*, *C. russata*, *C. suffumata*, *C. testata*, and *C. pyraliata*, all common, the latter very abundant one season, and larvæ found on *Galium mollugo*.

DREPANULÆ, 2 species.—*Platyperyx hamula*, two specimens netted, and a pupa once found spun up in an oak leaf at the foot of oak tree, from which ♀ was bred; *Cilix spinula*, not uncommon.

PSEUDO-BOMBYCES, 4 species.—*Dicranura vinula*, *Pygæra bucephala*, *Notodonta camelina*, and *Diloba cæruleocephala*, all in larval stage.

NOCTUÆ, 122 species.—*Cymatophora duplaris*, a few; *Leucania conigera*, *L. comma*, *Dipterygia pinastri*, *Cerigo cytherea*, *Mamestra anceps*, and *Apamea unanimis*, all common at sugar; *Heliothis popularis*, several came into house about 10 p.m.; *Miana arcuosa*, plentiful, flying over grass in new orchard just before dusk, rarely at sugar; *Agrotis saucia*, one year common at sugared shrubs in August; *Triphæna fimbria*, also larvæ; *T. interjecta*. Of *Noctua rubi* there were in some seasons two broods, one in June and another in August, this last, though larger in point of number, was decidedly less individually; *N. umbrosa*, not uncommon; *Tæniocampa rubricosa*, *T. gracilis*, and *T. munda*, not scarce at plum-blossom (see above); *Xanthia*, the whole genus at sugared shrubs, and larvæ of *X. citrago*, *X. cerago*, and *X. gilvago*; *Cirrhædia xerampelina* (2); *Tethea subtusa* and *T. retusa*, at honeydew, larvæ of the former on aspen; all the genus *Cosmia* at sugar, and larvæ found, excepting perhaps of *pyralina*, about which I am not certain, I once found some larvæ on plum, thought to be this species, but they all died in pupæ; *Dianthæcia cucubali*, one or two at sugared shrubs, and a few larvæ in seed capsules of pink; *Hadena genistæ*, not uncommon at sugar likewise; *Calocampa vetusta* and *C. exoleta*; *Xylinea semibrunnea*, at ivy; *Heliodes arbuti*, larvæ on *Cerastium*; *Mania maura*, larvæ on various plants; *Catocala nupta*, common at sugar some years.

DELTOIDES, 4 species.—*Hypena proboscidalis*, *H. rostralis*; *Herminia tarsipennalis*, all commonly; *Hypenodes costæstrigalis*, a few.

AVENTIÆ.—*Aventia flexula*, 3 specimens.

PYRALIDES, 12 species.—*Pyralis fimbrialis* and *P. glaucinalis*, plentiful at sugar.

CRAMBITES, 8 species.

TORTRICES, 60 species.—*Halias quercana*, at sugar and beaten out of trees, also

bred; *Sarrothripa revayana*, at sugar, and bred; *Dichelia Grotiana* and *Sideria achatana*, beaten out of hedge, the latter also bred from hawthorn; *Sericoris bifasciana*; *Phoxopteryx Lundana*; *Grapholitha nævana*, bred from holly; *Pædisca oppressana*, on trunks of aspen; *Coccyx nanana*, abundant; *Retinia Buolianæ* and *R. sylvestrana*, a few of each; *Carpocapsa splendana* and *Catoptria juliana*, bred from acorns.

Altogether 336 species, without including the *TINEÆ*, of which Family I only took a few, although there were many to be obtained.

I may add that 151 species were also found in the larval stage, and 74 in pupæ.
—ID.

Economic Entomology at Worcester.—About twenty years ago I and another collector, one with moth-net in hand, were walking by a cottage at Crowle, when we were invited by an ancient rustic, who seemed to be near eighty years old, to enter his dwelling, and look at his “ob-owlud.” On entering he reached from a shelf a large match box, and took off the lid, disclosing to view a fine *Arctia caja*, imago, together with *some leaves* put into the box for it to subsist on. The old man’s face brightened up as he exhibited his prize, like a child’s when showing his first capture.

Some seven years since the larvæ of *Nematus ribesii* were very troublesome here, and had nearly defoliated the bushes in the garden of a neighbour who had spent nearly all her life in the midst of gardens and nurseries, and whose husband was a gardener by trade, but then decrepit: on being spoken to about the “grubs,” she replied that “they came out of the ashes (burnt coal) she had placed in the garden.” Trying to disabuse her was useless, and equally useless to advise her to destroy the larvæ.

In 1876 complaints reached me of some “great black grubs, as long as one’s finger,” that were making webs on the fruit trees, and which, if not destroyed in time by cutting off the boughs they were on, would destroy all the leaves and fruit on the trees. With some difficulty I induced one of the complainants to procure me some of the “big black grubs,” and was not a little surprised when an egg cup was brought containing two larvæ of our old acquaintance *Bombyx neustria*. A man of some cultivation and musical reputation in the city, possessing a well-fruited garden, was silly enough to saw off (by advise of one of the knowing ones) a branch of one of his plum trees, to save the rest of the tree from the devourers.

The red-runner (*Phaseolus*) is subject to drop many of its blossoms without producing pods: the cause of this is said to be a “fly that bites (or ‘takes’) them.”

During the recent summer season I heard much of the “wire-worm,” which was destroying many of the garden peas and other plants; but none of the worms shown to me were what Coleopterists know as wire-worms, a few were larvæ of *Diptera*, and all the others were *Myriopoda*.—J. E. FLETCHER, Happy Land, Worcester: December, 1879.

Notes on British Diptera of the Family Oscinidæ.—Dr. Schiner, in his “Catalogus systematicus Dipterorum Europæ,” gives one hundred and eighty species of this Family as found in Europe; probably about fifty have occurred in the British Isles. The following notes may be useful. The two species marked * have not before been recorded as British.

Eurhina lucida.—Taken by my father at the salterns near Lymington, on June 11th, 1832 ; and by myself at Hayling Island, on May 5th, 1874.

Platycephala umbraculata.—Taken by my father at Charmouth, on July 5th, 1830, and September 1st, 1845.

Platycephala planifrons.—Taken by my father and Mr. Curtis at Blackgang Chine, on August 8th, 1835 ; also at Whittlesea Mere.

**Selachops flavocincta*.—Taken by my father and myself at Glanville's Wootton, on May 20th, 1867, and July 18th, 1866.

Camarota flavitarsis.—Common amongst samphire on the coast during the autumn.

Elachiptera brevipennis.—Of frequent occurrence on the coast amongst sedge.

**Siphonella (Madiza) oscinia*.—Taken by my father at Lulworth. This little black fly much resembles a *Mosillus (Gmnopa)*, and was in company with several other species, kindly named for my father by the late Mr. Haliday.

Lipara lucens.—Bred by Mr. Winter from reeds, in 1861.

Lipara tomentosa.—Taken by my father in the New Forest, on June 2nd, 1831.—C. W. DALE, Glanville's Wootton, Sherborne : 7th January, 1880.

Notes from Guatemala.—It is very hot, dry, and dusty here now, though cold in the higher mountains at night ; December in Guatemala is indeed finer than June or July.

It seems as if an English collector is bound to find English genera. Day after day, I keep finding old friends. I believe more than half of the genera occurring here in the higher mountainous districts occur also in Europe, if not in Great Britain ; to day, for instance, I have found, amongst others, species of *Anaspis*, *Mordellistena*, *Euglenes*, *Scaptia*, *Anthicus*, *Tomoderus*, *Notoxus*, *Cistela*, *Lycus*, *Scirtes*, *Clerus*, *Telephorus*, *Lyctus*, *Dorecatoma*, *Anobium*, *Apion*, *Baris*, *Cæliodes*, *Scolytus*, *Cryphalus*, *Tomicus*, *Acalles*, *Bruchus*, *Clytus*, *Callidium*, *Graptodera*, *Crepidodera*, *Thyamis*, *Aphthona*, *Stenus*, *Sunius*, *Platystethus*, *Oxytelus*, *Philonthus*, *Falagria*, *Othius*, *Scopæus*, *Conurus*, *Homalota*, *Pæderus*, *Tachyporus*, *Cercus*, *Lathridius*, *Silvanus*, *Læmophlaeus*, *Plegaderus*, *Platysoma*, *Harpalus*, *Tachys*, *Lebia*, *Amblystomus*, *Coccinella*, *Scymnus*, *Bryaxis*, *Scydmaenus*, *Agriotes*, *Cardiophorus*, *Aphodius*, *Copris*, &c., &c.

In the *Hemiptera*, also, I recognised very many genera ; we have small *Capsidæ*, and others, in Guatemala just as in England : in fact, strange as it may seem, it appears to me that the species of *Coleoptera* and *Hemiptera* of the elevated mountainous districts (2500 feet and upwards) of this part of Central America average, on the whole, smaller in size than in England ! I have not yet met with a "Staph." anything like *Ocyphus olens* in size, nor one of *Geodephaga* larger than a *Cicindela*, nor a water-beetle so large as our *Hydrophilus* or *Dytiscus*, nor a *Circulio* so large as *Cleonus nebulosus* ; these things strike a Britisher as odd, but such is the case. I have found no better *Anisotoma* as yet than a miserable *Colenis*, though I have met with one or two queer looking species in fungi, perhaps belonging to this family but more nearly allied to *Liodes*. *Agathidium* occurs here ; I have not forgotten to work at evening sweeping, which is fairly productive in other things, and have frequently

swept on sunny evenings along forest footways, but without result as far as *Anisotomidae* are concerned.—GEORGE C. CHAMPION, Hacienda de San Gerónimo, Salamá, Baja Vera Paz, Guatemala: 22nd December, 1879.

Coleoptera near Maldon.—At the beginning of last January, I found a decayed oak stump in a wood at Ulting, near Maldon, Essex: the whole stump was riddled with the burrows of *Xestobium tessellatum*, of which I found both the larvæ and the perfect insects. I also took from the rotten wood, and from under the bark, the following insects:—*Paromalus flavigornis* (in some numbers, in a narrow wet channel of decayed wood that ran up the stump), *Batriscus venustus* (in perfectly dry decayed wood), *Euplectus nigricans*, *Abræus globosus*, *Cerylon histeroides*, *Agathidium seminulum*, *Choleva nigricans*, *Baptolinus alternans*, *Homalota circellaris*, *Quedius scitus*, and a variety of *Quedius fulgidus* (*Q. sageti*, Thoms.), besides two or three other insects.—W. W. FOWLER, Repton, Burton-on-Trent: 16th February, 1880.

Tenacity of life in Timarcha lœvigata.—Seeing in the last number of the Ent. Mo. Mag. a remark by Mr. C. O. Waterhouse, at the December Meeting of the Entomological Society, on the tenacity of life in a beetle, *Curculio cleonus*, I would like to record that a *Timarcha lœvigata*, which I captured last summer in Kent, was exceedingly difficult to kill. I chloroformed it when taken, and three hours after, when I was about to set it, I gave it another dose, the first having had no effect; the second was also ineffectual, and I then placed it in a close-fitting box with a piece of burning sulphur, and left it over an hour. When taken out it appeared dead, but in a few minutes revived for the third time. I then plunged it into a pan of boiling water, and by this means I managed to kill it after leaving it for some time in the water.—ENRICO A. BRUNETTI, Lower Grosvenor Place, London, S.W.: 13th February, 1880.

Obituary.

Dr. Boisdural, born 1799, died December 30th, 1879, was one of the most celebrated Lepidopterists of France.

He was one of the original members of the French Entomological Society, and in 1866 he was elected an honorary member of that body.

His earliest scientific contributions appeared as far back as 1827, more than half a century ago, and three of his principal works were issued more than 40 years ago.

These were the “Monographie des Zygénides,” in 1829, the “Index methodicus,” of which a second and improved edition appeared in 1840, and the first volume of the “Species Général des Lépidoptères,” treating of a portion of the *Rhopalocera*, which appeared in 1836.

It was not till 1874, after an interval of 38 years, that it was followed by a vol. treating of the *Sphingides*, *Sesiides*, and *Castnides*.

There still remains a gap in the series of volumes, which should have treated of the *Bombycina*, and this important lacune appears now scarcely likely to be filled up, though M. Guenée had intimated in his preface that when he had finished all

the *Micro-Lepidoptera*, "les Tordeuses, les Teignes et les Alucites ou Ptérophores," he would turn his attention to the sections originally intended to have been worked out by his "collaborateur," Dr. Boisduval.

Another important work brought out by Dr. Boisduval, in conjunction with "MM. Rambur et Graslin," was a series of illustrations of European larvæ, "Collection iconographique des chenilles d'Europe," which appeared from 1832—1843.

He also wrote Entomological volumes describing the new species collected during the voyages "de l'Astrolabe" and "de la Coquille," and communicated many papers to the "Annales de la Société Entomologique de France;" but he was not a voluminous writer like those entomological giants Guérin-Menéville and our own Westwood.

Hagen enumerates only 45 productions of the pen of Dr. Boisduval, and 5 more are given in the Supplementary volume of the Royal Society's Catalogue of scientific papers.

His collection of *Lepidoptera* was very extensive; Dr. Boisduval parted with it in his life-time, and it is now the property of MM. Oberthur, and has been removed from Paris to Rennes (Ille et Vilaine).

Jean Etienne Berce, another well-known French Lepidopterist, died on the 29th December, 1879. He was born in 1802, and for very many years was in business as an engraver at Paris; after this he settled at Fontainebleau, and more than one English Entomologist had the pleasure of visiting him there, and of being guided by him through the mazes of the marvellous forest surrounding that town. We believe the Franco-Prussian war to some extent occasioned a change of fortune with him, and he returned to Paris. He was one of the most genial and well-informed of French Lepidopterists, and one of the most regular attendants at the French Entomological Society, in the "Annales" of which his first publication appeared in 1847. He published many other memoirs, and only a few years ago completed his "Papillons de France," a semi-popular monograph of the native *Macro-Lepidoptera*, illustrated by numerous plates of coloured figures, a work that is extensively used by French Lepidopterists, but which is little-known (undeservedly) here. [IN MEMORIAM, cf. Ent. Month. Mag., September, 1865, p. 73.—R. McL.]

Review.

THE AMERICAN ENTOMOLOGIST: an illustrated magazine, devoted to practical and popular entomology. Edited by C. V. RILEY (Washington) and A. S. FULLER (Ridgewood, New Jersey). No. 1, new series, January, 1880. New York: Max Jaegerhuber.

The "Practical Entomologist," which became "The American Entomologist," which, in its turn, became "The American Entomologist and Botanist," was generally supposed to have departed this life nine years ago. It seems that it was *not* dead, but only in an unduly prolonged trance. "The American Entomologist," No. 1, new series, is so like the original, in its intermediate stage, that but few would detect any difference. We naturally miss the outspoken, but always genuine, observations of the late B. D. Walsh, who might be held up as a model of "anti-

humbug" in entomological matters in the States. We welcome the re-appearance of Prof. Riley, and think he has found an efficient colleague. The matter in this "first" No. is sufficiently varied to satisfy all, excepting, perhaps, those who look upon descriptions of "new species" as the end and aim of all entomological publications. It is not our custom to analyze, or even to enumerate, the contents of periodicals, nor do we intend to modify this custom in the present instance. But we make one exception, and call especial attention to a communication from S. A. Forbes, on "The Food-habits of Thrushes;" it is short, but it is suggestive from the point of view of "applied Entomology," and "applied Ornithology." In order to obtain the results, a considerable number of useful birds were evidently sacrificed; but we are no partisans of those misguided enthusiasts who seek to place prohibitive restrictions (and have to some extent succeeded) upon the utilitarian researches of naturalists. We wish our resuscitated contemporary all success.

SOUTH-LONDON ENTOMOLOGICAL SOCIETY.—We have received the Report of this Society for the year 1879, and are glad to find the number of Members is increasing, and that the financial condition is correspondingly satisfactory. At present there appear to be 77 Members on the list (including several well-known names), and there is a solid nucleus around which to accumulate a good library. This Society has always had our best wishes. It has held aloof from the dealing element, and it holds equally aloof from the "mere collecting" element (as such). At any rate, the address of the outgoing President (Mr. Standen) warrants this latter assertion, for we have seldom (if ever) been aware of the promulgation of such broad ideas in the presidential addresses of a local British Entomological Society. Succeeding presidents will do well to follow in his footsteps.

We are sorry to notice some apparently fond-linging reminiscences of a certain so-called "Great National Entomological Exhibition" that took place a few years ago, and which was favoured by this Society, in lieu of the modest and useful exhibitions it had previously encouraged.—EDS.

CAMBRIDGE ENTOMOLOGICAL SOCIETY.—This Society held its 28th Anniversary Meeting on February 6th, 1880, in Mr. T. D. Gibson-Carmichael's rooms, St. John's College.

In the absence of the President, the Vice-President Mr. J. Brown took the chair. The minutes of the last meeting having been read and confirmed, and the Treasurer's accounts (which showed that the Society's finances were in a prosperous condition) audited, the following officers for the year were elected: President, Mr. J. Brown; Vice-Presidents, Mr. Bansall, St. John's College, Mr. Warren; Librarian, Mr. R. Weldon, St. John's College; Secretary, Mr. Hunter, Jesus College; Treasurer, Mr. Curtis, St. John's College.

A plan of meetings and excursions for the ensuing year was then drawn up, and has since been printed. There will be two meetings each term, and no less than seventeen excursions are projected. It is much to be hoped that these will be rendered more successful than of late, both by a more propitious season, and by an increased attendance on these interesting occasions.—A. E. HUNTER, Secretary, Jesus College, Cambridge: *February, 1880.*

NOTES ON BRITISH TORTRIES.

BY C. G. BARRETT.

(Continued from page 195).

Dichrorampha plumbagana, Tr. Kaltenbach records, on the authority of Mühlig, that the larva of this species feeds in autumn in the stems of *Achillea millefolium* and *Tanacetum vulgare*. In the case of the latter plant, he has doubtless confounded this species with *D. tanaceti*, but the other proves to be correct. In February, 1878, I examined numbers of plants of yarrow (*Achillea millefolium*) growing in quarries and on railway banks, in places frequented by *D. plumbagana*, and found a number of larvæ in small stunted plants in very stony places. These larvæ were, when young, moderately slender, clear semi-transparent yellowish-white, with distinct brown internal dorsal vessel, head light brown, jaws black, dorsal and anal plates very pale brown. When full grown, more plump, and the colour dull yellowish-white. The young larvæ feed singly in galleries under the bark, at the base of a previous year's flower-stalk of the *Achillea*, but afterwards penetrate to the middle of the stem, and eat out the pith down into the root-stock. When this fails, they sometimes enter the root-stock of a young shoot, which then betrays their presence by its drooping leaves. They continue to feed until May, assume the pupa state in the burrow, and the moths emerge early in June.

Dichrorampha acuminatana, Zell. I think that no description of the larva of this species has been published. The first hint of its habits that I received was from Mr. E. Meyrick, who mentioned that he had found larvæ in shoots of *Chrysanthemum leucanthemum* which he believed belonged to this species, but failed to rear. This information was afterwards confirmed by Messrs. Hodgkinson and Threlfall, who have, I believe, reared this species.

In February, 1878, I found larvæ in stems of old plants of *Chrysanthemum leucanthemum*. They were thick and rather stumpy, but slightly smaller at both extremities, colour semi-transparent whitish (faintly dirty greenish when young), with a distinctly visible brown dorsal vessel. Head light brown, with a darker line down the middle of the face, joints blackish, dorsal and anal plates very pale yellowish, hardly distinguishable. Feeding in the lower thick part of the stem of the *Chrysanthemum leucanthemum* (ox-eye daisy), burrowing passages under the bark or skin. Active when removed from the burrow. This larva grows but slowly, but by April has bored into the middle of the stem or root-stalk, to feed on the pith, and here it apparently changes to pupa, the moths appearing early in June.

On July 26th, I again found larvæ feeding in dwarfed shoots of the same plant, feeding on the pith, and lining the burrow with frass. From these the second brood of moths appeared at the end of August.

Dichrorampha simpliciana, Haw. The food plant of this species has long been known, in fact, it could hardly be mistaken, as the moth scarcely ever leaves it. Heinemann simply says of it, "from October "to April in roots of *Artemisia vulgaris*." Wilkinson describes the larva, "yellowish-white, with a hazel-coloured head." It does not appear to be found in this neighbourhood (Pembroke), where indeed its food plant (the mugwort) is not very common, and I am indebted to Mr. F. D. Wheeler, of Norwich, and Mr. W. West, of Greenwich, for larvæ. This larva is cylindrical, colour dirty whitish, with an irregular dark internal dorsal vessel. Head light brown, dorsal and anal plates faintly brownish. It feeds through the winter and spring in the root-stocks and lower part of the stems of *Artemisia vulgaris*, making burrows under the bark, and Mr. West tells me that near London, when it is abundant, the larvæ feed in small companies of five or six together. The pupa is bright brown, in a cocoon within the burrow, from which it projects when the moth emerges, which takes place towards the end of July.

Dichrorampha tanaceti, Stn. The food plant of this species has also long been known. In the year 1872, the late Mr. D'Orville, of Exeter, wrote to me: "They are on the wing about the end of May and "beginning of June. They fly in the hot sunshine, and regularly "breed in my tansy-clump." I do not think, however, that any description of the larva has been published.

I have received them from Mr. W. H. Grigg, of Bristol, and have also dug out a few from hedge-banks in this neighbourhood, but with much difficulty, from the tangled state of the place in which the tansy grows.

This larva is short and stout, colour semi-transparent white, with distinctly visible brown internal dorsal vessel, and colourless shining raised dots. Head deeply lobed, light brown, mouth darker brown, dorsal and anal plates very faintly brownish, both mottled with darker brown posteriorly. In root-stocks of *Tanacetum vulgare*, mining when young under the bark, where it may be found lying curved in its burrow, when older penetrating to the centre of the root-stock, and feeding on the pith. It feeds through the winter and spring, and assumes the pupa state in the burrow in May. My moths emerged early in June, and I found specimens at large (the males) flying very

wildly in the sunshine, but the females sitting on the tansy plants. I am still unable to find out the food plant of the moths, apparently undistinguishable from this species, which are found rather commonly along the coast in places where there certainly is no tansy.

Dichrorampha consortana, Steph. The first hint I received of the food plant of this species was from Mr. Sydney Webb, who reared one specimen from a flower-head of ox-eye daisy in 1874. It has been since found by Mr. J. W. Threlfall, of Preston, who very kindly sent me larvæ in 1877; but I have to confess, with much perplexity, that I have searched the ox-eye plants with great care for the last two seasons in fields where the moth occurs, without even finding a larva. My description is from those sent by Mr. Threlfall—short and thick, but shortly attenuated at each extremity, colour pale yellow, internal dorsal vessel visible as a brown blotch within the 10th segment. Head and dorsal plate brown, anal plate hardly visible. Eating in June into the growing shoots of *Chrysanthemum leucanthemum*, just below the buds, and causing the shoot to become thickened and distorted, feeding on the pith, and sometimes eating out the buds. Pupa brown, spun up between the burrow, from which it projects when the moths emerge, from the middle to the end of July.

Catoptria hypericana, Hüb. The food plant and habit of the larva of this species are well known, but the larva does not seem to have been described with us.

When young, it is pale yellow or pale grey, with a tinge of liver-colour on the back, head and dorsal plate shining black, anal plate yellowish edged with black. When nearly full grown, short and stout, smoky or blackish-brown, rather paler at the sides, head light brown, dorsal and anal plates black. When full fed, the colour fades a little. On *Hypericum perforatum*, drawing together and twisting up the terminal leaves of the young shoots, and feeding in the heart. The top of the shoot is nearly always twisted over to one side, and so completely eaten out, that it withers and turns brown as soon as the larva has deserted it, either to enter a fresh shoot or to spin up among rubbish. It feeds from the middle of April through May, and the moth appears early in June.

Hofmann gives a careful description from Treitschke—"short, "thick, wrinkled, dirty white, with small undivided single-haired "raised dots. Head honey-yellow, dorsal plate shining black, with a "pale border. In May and June, spinning together young plants of " *Hypericum perforatum*. Pupating in the earth."

Catoptria cana, Haw. Larva plump, rather flattened, with swollen segments, colour dull pink, head and dorsal plate large and broad, chestnut-brown, anal plate hardly visible. In seed-heads of *Carduus lanceolatus* and other thistles, also sometimes of *Centaurea nigra*, feeding on the seeds. The eggs are doubtless laid in July on the flower-head, and by the middle or end of August the larva is generally full fed, it then leaves the seed-head and spins a tough papery cocoon, short and dumpy in shape, among rubbish, and remains unchanged within it through the winter and spring, assuming the pupa state at the end of May or in June. The pupa is light brown. In the past season the first specimen emerged on July 10th, and they continued to come out until August, but the season was very late.

I think that this larva has not hitherto been described. Its attachment to thistles is well known, and Mr. Machin reared it from the seed-heads some years ago.

Catoptria fulvana, Steph. My first knowledge of the larva of this species was from a note by Mr. Machin—"larva in heads of *Centaurea scabiosa*, spinning up among rubbish," and Mr. Jeffrey wrote to me that he had reared it from *Centaurea nigra*. I think this must have been an exceptional case, for its attachment to *C. scabiosa* is obvious. Mr. Tugwell reared some very richly coloured specimens two years ago from this plant, found at Folkestone, and I found larvæ here in the limestone quarries.

This larva is tolerably active, plump, with deeply divided segments, and with a slightly raised ridge on the posterior portion of each segment, colour pale pink, paler beneath, head light chestnut, dorsal plate rather broad, yellowish-brown, anal plate minute, brown.

In seed-heads of *Centaurea scabiosa*, eating out the seeds and the pith at their base, in the middle of August. Before the capsule withers and spreads open, the larva is full-fed, and has deserted it to spin a tough drab cocoon under stones or among rubbish, where it seems to remain unchanged until the succeeding June, or even July. In the present late season, the first emerged on August 24th, but usually they would be a month earlier.

Catoptria Scopoliana, Haw. Larva short and rather broad, but attenuated at the anal extremity, wrinkled, and having on each segment a posterior ridge, colour dull yellowish-pink, paler beneath and between the segments, and with faintly redder dorsal and sub-dorsal lines. Hairs very short and inconspicuous. Head large, pale chestnut, dorsal plate very large and broad, pale umber, anal plate reddish. In

the blossoms of *Centaurea nigra*, eating out the immature seeds and the pith at their base, in August, very quickly full-fed, and leaving the blossom or seed-head to spin a tough cocoon among rubbish, in which it remains as a larva until the succeeding summer. Pupa brown. The moths emerge at intervals from the end of June until the middle of August, so that sometimes there is an appearance as of two broods.

This and the two allied species seem to carry to an extreme the peculiar habit of so many *Tortrices*, of feeding very rapidly, and then remaining unchanged in a cocoon for many months.

It is difficult to say which of their larvæ have already been described. Guenée's note on *Scopoliana*, that "the larva is yellowish-white, and lives in the heads of thistles," seems to refer to *Cat. cana*, except that the colour does not agree. Dr. Steudel records of *C. Hohenwarthiana*, larva—"bone-colour, with heart-shaped brown head, "dorsal plate consisting of two brown plates. From autumn till June "in the heads of *Centaurea jacea* and *nigra*," and this may refer to *C. Scopoliana*; but Hofmann's further note, "in *Hypericum quadrangulum*" does not tend to make matters clearer. Doubtless, it is due to the tangled state of the synonymy of these species, on which some remarks are to be found in this Magazine (*vide* vol. x, pp. 5 & 6).

Catoptria æmulana, Schl. This species has been reared by Prof. Zeller from *Solidago virgaurea*, and Mr. Machin reared it in 1876 from the same plant. Gartner describes the larva—"leather-brown, with "belly and feet brownish, and with elevated spots. Head dark brown, "also the dorsal plate, which is bordered with pale. In August and "September, in the flowers of *Aster tripolium* and *Solidago virgaurea*. "Pupating in an earth-cocoon early in June."

Two years ago, I met with the moth among *Solidago virgaurea* on this coast, and, consequently, collected the flowers to find the larva. In this I succeeded, but it does not correspond with Gartner's description. It is rather short and stout, but attenuated a little at each extremity, the segments ridged and deeply divided, colour very pale yellow, with a deep purple dorsal stripe and paler purple subdorsal and spiracular stripes, all interrupted at the segmental divisions. Sometimes these stripes are purplish-grey. Head black, deeply lobed, dorsal plate whitish, with a black spot at each side and two black dots between them. Anal plate light brown, but having the purple dorsal stripe continued through it. Feeding in the latter part of August and through September, in flowers of *Solidago virgaurea*, eating out the unripe seeds, and evidently passing from flower to flower, but without

attaching them together by any web. When full-fed, leaving the flowers to spin up among rubbish, where it remains unchanged until May or June, and, indeed, will sometimes leave its hibernaculum and crawl about in the spring. The moths appeared from the beginning to the middle of July.

It is not yet determined whether the slightly larger and much more variable form which is found among *Aster tripolium* is a distinct species; but if larvæ lately sent me by Mr. Machin should produce it, I think its distinctness will be fully proved. These larvæ agree much more nearly with Gartner's description.

Catoptria pupillana, L. Wilkinson says of this species—"that "it flies among sea wormwood (*Artemisia maritima*), and that the larva "feeds in the roots of that plant." I think this is a mistake. At any rate, it does not appear to be so here, where the sea wormwood has not a stem or root large enough conveniently to contain this larva. Heinemann only says "among *Artemisia*."

Mr. Jeffrey wrote to me some years ago that he had taken it among *Artemisia absinthium* near Scarborough, and I think this is its usual food plant.

The summer before last, I had collected a lot of stems of this plant containing larvæ of *Epeorus cinerosella*, which were kept tied down in large pots in the yard. The *Epeorus* larvæ having spun up in their burrows, all emerged duly in the pots; but one day I was startled to see on the fence close by a specimen of *Catoptria pupillana*, evidently just emerged from the pupa, and, on subsequent days, I found several more sitting about the yard, although not one emerged within the pots.

It was evident that the larvæ had fed up in the wormwood stems, and then that their natural restlessness had prompted them to force their way out of the pots and spin up at large. This year, after much trouble and search, I managed to determine the larva, and to induce it to submit to necessary confinement. It is tolerably plump, naked, with the segments ridged in front and rather deeply divided, colour yellowish-white, a minute grey spot on each spiracle, head deeply lobed, bright chestnut, jaws darker, dorsal plate light brown, anal plate yellowish, all the legs of the colour of the body. I think, that when very young it is more tinged with grey, from the colour of the intestinal canal, but this description is correct, until it is nearly full grown. It remains from October until March still lively, and evidently feeding, but hardly growing larger, and then begins to show faint pinkish dorsal

and subdorsal lines, the head becoming light brown and the plates whitish. In July, although still apparently feeding, it has become contracted to a mere lump, and is very sluggish, the ridges of the segments are then very distinct, and the pink dorsal and subdorsal lines brighter. Up to this time it has burrowed in the stem of *Artemisia absinthium*, at first making passages under the bark, but soon boring into the wood and eating out its substance and pith, like that of *Ephestia cinerosella*, which it accompanies. But now it leaves its burrow and wanders about, making special efforts to escape from confinement, and finally spins a slight white cocoon among rubbish, where it changes to a chestnut-brown pupa, the moth emerging in August. Its habits, therefore, are very different from those of the seed-feeding species, which feed up so rapidly and remain so very long in the larva state in cocoon. I have seen no indication of its ever feeding, even in earliest infancy, in the flowers of the wormwood.

Pembroke : 10th November, 1879.

EXPERIMENTAL RESEARCHES ON THE PHOSPHORESCENCE OF THE GLOW-WORM.

BY M. JOUSSET DE BELLESME.*

Electricity, the nervous fluid, and the insulation of vital forces, have each, in turn, been evoked as causes of phosphorescence. Finally, we stop at the consideration of the existence of a phosphorescent matter emitted by the luminous animal, which appears more likely. I have thought it my duty to study anew this phenomenon in *Lampyris*, because the researches made by Matteucci,† the principal experimenter on this subject, were not conducted after a method altogether irreproachable. In fact, neither this author, nor others, have taken into account the will of the animal, and have not sought to eliminate this cause of incertitude, so that when they placed a glow-worm in carbonic acid (for instance), they were not able to appreciate exactly whether the phosphorescence ceased because the medium did not admit of its being produced, or whether the animal voluntarily refused to shine. In order to decide this, one must first of all try to prevent the animal from lighting-up voluntarily, and force it to become luminous at the will of the experimenter. With this idea, I took out the cephalic ganglia, which abolished all spontaneous phosphorescence, and replaced the voluntary excitation by the passage of a moderate

* Translated from the Comptes-Rendus of the French Academy of Sciences, vol. xc, No. 7 (February, 1880).

† *Vide Annals and Mag. Nat. Hist.*, vol. xii (1843), pp. 373, 374.

electric current in the trunk, or in the luminous organs. This excitation determined an undoubted bright phosphorescence.

Armed with the results of these experiments, I have proved (as did Matteucci) that the presence of oxygen is absolutely necessary in order to allow the action of the function. An insect prepared in the manner first noticed, plunged into carbonic acid, azote or hydrogen, and excited electrically in the gas, never became luminous.

It may be thus considered certain that the large granulous protoplasmic cellules constituting the parenchyma of the phosphorescent apparatus, produce a substance which becomes luminous on contact with the air emitted from the numerous tracheæ that traverse the apparatus.

In order to know what that substance is, one must isolate and analyze it. The resemblance of the glow to that of phosphorus has caused several chemists to seek that substance in the luminous apparatus, but their researches have been in vain, so that naturalists have found themselves in the presence of two contradictory assertions. This memoir proves that this contradiction is more apparent than real, and that it results from a wrong interpretation of a common fact. If one crush a glow-worm, one sees that traces of luminosity remain; one imagines that they result from its apparatus, as from lucifer matches, and that they are nothing else than the phosphorescent matter stored up for the requirements of the insect. Experiences thus gained are very defective; let us consider them more methodically. If we content ourselves by dissecting a glow-worm by means of needles, the fragments remain luminous during several hours. If, on the contrary, we pound it in a mortar so as to destroy the cellules themselves, the phosphorescence disappears immediately; the collected remains, exposed to pure oxygen, and submitted to electrical action, remain absolutely dark. Thus a partial crushing permits phosphorescence to continue; a complete crushing abolishes it absolutely. According to the hypothesis of a reserve of phosphorescent matter, complete crushing would be favourable by spreading the matter over a large surface in contact with air, but what takes place is exactly the contrary, the phosphorescence only persists if the apparatus itself is divided into fragments. This proves that some groups of cellules remain intact, and continue their function. Dissection and contact with air excites them, and their protoplasm, reacting under this influence, produces the phosphorescent matter at the expense of the materials it contains. If we kill these cellules by pounding them, life no longer intervenes to put these materials in action, and to give them the chemical conditions under which phosphorescence shows itself.

Thus we are in the presence of a chemical action, but which only shows itself in the glow-worm under biological conditions. We can demonstrate this in another manner. Without pounding, certain toxic agents have the power of destroying the cellules. If we submit the glow-worm to the action of sulphuretted hydrogen, it is killed immediately. If we excite it afterwards electrically, we obtain no light. The cellules are intact in form, but destroyed physiologically; they have lost their functional power. It is certain, however, that the protoplasm contains all the materials necessary for the production of the phosphorescent substance, but the substance is not fabricated. It is only produced as a means for an end, under the influence of will, and by the intermediary of the nervous system, which excites the cellules and calls them into action. Phosphorescence is thus a phenomenon of the same order as muscular movement, such as the discharge of electricity in the apparatus of the *Torpedo*, the result of chemical combinations acting on the protoplasmic matter.

It is very probable that the phosphorescent substance is a gaseous product, for the structure of the gland, well studied by Owsjanikof, does not give one the idea of an organ secreting liquid. But chemical phosphorescent products at an ordinary temperature are not numerous, which induce one to believe the substance is phosphoretted hydrogen. It is for chemists to elucidate this point; but they should seek the matter in the cellular protoplasm, and not directly.

My researches induce me to believe phosphorescence a property of protoplasm, consisting in the disengagement of phosphoretted hydrogen. This explains why many of the lower animals, deprived of a nervous system, are phosphorescent. Besides, it offers the advantage of connecting the phenomena of phosphorescence in living beings with that we see in organic matters in a state of decomposition. It is one more example of a phenomenon of the biological order traced to an exclusively chemical cause.

DESCRIPTION OF A NEW LONGICORN BEETLE FROM ARABIA.

BY D. SHARP, M.B.

The pretty little *Cartallum ebulinum* is one of the commoner Longicorns in the Mediterranean region, and it is of interest as being hitherto without any congener, or without any nearly allied genus. I have found amongst the last *Coleoptera* sent by Dr. Millingen from

the Hedjaz district of Western Arabia an allied species, and as it is very easy to recognise, I have thought it expedient to give it a name and characterize it.

CARTALLUM THORACICUM, *n. sp.*

Angustulum, nigrum, thorace sanguineo, elytris viridibus; antennis, tarsis, tibiisque anterioribus rufo-testaceis, illis articulo basali nigro; thorace sparsim irregulariter punctato; elytris setis erectis pallidis parcus adspersis, fortiter punctatis.

Long. $6\frac{1}{2}$ —9 mm., lat. $1\frac{1}{2}$ — $2\frac{1}{4}$ mm.

The species is at first sight exactly similar to *C. ebulinum*, it has, however, the prothorax above and below entirely red, and its upper surface only sparingly punctured; the punctuation of the head is also much less dense and regular; the elytra are more coarsely punctured; and the front of the head is shorter, so that the antennæ are inserted nearer to the base of the mandibles: the thorax is more cylindrical, the angular prominence at the side, so conspicuous in *C. ebulinum*, being in *C. thoracicum* scarcely represented. The sexes show similar differences to those of *C. ebulinum*.

Found by Dr. Millingen near Jeddah.

Thornhill, Dumfries:

February 28th, 1880.

NOTES ON TENTHREDINIDÆ AND CYNIPIDÆ.

BY P. CAMERON.

(Continued from page 224).

Since writing the remarks on *Allantus*, Mr. J. B. Bridgman has sent me a species which he had from the late Mr. F. Smith as *zona*, but it is not the true *zona*; it is a variety of *viennensis*, with the posterior tarsi and apex of tibiae blackish, instead of reddish. In this variety (at least, in this country) the yellow bands on the 4th and 5th segments are fuller than in the common form. The form with black tarsi is not uncommon apparently in Germany, but does not occur in Scandinavia. It has generally a distinct yellow splash on the side of the 6th abdominal segment, but it may be absent. I suspect that *A. succinctus* was founded on this form of *viennensis*; any way, it has no connection with *zona*, Klug, although it would appear to have passed current in this country for it.

With reference to *A. cingulum* I would remark, that the words in the table on p. 221—"the 5th and 6th segments yellow all round"—

refer to the commonest variety in this country. According to the descriptions of Continental authors, the 5th only is yellow all round ; the 6th being black beneath.

Mr. C. W. Dale writes me that he has a specimen of *A. viduus* from Dover, where it was taken many years ago. It was included by Curtis in his "Guide," but seemingly in error, for neither Stephens in his "Illustrations," nor Smith in the B. M. Catalogue, makes any mention of it.

Tenthredo velox, Fab., would appear to be either a very rare and local species, or one which is confounded with some other species belonging to the same group. The Fabrician description is clear enough : "antennis filiformibus apice albis, atra, ore punctoque femorali albis" (Syst. Piez., 34, 24). St. Fargeau (Mon. Tenth., 111, 323) adds to this description the coloration of the legs : "ferruginei; femoribus posticis basi atris puneto albo." Hartig's description (Blattw., 312, 54) does not quite agree with these, for he says there is a "double spot" at the base of the posterior coxae. As no complete description of *velox* has been published, I give one now.

Black ; clypeus, labrum and base of mandibles, a single spot over the hind coxae ; the apex of the 3rd, the 4th, 5th and 6th beneath, and the 7th, 8th and 9th (except at extreme apex) joints of antennae entirely, white. Legs red ; the coxae, trochanters and base of femora, the apex of posterior tibiae and the tarsi, the anterior tibiae behind, and the joints of tarsi in part, black ; the front tibiae and tarsi livid white in front. Wings hyaline ; costa and stigma black ; tegulae and pronotum black. Vertex and abdomen shining ; the mesonotum opaque, punctured ; vertex finely punctured, shortly pilose ; mandibles brownish at apex.

The ♂ has the abdomen from the 3rd segment red ; and the whole of the femora and the four anterior tibiae and tarsi are broadly lined with black above. The antennae have the apical joints black on the upper side.

Length 4½—5 lines.

The ab. *nigro-lineata* has all the femora and the four anterior tibiae and tarsi broadly lined with black in both sexes.

It is very readily separated from the species most nearly related to it (*livida*, *colon*, *coryli*) by the white colour on the antennae extending to the 3rd or 4th joints, whereas, in these, the white commences at the 6th ; the abdomen is always black, and the *single* white mark over the hind coxae forms another good distinguishing point. Besides these differences, *livida* is known from it by having the stigma white at the base ; *coryli* by the red on middle of abdomen ; and *colon* by the reddish tegulae.

The following table will enable the student to distinguish the British species of *Tenthredo* having the apex of antennae white :

- A. Scutellum white *solitaria*, Scop.
- B. Scutellum black.
- a.* The 5th joint white.
1. Eyes and pronotum marked with white ; abdomen bronzy, often reddish.
No spot over hind coxae.
Tegulae white, pleurae more or less rufous *rufiventris*, Fab.
Tegulae and pleurae black *balteata*, Kl.
 2. Eyes and pronotum not marked with white ; abdomen black ; a single spot over hind coxae *velox*, Fab.
- b.* The 5th joint black.
1. Stigma distinctly white at the base *livida*, L.
 2. Stigma not distinctly white at the base ; apex of abdomen red (rarely black), tegulae red *colon*, Kl.
Middle of abdomen red ; tegulae black *coryli*, Kl.

Except *velox*, these species have been recorded from almost all the European countries ; *velox* I can only find recorded from Germany (Halle), Silesia, Holland, and Italy. In Scotland it is common, and extends to Sutherlandshire ; and yet, curiously enough, it does not appear to occur in Scandinavia : nor does it seem to be a common English species.

From the great variation in coloration which *T. livida* exhibits, it is often a puzzling form to beginners ; yet the half white, half fuscous stigma forms a slight but constant mark of distinction. The form with entirely black abdomen and legs is, I believe, the *T. bipunctata* of Klug and Hartig.

On re-examining my specimens of *Dolerus* of the *gonager* section, I found among them two species new to our Fauna, viz., *D. puncticollis*, Thoms. (*Hymen. Scand.*, i, 286, 14), and *D. liogaster*, Thoms. (*l. c.*, 286, 15). The former is distinguished from *gonager* by its shorter antennae, by the mesonotum being strongly punctured all over, the puncturing on the head, too, being much stronger ; *gonager*, on the other hand, having the sides of the mesonotum almost smooth. *D. liogaster* differs from both in having the femora red, except at extreme base, and the cerci all red. *D. vestigialis* agrees with *liogaster* in the coloration of the femora, but the tibiae are almost entirely red, the cerci black ; while the ♀ has, on the 2nd and 3rd abdominal segments, a white puncture, and the ♂ on almost all the segments ; and the eyes are oblong and emarginated on the inner side. Thomson says that *liogaster* has the thorax in front marked red, but I can discover no trace of this in my specimens. Of *liogaster*, I have taken several specimens in Clydesdale by sweeping grass at the end of May and beginning of June ; of *puncticollis*, I have one Scotch example without a note of the precise locality ; and another specimen has been taken by Mr. Bignell near Plymouth.

Selandria Sixi, Voll. (Bouwstoffen voor eene Fauna van Nederland, iii, 278, 1858), according to Vollenhoven, is identical with *S. grandis*, Zad., and, as it has priority by a year, the name of *Sixi* must stand. The larva, according to the Dutch entomologist, feeds on *Poa aquatica*. *S. serva* is not known in its earlier stages, but it frequents the same marshy situations as *Sixi*.

Paecilosoma longicorne, Thoms. (Hymen. Scand., i, 232, 6), I find among my Scotch specimens. Mr. J. B. Bridgman has taken near Norwich a *Paecilosoma* which seems to be intermediate between *longicorne* and *submuticum*; while I have from Rannoch an apparently undescribed species. Without further specimens, however, I can say nothing definite about them. The species mentioned at p. 119 of this Magazine (vol. xvi) I have seen through the kindness of Mr. Roebuck. It is a badly set specimen of *excisum*, Thoms.

(To be continued.)

DESCRIPTIONS OF FOUR NEW SPECIES OF RUSSIAN PSYLLIDÆ.

BY JOHN SCOTT.

Some few months ago I wrote to M. Jakowleff at Astrachan, asking him to be good enough to permit me to see all of the Russian species of *Psyllidæ* which he had in his collection, in order that I might be able to give the localities of those already known to science, and, further, to describe such as might prove to be new, in my monograph of the *Psyllidæ* of Europe, on which I am at present engaged. I received a box from him in September last, and I think it will be of interest to give a list of the species forwarded to me. These are as follows:

Aphalara Jakowleffi, Scott, described in Ent. Mo. Mag., p. 266, May, 1879. I am now able to say that this species is found on *Tamarix laxa*, in May.

Aphalara lurida, n. sp. *A. bicolor*, n. sp. *A. unicolor*, n. sp.

Rhinocola tamaricis, Puton. Found upon *Tamarix laxa* in May.

Allæoneura radiata, Först.

Psylla glycyrrhizæ, Becker. *P. spirææ*, Becker, taken at Sarepta.

Trioza dichroa, Scott, described in Ent. Mo. Mag., p. 265, May, 1879. *T. Dalei*, Scott ?, immature example, found on *Atriplex laciniiata* in May. *T. clæagni*, n. sp.

APHALARA LURIDA.

Green. Head scarcely as long as broad. Crown with a deep fovea on each side, posterior margin slightly concave. Face: anterior margin somewhat deeply cleft in the middle, lobes distinctly rounded. (Antennæ wanting.)

Thorax: pro- and mesonotum green, convex both longitudinally and transversely, the former scarcely as broad as the anterior portion (*dorsulum*) of the latter. *Elytra* pale, scarcely transparent, apical half pale dirty yellow: anterior margin concave next the apex of the basal costal cell; radius suddenly concave towards the dorsal margin, immediately on leaving the nerve of the costal cell, then almost straight until near its extremity, where it curves round and joins the costal margin a little way before the apex; petiole of the cubitus longer than the posterior arm; posterior furcation elongate, the inner nerve directed towards the apex of the clavus, which it almost reaches. *Legs* green. *Tarsi*: 2nd joint brownish.

Abdomen green, ♂ processes scapulate at the apex. Length, 1 line, barely.

A single specimen from the Caucasus. Neither date of capture nor food-plant given.

APHALARA UNICOLOR.

Buff. *Head* almost twice as broad as long, considerably depressed on each side of the centre. *Crown*: posterior margin very slightly concave. *Face*: anterior margin flatly hollowed out in the middle. *Antennæ* buff, terminal three joints dark brown.

Thorax: pronotum buff, considerably deflected towards the head, almost uniform in width, with two deep foveæ on each side, placed one near the outer margin, and the other about in a line with the inner margin of the eyes: mesonotum convex, widest across the base of the posterior portion. *Elytra* transparent, pale yellow with a slight fuscous tinge, thickly and finely wrinkled transversely, costal margin at the base broadly rounded, costal basal cell broadest in a line with the base of the cubitus, its apex terminating in a short narrow stigma; radius almost straight, extending to the apex; petiole of the cubitus longer than the posterior arm; width of the cells of the furcations measured on the margin almost equal. *Legs* buff. *Claws* dark brown.

Abdomen, ♀, buff, slightly greenish on the under-side at the base; genital plate elongate, about one and a half times as long as the basal margin.

Length, $1\frac{1}{4}$ line.

The fine transverse wrinkling of the glossy and transparent elytra is the best character I can at present give for distinguishing this from all the other species of this genus.

A single ♀ example from Sarepta, but neither food-plant nor date of capture indicated.

APHALARA BICOLOR.

Deep reddish or purplish-black. *Head* about one and a half times as broad as long. *Crown* generally reddish-brown; the usual fovea on each side distinct and darker than the other portion of the surface, posterior margin concave. *Face*, anterior margin faintly hollowed out in the middle.

Thorax: pro- and mesonotum deep reddish-black, lateral margins, especially at and

around the insertion of the elytra, red. *Elytra* pale yellow, scarcely transparent, nearly twice as long as broad; radius straight, terminating in the apex; petiole of the cubitus about one-fourth longer than the posterior arm; posterior furation elongate, about twice the length of the anterior measured on the margin: *pro-* and *mesonotum* pale yellow. *Legs* pale yellow.

Abdomen bright green; genitalia bright green, upper margin of the processes of the ♂ very narrowly black. Length, 1 line.

Taken at Astrachan in August, but at present I am unable to say upon what plant. Appears to be a common species, as a number of individuals were sent to me in a quill. Unfortunately the shaking in transit detached the antennæ in every case. Its small size and peculiar coloration will at once enable any one to recognise it.

TRIOZA ELEAGNI.

Delicate pale green. *Head* almost perpendicular. *Crown*: down the middle a little more than one-half the width between the eyes, on each side near the posterior margin is a fovea, from which proceeds a deep channel running obliquely in the direction of the lower margin of the eye; posterior margin concave. *Face*: lobes delicate pale green, about two-thirds the length of the crown, measured down the centre, sparingly clothed with some very fine pale hairs, base of either nearly equal to the length, divergence at the apex equal to the base of either. *Eyes* reddish-brown. *Antennæ* very pale, 9—10 joints black.

Thorax green: *pronotum* narrow, deflected to almost in a line with the head; *mesonotum* convex, anterior portion (*dorsulum*) narrowed towards and rounded at the middle of the anterior margin, posterior angles produced into a short spine; posterior portion on either side adjoining the insertion of the elytra with a distinct round callus. *Elytra* clear, transparent, about two and a quarter times as long as broad, nerves white; costal margin convex, greatest convexity beyond the middle, apex obtuse; radius flatly convex next the base, then concave towards the costal margin, and recurring just before joining it, junction considerably before the apex. *Legs* delicate pale green. *Tarsi* pale. *Claws* black.

Abdomen, ♂, pale malachite-green, sparingly clothed with short, very fine white hairs; genitalia clothed with very fine white hairs, genital plate conical, height about equal to twice the width of the base, processes in outline, shaped somewhat like the breast and neck of a bird with the breast-shape inwardly; ♀ pale malachite-green, genitalia inclined to brownish; upper genital plate considerably longer than the lower one, from which it diverges and curves upwardly.

Found upon *Elæagnus angustifolius* in June and July at Petrowsk (Caucasus).

The earlier stages of the life of the species are at present unknown.

NOTE ON *DISCOPUS*, A GENUS OF SOUTH AMERICAN LONGICORNS,
FAMILY LAMIIDÆ.

BY H. W. BATES, F.L.S.

Discopus is one of the numerous genera of conspicuous and beautiful insects characteristic of the fauna of the Eastern slopes of the Andes, a few degrees north and south of the equator, *i. e.*, from New Granada to about the middle of Peru. The range of the genus, like that of many genera of butterflies of this region, extends some few hundred miles down the plains of the Amazons, but without reaching so far eastward as the confluence of the Rio Negro. Within its area it is represented in the different river valleys by a number of similar species, some of which scarcely rise to the distinction of more than local forms or races. The genus is allied to the European *Acanthoderes*, differing chiefly by the antennæ being ornamented, on the third joint, by a cylindrical brush of silky hairs, and by the elytra having a strongly-elevated rib down the middle of each, from base to apex. The name (suggested by the pair of brushes which the insects seem to bear on their antennæ) was proposed by M. J. Thomson, who first separated these insects from *Acanthoderes*. The genus, as will be seen in the following enumeration, has been enriched by the researches of Mr. C. Buckley, in Ecuador, but the species described were mostly the fruits of his first journey.

1. *DISCOPUS SPECTABILIS*, Bates, Ann. Mag. Nat. Hist., November, 1861, p. 476 (*Acanthoderes*). Hab., Ega, Upper Amazons. Distinguished by its rich black colour, and the narrow and interrupted ashy-white sutural vitta, without oblique belt of the same colour across the middle of the elytra.

2. *D. EQUES*, *n. sp.*—*Paullo major, elytris apice latius et rectius truncatis: fuscus, antennis castaneis, scopis fusco-castaneis: elytris maculis parvis, segregatis, fulvo-cinereis, viz. una utrinque pone scutellum, duabus medianis oblique positis, altera supra angulum apicalem, guttis autem nonnullis suturalibus versus apicem.*

Long. 9 lin., ♂ ♀.

Hab.: Chanchamayo, Peru (Dr. Thamm).

Agrees with *D. spectabilis* in wanting the median oblique cinereous

fasciæ possessed by other species. In its place there are two rounded spots, a larger one on the side, and a smaller one on the disc and farther from the base. The sutural stripe is, however, much less indicated in *D. eques*, there being only a few minute specks behind the middle, and an isolated spot at the extreme apex, which is more squarely-cut than in *D. spectabilis*, each elytron being sinuate-truncate, with the sutural not much less (at least in the ♂) produced than the exterior angle. The head and thorax are spotted with pale tomentum, and the legs coloured as in *D. spectabilis*.

3. *D. PATRICIUS*, n. sp.—*Fulvescenti-fuscus, velutinus, abdomine nigro : antennis pedibusque obscure rufescentibus, scopis fusco-nigris : elytris apice oblique truncatis, angulis exterioribus dentiformibus, suprà tomento cinereo juxta suturam et apud discum subcerebre maculatis, maculaque majori rotunda laterali post humerum, altera paullo minori suturali post scutellum.* Long. 8 lin., ♂.

Hab.: Eastern Ecuador (Buckley).

The ashy-tomentum is spread over the apical half of the elytra, including the suture, in numerous small specks. The colour of the elytra is a rather light coffee-brown, with a silky lustre.

4. *D. BUCKLEYI*, n. sp.—*Supra rufesceni-fuscus velutinus, elytris vitta suturali (guttis fuscis crenulata) fasciaque obliqua mediana cinereis : antennis pedibusque rufo-castaneis, femoribus subtus abdomineque nigris, scopis nigro-fuscis : thorace vitta laterali, vittulis duabus virguliformibus dorsalibus, maculaque postica marginali cinereis.* Long. 7—8½ lin., ♂ ♀.

Hab.: Banks of the Morona, Ecuador (Buckley).

The velvety pile of the elytra is of a rich coffee-brown colour, and the ashy-white marks form a sutural vitta (irregular on its outer margin and crenulated by brown specks on the suture itself), a broad oblique submedian fascia, and a small spot near the apex and outside the rib.

5. *D. COMES*, n. sp.—*Supra tomento velutino atro-fusco vestitus, elytris vitta suturali fasciaque obliqua utrinque mediana cinereis : fronte cinereo ; thorace atro-fusco, vitta lata dorsali alteraque utrinque laterali cinereis : antennis piceis, articulis 4—11 apice (vel toto) obscurioribus, tertio scopo atro-fusco : pedibus nigris, tarsis tibiarumque apice fulvis.* Long. 8½ lin., ♂.

Hab.: Eastern Ecuador (Buckley).

The markings of the elytra are more simple and sharply-defined than in any other species: the white sutural vitta being compact, except two emarginations near the scutellum, and the oblique fascia extending from the margin near the shoulder to the mid-rib of the elytra. The sutural vitta is, however, marked from the middle of the elytra to the apex with a series of round dark spots, and similar spots are seen on the fascia.

6. *D. PRINCEPS*, *n. sp.*—*Precedenti proxime affinis, at differt colore nigerrimo, vitta suturali immaculata; antennis nigerrimis articulis 4—10 basi griseis.* Long. 6½—8½ lin., ♂ ♀.

Hab.: Pebas, Upper Amazons (Hauxwell).

Very closely allied to *D. comes*, having a similar ashy-white forehead and uninterrupted sutural vitta and oblique fascia. But the colour in *D. princeps* is a deep black, richer and deeper even than in *D. spectabilis*, which colour extends to the antennæ and the legs, in the latter of which only the tarsi and the extreme apex of the tibiæ are of the usual fulvous hue. The sutural vitta is free from the dark spots which mark its central part along great portions of its length in *D. comes*.

7. *D. ANTENNATUS*, Guérin, Verhandl. Zool. Ver. Wien, v, p. 599 (*Acanthoderes*).

Hab.: Banks of the Napo.

According to the description this species differs from *D. comes* chiefly by wanting the sutural ashy vitta of the elytra, there being only a large spot behind the scutellum. The oblique fascia is present, and the velvety tomentum of the elytra is of a castaneous colour.

8. *D. QUADRISCPULATUS*, Thomson, Physis, ii, p. 146.

Hab.: Guatemala.

This, and one or two other undescribed species, occurring in Central America, differ from the typical forms in having a pencil of hairs at the end of the 4th, as well as of the 3rd, antennal joint. They differ also in other characters, and, according to Lacordaire, scarcely belong to the genus. They are much smaller and less conspicuous insects than the true *Discopi*.

Bartholomew Road, Kentish Town, N.W.:
March, 1880.

THREE WEEKS' BUTTERFLY-COLLECTING IN THE ALPS.

BY W. A. FORBES, F.L.S.

The following is an account of a short trip in the Alps of Dauphiné and Piedmont made last summer by myself, in company with Messrs. Salvin and Godman, and Capt. Elwes. Our object was quite as much to enjoy a change and breathe fresh air, as to catch butterflies, though we devoted most of our time to the latter pursuit. We left London on June 22nd, and reached it again on the 11th of July, so that we were only about three weeks, and as we got over a good deal of ground in that time, rarely staying more than one night in a place, a large part of our trip was spent in travelling. Our route was as follows: from Chambery we drove, by St. Laurent du Pont, a village close to the famous monastery of La Grand Chartreuse, to Voiron, and thence by rail to Grenoble. From there we proceeded to Bourg d'Oisans, and next day over the Col du Lautaret—a driving pass about 6800 ft. high—to Briancon. Mr. McLachlan* had made known to us before starting his experiences some years ago of this part of the Dauphiné Alps, but unfortunately we were too early for *Lepidoptera*, the snow lying still thickly about the top of the pass above La Grave, where, indeed, we narrowly escaped being carried away by a small avalanche—a catastrophe that happened to a small cart that had preceded us by about an hour. At Briancon, although over 4000 ft. above the sea, we got for a while into a more southern fauna, as evidenced by the occurrence of such forms as *M. Dejone*, and the beautiful yellow "orange-tip" *A.*

* I visited this part of the Alps of Dauphiné as far as the Col du Lautaret, in the beginning of July, 1876, in company with M. Constant (then of Autun, now of Cannes), who joined me at Grenoble, and a botanist from the neighbourhood of Bordeaux. This district had long been known to members of the Alpine Club, and possessed the peculiar attraction of a mountain (La Meije, over 13,000 ft.) that had, up to that time, baffled all attempts to scale it (it has since been several times successfully ascended), in addition to many other inducements for mountaineers of the more amateur class; it was also well known to botanists as a paradise for rare alpine plants, and it supplies (through its adventurous and migratory inhabitants) many of the horticultural establishments of Europe (and even of America) with them, either in the form of seeds or roots. French entomologists had also visited it; but it had rarely seen an English net; yet there are probably few districts in Europe so favourable for a Lepidopterist: it is *not* favourable for a Neuropterist, owing to most of the streams having their source in glaciers. It has the advantage of a magnificent military road, a wonderful piece of civil-engineering. British tourist-entomologists should decidedly make its intimate acquaintance. It is easy of access. From Grenoble to the summit of the Col du Lautaret is about 50 English miles by diligence and mail. Grenoble can be reached from London in about 27 hours (on my return I left that city at 3.15 p.m., and was at home in my study before 7 p.m. next day). The end of June is too early, even in an ordinary season, and in such a season as 1879 was a month too early. I would recommend entomological tourists (not pressed for time, nor wanting to go over too much ground) to stay first at Bourg d'Oisans, where there is a comfortable inn, kept by an obliging old Frenchman, M. Martin ("Hôtel de Milan"). Afterwards they should push on to the Col du Lautaret, where there appears to be good accommodation at the Hospice on the summit (subsidized by government, as a refuge for wayfarers in the long winter months). My head-quarters were at Bourg d'Oisans and La Grave, the latter at the foot of La Meije. But I think (for an entomologist) the Hospice is preferable to La Grave. This latter is a miserable village with a poor inn, offering no special inducements, excepting to Alpine climbers: the sleeping-quarters were over the stable (which is, perhaps, cleared out once a year), the food was indifferent, the charges not moderate: and, moreover, newly-arrived strangers are liable to an indisposition (already alluded to several times in the records of mountaineering), that may place them (as it did me and one of my companions) *hors de combat*, and take several days to shake off. (The water, and the sudden change of temperature from the *excessively* hot experiences of Bourg d'Oisans were both blamed for this; but there has been no report from an official sanitary inspector!). Any British entomologist who is not specially connected with water insects should visit this district; and even the exception I have made would, perhaps, not hold good in the autumn months, when the glaciers have discharged their annual surplus.—R. MC LACHLAN.

euphenoides. The Mediterranean fauna would, therefore, seem to extend up the valley of the Durance quite into the Alpine district. From Briancon we drove by Mout Genèvre, a pass of about 6000 ft., over the frontier to Oulx, a small village (at an elevation of 3500 ft.) on the Mont Cenis railway, between Bardonèche and Susa, and after a day there, proceeded to Turin. Spending the Sunday there, we, after a good baking, were glad to get away early next morning, and travel by rail to Arona, and then up the lake by steamer to Baveno. Baveno being hot and crowded, we left next day, and drove up the Val Anzasca to Ponte Grande, a charming village about 2500 ft. above the sea, with a lovely view of Monte Rosa. Finding good quarters here, we stayed several days (from July 1—5). The Val Anzasca is a good example of an Italian alpine valley, and proved likewise very productive in insects, though the weather was not as fine as it might have been. We only had one really fine day, July 3rd, and on that Mr. Salvin and I working down the valley towards Vogogna, saw or caught fifty-two species of butterflies, not a bad day's work for one morning between 8 and 2 p.m. In this valley below Ponte Grande alpine and southern species were curiously interblended, as evidenced in such forms as *Neptis* and *Libythea* occurring with *Parnassius* and other mountain insects. From Ponte Grande we went further up the valley to Macugnaga, and after spending a day there, over the Monte Moro pass (about 9000 ft.), and down the Saas Thal to Saas, and eventually Visp. After this, except for an hour or two near Bienné, on our way home, we had no occasion to use our nets.

The total number of species of *Rhopalocera* seen or caught by us during the trip was 103, and, had the weather been finer, this number would, doubtless, have been increased. We altogether missed numbers of common Alpine species, as owing to the unusual amount of snow that had fallen during the winter, the season was extremely backward, so that had we started a fortnight later, our "bag" would, no doubt, have been correspondingly increased. A list of some of the more uncommon species we obtained is appended.

Papilio Podalirius: Chambery, Col du Lautaret, Briancon, &c.

Parnassius Apollo: Val Anzasca, Col du Lautaret, &c. *P. Mnemosyne*: Val Anzasca, above Ponte, Macugnaga.

Pieris napi, var. bryoniæ: several near Macugnaga.

Anthocharis Belia, var. simplonia: rather common towards, and on, the top of the Col du Lautaret. *A. euphenoides*: this truly Mediterranean species occurred, but not commonly, at Briancon; one specimen was seen at an elevation of about 5000 ft., on the road towards Mont Genèvre. All seen were males.

Leucophasia Duponcheli: Oulx (?) and Briancon. At the time we did not distinguish this from the common species, so only got two or three specimens. According to M. Bellier de la Chavignerie (Ann. Soc. Ent. France, 1869, p. 514), this species is, in France, almost confined to the lower parts of the Basses Alpes, and the neighbourhood of Digne, and Aix in Provence.

Colias Edusa, var. *Helice*: Oulx, Chambery, &c.

Thecla ilicis: round bushes in the Val Anzasca. This and *T. rubi* were the only "hairstreaks" met with.

Polyommatus virgaureæ: Val Anzasca, not numerous. *P. Hippothoë*, var. *Eurybia*: upper parts of Val Anzasca, and near Macugnaga. *P. Aleiphron*, var. *Gordius*: this beautiful "copper" was abundant in the Val Anzasca, flying about, and settling on, the flowers by the sides of the road. The males were by far the most numerous; a few were also caught at Baveno and near Briancon. *P. Dorilis*: near Chambery, Briancon, Val Anzasca, &c.; the males commoner. The alpine form (*subalpina*, Speyer) occurred at Macugnaga.

Lycæna argyrotoxus (= *Aegon*): St. Laurent du Pont, &c., common. *L. Argus*: very common in the Val Anzasca; also on the Col du Lautaret, at Oulx, and Baveno; most of our specimens are referable to the form *Aegidion* (Meissner). *L. Orion*: not uncommon, flying over the road, particularly where muddy, in the lower parts of the Val Anzasca, but local, and generally worn. *L. Baton*: one at Bourg d'Oisans, and a few at Briancon and Macugnaga. *L. Eros*: Oulx, and more commonly in the Saas Thal, above Stalden. *L. Icarus*, ab. *icarinus*: Oulx. *L. Eumedon*: Oulx, and Saas Thal, above Stalden; nowhere common. *L. Escheri*: Chambery, near Bourg d'Oisans, Oulx, and Stalden, singly. *L. Hylas*: common at Oulx, Saas Thal. *L. Sebrus*: Col du Lautaret, Oulx, males only; we probably passed this species over as the next in many cases. *L. semiargus*: common at Briancon, Oulx, &c. *L. Cyllarus*: rather common on the Col du Lautaret, and about Briancon, Baveno, and Val Anzasca. *L. Alcon*: Oulx, a few. *L. Arion*: Col du Lautaret, Oulx, Saas Thal, &c.

Nemeobius Lucina: Chambery, Val Anzasca, &c.

Libythea celtis: I saw, and caught, a single specimen of this S. European species in the Val Anzasca, below Ponte Grande. This was the only one seen.

Apatura Ilia, var. *Clytie*: a single specimen of this species was seen, but not secured, on the road side near Baveno.

Limenitis populi: a fine female near Ponte Grande; we saw another higher up the valley, but failed to catch it. *L. Camilla*: I caught a single specimen at Oulx, the only one we saw.

Neptis Lucilla: we got two or three specimens, only in the Val Anzasca, of this species. This must be nearly its most western habitat.

Melitaea Phœbe: Briancon, &c., very common in the Val Anzasca. *M. didyma*: Chambery and Val Anzasca. *M. Dictynna*: Briancon, Macugnaga. *M. Dejone*: a few specimens at Briancon; this species is, according to Dr. Staudinger, confined to Spain and the South of France. *M. Athalia*: abundant nearly everywhere in suitable localities; in swarms in the Val Anzasca, with *M. Phœbe* and others. *M. Parthenie*: St. Laurent du Pont.

Argynnис Amathusia: common at Oulx, near Macugnaga. *A. Thore*: Godman caught a single specimen of this rather scarce species in the Val Anzasca, above Ponte Grande. *A. Lathonia*: common in the Val Anzasca; this species seems fond of settling on the dusty roads, and has a peculiar jerking flight, unlike the other species of *Argynnис*. *A. Niobe*: a single specimen of the typical silvery-spotted form at Briancon; curiously enough, we saw nothing of *Eris*, which is usually the commoner of the two.

Erebia Melampus: Val Anzasca and Saas Thal. *E. Epiphron*, var. *Cassiope*: Saas. *E. Ceto*: Col du Lautaret, Val Anzasca, and more commonly near Macugnaga. *E. Medusa*, Val Anzasca, Macugnaga, &c. *E. Stygne*: Col du Lautaret, Briancon. *E. Evias*: on the Col du Lautaret near La Grave, but mostly worn; also near Macugnaga. *E. Euryale*: Val Anzasca.

Oeneis Aello: not very uncommon near Macugnaga, and also caught in the Saas Thal, between Stalden and Saas.

Satyrus Alcyone: Val Anzasca and Saas Thal, common near Stalden. *S. Semele*, near Stalden. *S. Actaea*, var. *cordula*: a few near Stalden.

Pararge Mæra: common everywhere in the alpine valleys. *P. Hiera*: Oulx Val Anzasca, nowhere abundant. *P. Achine* (= *Dejanira*): two specimens in a wood near Bienné.

Cœnonymphia Arcania, var. *Darwiniana*: Chambery, Baveno, and common in the Val Anzasca. The alpine form *Satyrion* occurred sparingly in the Saas Thal.

Spiloptyrus althææ: we got two specimens of this rather scarce species in the Val Anzasca. *S. lavateræ*: this skipper was not uncommon one hot day flying over the road in the Val Anzasca, but it was very lively and difficult to catch; we subsequently saw it again in the Saas Thal, above Stalden.

Syriethus carthami: Briancon, Oulx, and Saas Thal. *S. Sao*: near Chambery, Briancon, Oulx. *S. alveus*: Saas Thal and Oulx.

Hesperia Thaumas: Ponte Grande, Saas Thal. *H. lineola*: Saas Thal, and Val Anzasca.

Carterocephalus Palæmon (= *Paniscus*): a single specimen caught by Salvin near Chambery.

The generic name Pachymerus in Hemiptera.—In the “ Bulletin des Séances de la Société entomologique de France,” 1879, p. 206, Dr. Puton has done me the honour to reply to my remark at p. 23 *ante*, and says, that “ if Latreille has created the genus *Pachymerus* for a section of *Bruchus* (*Coleoptera*) in his ‘ Familles naturelles,’ 1825, in the same volume, p. 422, he cites the genus *Pachymerus*, Lep. Serv. (*Hemiptera*), and therefore the latter has priority.” What Latreille did, *l. c.*, was to allude to the generic sections of *Lygaeus*, adopted by Lepeletier and Serville in the “ Encyclopédie méthodique,” x, 322 (also 1825), thus—“ On peut diviser ainsi les lygées : 1^o, appendices membraneux des élytres, soit très-striés, soit aréolés à leur base et terminés ensuite par des nervures; 2^o, appendices membraneux n’offrant que quelques nervures longitudinales et souvent même à peine distinctes. On pourra ainsi en détacher génériquement (PACHYMÈRE, de Saint-Farg. et Serv.) les espèces à cuisses renflées.” That is to say, that Latreille, although approving the generic distinction of the insects thus characterized, did not therefore accept the name which the said authors had applied to the genus, merely using it parenthetically in explanation. Indeed, he could not have adverted to the name in any other sense, considering he had just before (p. 386) used it for the genus of *Coleoptera*, for which he had previously elsewhere originated it ;* and he certainly would not have done this if he had not been sure his name *Pachymerus* had priority over that of Lepel. and Serv., because otherwise it would *ipso facto*, and, to his own knowledge, have been at once superseded. So also Amyot and Serville understood the matter, when, for this very reason, they abandoned the name :—“ Le nom de *Pachymerus* donné par l’un de nous (Enc. x, 322) à un démembrément des *Lygaeus* de Fabricius, devait être changé puisque cette dénomination avait été antérieurement appliquée par Latreille à un genre de Coléoptères” (Hist. nat. des Insectes—Hémiptères, p. 253, 1843). This was also my argument, and its validity is not yet affected ; so that *Pachymerus* is not available in *Hemiptera*, unless it can be shown that Latreille, and Amyot and Serville were in error, which is not probable, considering the action the latter authors took in relinquishing the name, and thus confirming Latreille’s position.—J. W. DOUGLAS, 8, Beaufort Gardens, Lewisham : January 12th, 1880.

Early appearance of Dorcus.—On February 20th, I caught a fine ♂ specimen of *Dorcas parallelopipedus* crawling on a road close here. Is not this unusually early for the insect?—THOS. H. BRIGGS, Hampton House, Teddington : March 12th, 1880,

How to catch Cicindelidæ.—On the sandy beach at Colombo, I came across a very active *Cicindela*, and, after some considerable efforts to secure a specimen, gave up the chase, thinking the seaweed, which teemed with life, the more profitable for the half-hour I had for collecting. The species, moreover, was well known to me from a series I have at home from the Andaman Isles. But the waving of the net and the frantic movements of the foreigner, unusual here in the sun, were seen by half a dozen little urchins of a neighbouring hamlet, and down they came to see what was up. A few signs suggested the nature of the sport and instantly four or five commenced pursuit. In a moment handfuls of sand were clenched and dexterously

* Agassiz gives “ *Pachymerus*, Latr., Règne animal, 1817,” but this date is an error. The name is still used, as Latreille’s, in *Coleoptera*.

thrown at the basking beetles, and before they could disentangle themselves from the otherwise harmless missiles, they were adroitly captured by the fingers of the agile Cinghalese. I had a dozen in a few minutes.—GEO. LEWIS, Ceylon : *Feb. 3rd, 1880.*

Description of the larva of Plodia interpunctella.—On the 21st December, 1878, I received from Mr. J. R. Wellman, of London, larvæ of two species, supposed at the time to be *Ephestiæ*, feeding on dried figs: from the one described below *Plodia interpunctella* was bred.

Length about five-eighths of an inch, cylindrical, and of average bulk; head polished, the lobes rounded, and the mandibles prominent; it is slightly narrower than the second segment, adjoining the head, on the second segment, is a semi-circular polished plate; the skin has a flabby translucent appearance.

Body almost uniformly a very pale straw-colour, the alimentary vessel showing through the skin forming the darker medio-dorsal stripe; the head and plate a warm sienna-brown; and the mandibles and the tips of the prolegs still darker brown. There are no other noticeable markings.

These laryæ lived on, apparently not increasing at all in size, and rarely feeding, until June following, when loose silken cocoons were formed under the edges at the top of their glass cylinder; and an imago appeared at the end of the month following.—GEO. T. PORRITT, Highroyd House, Huddersfield : *March 5th, 1880.*

On the structure of Lampyridæ.—In the Report of Proc. Ent. Soc., of December 3rd, in Ent. Mo. Mag., I am made to say the amount of Phosphorescence in *Lampyridæ* was correlated to the length of the antennæ. This is inaccurate. The facts I called attention to were the development of the eyes, and especially those of the males, in direct proportion to the luminosity of the species, and to that of the female when that sex has the superior power of giving light: and to the plumosity or flabellation of the antennæ, being in inverse proportion. Therefore, a species or genus with plumose antennæ has usually small eyes in both sexes. Where the eyes are large but equal in each sex then both sexes are luminous, and usually the male especially, both being furnished with wings. Where the female is especially the luminous sex, there the eyes of the male attain their largest development. And in this case she is often unable to fly, the distension of the abdomen with ova being apparently the cause of her losing her power of flight.

In this case the antennæ are usually rudimentary, and the male has lost his light or nearly so.

The mimicry noticed by me was between this group and the *Cleridæ* and *Lycidæ*.

You would oblige me very much by noticing this correction of what I wish to express in the next number of your Magazine, if possible.—H. S. GORHAM, Shipley, Horsham : *February 19th, 1880.*

The larva of Gelechia ocellatella.—In April, 1878, I found a few larvæ mining in leaves of *Beta maritima*, at Tenby. From bad management, and the succulent nature of the leaves, I reared only one, but captured two more among the food-plant. In April last, I again searched for the larva, and found it pretty commonly on the plants growing on the rocks.

When young, it is dirty yellowish-white, with dark grey dorsal vessel, head pale brown, dorsal plate black, anal plate blackish.

When full-grown, it has broad, interrupted, pink, longitudinal lines, the sub-dorsal being the broadest, head and plates as before.

When very young, it turns down the edge of the leaf of *Beta maritima*, making a chamber of white silk, but it soon begins to mine the leaf, keeping especially to the midrib, or else enters a young shoot, or even the stem: in fact, it seems as various in its manner of feeding as *Gelechia costella*. When removed from its mine it is very active, and wriggles violently, but when full-fed, leaves its feeding place to spin up in a dead leaf, or among rubbish. Pupa light brown, in a silken cocoon. The moths emerged this year late in June and through July, last year on June 22nd.—CHAS. G. BARRETT, Pembroke: *December*, 1879.

Reviews.

THE FIELD NATURALISTS' HAND-BOOK, by the Rev. J. G. WOOD and THEODORE WOOD: Cassell, Petter, Galpin, and Co., London, Paris, and New York. Pp. 167, 8vo (no date on title-page).

It is difficult to comprehend the *raison d'être* for the appearance of this book. It is a calendar purporting to give the young collector information as to the times of appearance of British *Macro-Lepidoptera*, the time of flowering of British Plants, and the time in which to find British Birds' eggs, interspersed with notes, and instructions for collecting, preservation, &c. But such calendars exist already almost *ad nauseam*, and we fail to detect anything original, excepting in the treatment. The authors show themselves profoundly ignorant of the veriest rudiments of the practice of naturalists in penning and publishing such nonsense as the following (when speaking of nomenclature):—"One well-established genus, for example, is "broken into half-a-dozen new genera, while the original name is transformed into "an order, sub-order, tribe, phalanx, &c., just as the writer chooses to call it." We warn our younger readers against such assertions, which could only emanate from writers without the slightest scientific aspirations, and may tend to reduce their readers to the same level as themselves. The aim of a popular writer on Natural History should be that of leading his readers to broad views, and not that of narrowing their minds by ridicule and false statements; and more especially when those readers must, of necessity, mainly consist of the rising generation. The mechanical part of the book appears to be well done; the bulk of the authors' self-asserted advice had better be ignored. Much sounder advice and information can be obtained from a multitude of less pretentious works. At p. 36 is an explanation of a "moth-trap," which is said to have been so successful that more than forty moths have been caught in it in one night. This is a modification of the American invention explained in vol. ii, pp. 199—202, of this Magazine (1866), and which did not, we think, fulfil the great expectations it appeared to hold out.

ENTOMOLOGISK TIDSKRIFT, på föranstaltande af entomologisk föreningen i Stockholm, utgifven af JACOB SPÅNGBERG. Band i, Häft i, pp. 52. Stockholm, 1880, 8vo.

This Magazine, which is the organ of the newly-established Entomological Society of Stockholm, supplies a want by furnishing the entomologists of the Scandinavian races with a special journal devoted to their studies. According to the prospectus (in French), it is intended to publish four parts a year. The type and

getting-up are both in every way excellent, and this first part contains memoirs by Spångberg, Holmgren, Wallengren, Schoyen, and others. Communications may be sent written in French, Latin, German, English, or any of the Scandinavian tongues, but French is preferred, and when the vernacular is used, a short résumé in French will appear at the end of each part. Under the editorship of so young and energetic an entomologist as Dr. Spångberg, we have no doubt the new journal will prove both successful and useful.

ENTOMOLOGICAL SOCIETY OF LONDON, February 4th, 1880.—J. W. DUNNING Esq., M.A., F.L.S., Vice-President, in the Chair.

The following elections took place:—Mr. P. F. Copland, of Hillcote, Buckhurst Hill, as Member; and Mr. J. B. Bridgman, of Norwich, and Mr. P. Cowell, of Liverpool, as Subscribers.

Mr. Stainton exhibited, on behalf of Mr. Grigg, of Bristol, an example of *Heliothis scutosa*, captured near Weston-super-Mare.

Mr. Pascoe exhibited an example of what, according to his experience, is the ordinary "fire-fly" of the Amazon Valley—*Aspisoma lineatum*—which is not alluded to in the works of Messrs. Bates and Wallace: its light was intermittent, appearing at intervals of about two seconds, but it seemed able to extinguish it at will for an indefinite period.

The Rev. H. S. Gorham questioned the advisability of applying the term "fire-fly" to all luminous insects indiscriminately. With regard to our *Lampyris noctiluca*, he did not think it possessed the powers of extinguishing its light when alarmed, and he thought the supposed "flashing" was due to the light-producing surface becoming alternately exposed and concealed during the insect's movements.

Mr. McLachlan said that many years ago he and a companion had placed a large number in their nets, and carried them for a long distance, the accumulated lights producing quite a "sensation." He called attention to a discussion on the supposed power of swarms of "fire-flies," to simultaneously exhibit and extinguish their lights, that took place at meetings of this Society, May 1st, June 5th, and July 3rd, 1865 (*vide* Proc. Ent. Soc., ser. 3, vol. ii, pp. 94, 95, and pp. 101, 102: Ent. Mo. Mag., vol. ii, pp. 24 and 72), in the course of which he had suggested that the phenomenon might be due to slight currents of air altering the position of the insects when flying, and thus exposing and obscuring the light-producing surfaces.

Mr. Salvin said that in Central America the flight of *Pyrophorus* was in a straight line; and Mr. Meldola remarked that in Ceylon he had noticed a Lampyrid very numerous; its flight was straight, and not in swarms, and its light did not appear intermittent.

Sir S. S. Saunders said that in Corfu and Albania he had constantly observed the intermittent nature of the light of *Luciola italicica*. There could be no doubt of this; the light was not merely temporarily obscured, but totally extinguished, and all the insects in a swarm acted in unison in this lighting-up and extinction.

Mr. Meldola said he had once made experiments as to the nature of the light of the glow-worm, and found that it was continuous, and spectrum analysis showed it to be very rich in green and blue rays, and poor in red and yellow.

Mr. Pascoe exhibited the sexes of *Isopogon hottentottus* (*Asilidae*), a Dipterous insect new to Britain, taken by him at Box Hill, and determined by Mr. R. H. Meade.

The Secretary exhibited, on behalf of Mr. G. Francis, of Adelaide, specimens of an Australian moth (*Anapaea*), the larva of which feeds on *Eucalypti*.

A letter was read from Mr. Swinton, in which the latter affirmed there were no well-marked differences in the larvae of *Acronycta psi* and *tridens*. (Has Mr. Swinton really seen the larvae of *both* species?—EDS.)

The Secretary read abstracts from a communication from Dr. H. Müller to "Kosmos," November, 1879, on the larva of *Stauropus fagi*, affirming that its structure served as a protection against the attacks of ichneumons.

The Rev. H. S. Gorham read a continuation of his "Materials for a Revision of the *Lampyridæ*."

Dr. Sharp communicated a paper "On some *Coleoptera* from the Hawaiian Islands."

March 3rd, 1880.—H. T. STAINTON, Esq., F.R.S., &c., Vice-President, in the Chair.

Dr. H. C. Lang, of 41, Berners Street, Oxford Street, and F. Crosbie, of The Chestnuts, Barnet, were elected Members.

Mr. Pascoe exhibited several species of Scorpions with reference to a controversy that had lately taken place in "Nature," as to these animals committing suicide by stinging themselves to death. He pointed out that in some genera it was almost impossible for the sting to reach a vital part, owing to the shortness of the tail, and in others, where the tail was long, owing to the curvature of the sting. He considered the believers in the theory were under the influence of errors of observation.

Mr. S. Stevens exhibited, on behalf of Mr. Pim, a remarkably dwarfed ♀ of *Lycæna Icarus*.

The Secretary exhibited, on behalf of Mr. G. Francis, of Adelaide, eggs of *Chrysopa*, placed on the edges of a leaf of *Eucalyptus*, and beautiful shell-like scales formed by a species of *Coccidae*, with the insects found beneath them.

The Rev. A. E. Eaton exhibited three plates from the series of drawings of *Ephemeridæ* he was having prepared for his forthcoming work on that Family. They consisted of a *Tricorythus*, *Batisca obesa*, Say, and an undetermined nymph from Chili, the latter remarkable for having its maxillary palpi 11-jointed, and the labial 14-jointed. In the nymph of *Batisca*, he remarked that the rudimentary fore-wings are connate along the greater part of their length.

Mr. McLachlan said these drawings were some of the most beautiful and detailed that had ever been executed for any family of insects.

Mr. Howard Vaughan exhibited series of *Cidaria russata* from the Isle of Arran and Yorkshire, as exemplifying the local variation that exists in this insect.

The Rev. H. S. Gorham read a continuation of his paper on the *Lampyridæ*, and also extended notes on the structure of the antennæ, eyes, light-giving segments, &c., and their correlation. This occasioned a long and interesting discussion, in which Mr. Stainton, Mr. Pascoe, Mr. W. C. Boyd, Mr. C. O. Waterhouse, Sir S. S. Saunders, Mr. McLachlan, the Secretary, and others took part, Mr. Gorham replying to remarks and objections.

Mr. C. M. Wakefield communicated a paper by Mr. R. W. Fereday on new species of *Lepidoptera* from New Zealand.

Mr. Butler communicated a paper on "Synonyms of Heterocerous *Lepidoptera*."

Mr. C. O. Waterhouse read "Descriptions of *Cetoniidæ* and *Cerambycidæ* from Madagascar."

NOTES ON TENTHREDINIDÆ AND CYNIPIDÆ.

BY P. CAMERON.

(Continued from page 250).

Emphytus calceatus.—The larva, with black marks along the sides, mentioned in Fauna of Scotland, Hymen., p. 20, is a form of *E. calceatus*, and has no connection with *Poecilosoma*.

Fenusia melanopoda, Cam. (*nigricans*, Thoms.), is an alder feeder, as I know from having bred it. My conjecture (Proc. Nat. Hist. Soc. Glas., 1875, p. 7) that it was Zaddach's *F. pumila* (Beschr. neuer oder wenig-bek. Blattw., p. 29, f. 12, copied also by André, Species dcs Hymen., pl. xiv, f. 15, 16, under the name of *pumila*) is, therefore, correct. Goureau (Ann. Soc. Ent. Fr. [4], viii, Bull., pp. 17, 18) likewise described its habits under the name of *pumila*.

Nematus Zetterstedti, Dbm.—M. André (*l. c.*, Catalogue, p. 14) sinks this name for *miniatus*, Htg., described two years after the publication of Dahlbom's Clavis, because no description was given by Dahlbom of *Zetterstedti*. This is true, but then it is figured (fig. 5), which is as good as a description, seeing that it is perfectly recognisable. I consider, therefore, that Dahlbom's name should stand.

In the same work (p. 152), M. André re-names *Nematus brevicornis*, Foerster, *Færsteri*. So far as I know, Foerster is the earliest author who used the word *brevicornis* for a *Nematus*, and I am at a loss to know why his name is now changed. It is true that Dahlbom applied the name to a *Nematus* (Conspectus, p. 7, No. 43), but he neither described nor figured it, and it remained undescribed until Thomson, in 1871, gave a description of it. There being thus two distinct species bearing the same name, it is clear that one of them must be re-named, and Dahlbom's (or rather Thomson's) name being the latest must give way.

Nematus togatus, Zaddach.—Schr. Ges. Königsb. 1875, pl. 6, fig. 3. I found some larvæ of this species in Arran last autumn, on hazel, but did not rear the flies. They are, however, so distinct that I am certain of their identity. No description has yet been given of the species in any stage.

Nematus curtispina, Thoms., Hym. Scand., i, 152, 84, is a good species, and not a variety of *miliaris*, as I once thought. It differs in both sexes from *miliaris (viridis)*, not to a large extent, certainly, while Mr. J. E. Fletcher finds that the larva—which has pink dorsal lines—is constant in coloration. These green *Nemati* are in a somewhat confused state, and their specific distinctions can only be elucidated by rearing both sexes from the larvæ.

Nematus aurantiacus, Htg., Blattw., 197, 25.—Mr. C. W. Dale has taken at Glanville's Wootton a *Nematus*, which agrees with the above in every way except that the stigma is not bluish-black at the base, but this cannot be regarded as of much importance.

It is allied to *pavidus*, Lep., but is easily distinguished by its more slender body, by the scutellum having two yellow spots, and by the pleurae being yellow. It is not unlike the form of *myosotides* without the black band on abdomen, but then that species has the antennae quite black, and differs in many other points.

N. aurantiacus, Thoms. (Hymen. Scand., i, 156, 89), is a different species : it is *pavidus*, Lep.

Athalia rosæ.—I feel satisfied that the habits of *A. rosæ* as described by Taschenberg and Boisduval are erroneous. The larva, I am sure, is not attached to the rose, and the observations of these authors must refer to *Eriocampa canineæ* (*aethiops*, West.). *A. rosæ* seems to be attached to *Ajuga*. When at Thornhill last year, Dr. Sharp asked me if I knew the saw-fly on the *Ajuga*; not knowing what species he meant, we went to the garden in search of it, and there, on the first plant examined, we found *A. rosæ*. This confirms Mr. James Hardy's observation of its partiality for this plant. Dr. Sharp told me that a saw-fly larva is found on it in the autumn, which is, in all probability, that of the *Athalia*.

Blennocampa bipunctata, Kl., is stated to live in the rose branches, boring in the pith, by Boisduval and Taschenberg. I think this observation must refer to *Paecilosoma repandum*, Fall., which has this habit, while the description of its larva agrees tolerably well with that given of the supposed *bipunctata*.

Aphlothrix clementinæ, Gir.—I found the gall of this species at Cadder, in the middle of October. It was then green, with pink stripes.

Cynips folii, L.—Thomson (Opuse. Ent., p. 790), has called attention to the fact that the *C. folii* of Linné is the same as Hartig's, and, consequently is different from the *folii* of Schenck and Mayr. That this is the case is proved by the description given by Linné of the galls of his *folii*: "gallis avellanae magnitudine," which scarcely can apply to the gall of *folii*, Schenck ; and, besides that, there is the fact that *folii*, Sch., is a rare South, or, at least, Central, European species, and not found in Sweden at all, while Hartig's *folii* (*scutellaris*, Ol.) is common there. The change of name seems to have been first made by Schenck

(Nassauischen Cynipiden, p. 57), on information received from Giraud. *Folii*, Sch., will then require another name. So far as I know, Schenck was the first to describe it.

I have the following parasitic *Cynipidae* from the West of Scotland:

Allotria citripes, Thoms., Öfv., 1861, 410, 18. *A. trapezoidea*, Htg., is, I believe, a distinct species from *A. citripes*.

Allotria fuscipes, Thoms., l. c., 410, 19, bred from an *Aphis* on *Salix aurita*.

Allotria brevis, Thoms., l. c., 408, 9.

Eucæla erythrocerca, Thoms., Opusc. Ent., 819, 1.

Heptameris pygmæa, Dbm., Thoms., Öfv., 1861, 398, 4; Scarborough, Dr. Sharp.

Eucoela picicrus, Gir. (Verh. z.-b. Ges. Wien, 1860, p. 143), is a distinct species from *E. hexatoma*, Htg. It belongs to Foerster's genus *Hexacola*, and the latter to his *Hexaplasta*. *H. picicrus* I have from Sutherlandshire. See Trans. Ent. Soc. Lond., 1879, p. 117.

(*To be continued*).

FORMICA RUFA STRENGTHENING ITS NEST BY TAKING WORKERS FROM OTHER NESTS.

BY C. G. BIGNELL.

In August, 1877, I discovered a very large nest of *Formica rufa*, and observed a number of large workers bringing home to their nest other ants as prisoners; at that time I did not take much notice of it, but during the winter the remembrance of it would occasionally crop up in my mind; at last I resolved to visit the formicarium the following year, which I did several times, and on my visit to it on the 23rd August, I found the war operations in full activity, the ants issuing from a magnificent formicarium, measuring at the extreme base about forty feet in circumference, and in the centre about three feet in height; the small nest on which the raid was then made was about 200 feet from the large nest, the stream of workers was continuous, the distance from each other on their homeward journey was about eight or ten inches, each one bearing another worker between the mandibles. The worker from the large nest, which I shall call No. 1, would come up to the worker of the small nest, No. 2 (who evidently was just returning home from a foraging expedition, and not knowing what was going on at home), would exchange a few words, or something very closely allied, as if to say:—"You must come with

me." No. 2 evidently replied, "No, I shall not, what have you to do with me?" No. 1: "You will have to come." No. 2: "If I must come, you will have to carry me." A very slight resistance would follow, when No. 2 would turn over on its back, be immediately seized by No. 1, who would at once return towards the large formicarium; this was repeated almost every minute in the path which led through the wood, which No. 2 had to cross to get to its home, the struggle was carried on for many yards in the wood among the undergrowth, wherever the worker of No. 2 could be found. How long the battle lasted I know not, I watched them about an hour, but before my departure I boxed about a dozen of the amazons and their prisoners, and sent half of them to the late Mr. F. Smith, who pronounced them all to be without doubt *Formica rufa*.

7, Clarence Place, Stonehouse, Plymouth :
8th April, 1880.

DESCRIPTIONS OF NEW SPECIES OF HETEROCEA FROM WEST AFRICA.

BY HERBERT DRUCE, F.L.S.

SPHINGIDÆ.

BASIANA HORNIMANI.

Pale ochraceous. Palpi, head, thorax, and abdomen brown. Fore-wings crossed by numerous indistinct waved brown bands. A broad silver-greyish band crossing from the costal margin beyond the middle to near the anal angle. Hind-wings reddish-brown. Under-side pale yellow: both wings crossed by two reddish-brown waved bands speckled with whitish scales. Exp. 6½ in.

Hab.: Mongo-ma Lobah (G. Thomson).

In colls. F. J. Horniman and H. Druce.

AGARISTIDÆ.

EUSEMIA GRANDIS.

Black. Head, thorax, and abdomen black. Fore-wings with a minute white spot at the base and crossed by two bands of pale yellow; the first from the end of the cell, but not reaching the costal margin, the second beyond, nearer the apex, both bands are intersected by the black nervules dividing the first band into two, and the second into four spots. The fringe at the apex white. Under-side the same as above. Hind-wings black, the fringe white. Under-side bright red, with the margins broadly black. Exp. 4 in.

Hab.: Mongo-ma Lobah (G. Thomson).

In colls. F. J. Horniman and H. Druce.

Allied to *Eusemia Agrius*, Her.-Schäff., differing from it in having a double band on the fore-wing, and wanting the white bands on the hind-wing.

EUSEMIA MEDEBA.

Black. Head and fore part of the thorax with blue spots. Abdomen greyish-white, with the base of each segment black, the apex bright orange. Fore-wing with a small spot at the base, one at the end of the cell, a square spot below, and a round spot close to, the anal angle, all white. A band of four white spots crossing the wing near the apex from the costal margin to the middle of the outer margin. Hind-wing greyish-white, the base, costal, and outer margins black. Under-side the same as above, the base of the hind-wing is pale orange. Exp. 3 in.

Hab. : Old Calabar.

Coll. H. Druce.

EUSEMIA HORNIMANI.

Black. Head and fore part of the thorax with white dots, abdomen black with white spots on the hind border of each segment, the apex pale yellow. Fore-wings black, with blue spots at the base, one in the middle, and one at the end of cell. A large white spot close to the base, one beyond the middle, and one below, but not reaching the inner margin. A white band near the apex, crossing from the costal margin to near the anal angle. Hind-wings pure white, with the outer margin broadly black. Under-side the same as above. Exp. 3½ in.

Hab. : Mongo-ma Lobah (G. Thomson).

In colls. F. J. Horniman and H. Druce.

Allied to *Eusemia pedasus*, Her.-Schäff., from Madagascar.

**ON PARTHENOGENESIS IN TENTHREDINIDÆ AND ALTERNATION
OF GENERATIONS IN CYNIPIDÆ.**

BY J. E. FLETCHER.

Having bred a ♀ of *Nematus miliaris* on April 20th, I confined her on a shoot of osier. Eggs laid by her were observed on May 17th, and minute larvæ on May 22nd; by June 13th, the larvæ were spun up, and on the 16th, the imagines began to emerge; by the 20th all had appeared—twenty-two in number, only one being a ♀. From a larva found on July 28th, I bred another ♀ on August 8th; this also I confined on sallow: she laid eggs which hatched, and the larvæ were half grown at end of month; several of these larvæ spun up in the latter third of September.

On May 26th, I bred a ♀ of *Nematus pallidus*, and confined her on black poplar (the food of the larva she was bred from), on a leaf of which she laid eggs about the beginning of June, the minute larvæ from which were noticed on the 17th, but they did not thrive, all but two dying when nearly full-fed, these two attained the perfect state at end of July—both males.

I have tried to breed from the following *Cynipidae*, but the result is *nil*, due, in the case of the first species, to the weakness of the oak-plant used:—*Dryophanta folii* (not *scutellaris*, Mr. Cameron informs me), *Cynips Kollaris*, and *Neuroterus ostreus*.

Happy Land, Worcester:
December, 1879.

P.S.—I have just bred several ♂ insects from another virgin ♀ of *N. miliaris*.—J. E. F.: 2nd April, 1880.

WHAT IS MEANT BY THE TERM "SPECIES"?

BY H. T. STANTON, F.R.S.

In the communication from the pen of Mr. Douglas in the March number of this Magazine, reference is made to Professor Huxley's recent work on "The Crayfish." So much in this work is applicable to other branches of zoological science, that it is scarcely possible for an Entomologist to peruse the book, without mentally applying sentence after sentence to the groups of insects with which he is most familiar.

Coleopterist, Neuropterist, Hemipterist, or Lepidopterist would equally feel the force of the explanation of the terms *species*, *genus*, *family* and *tribe* embodied in the following extract (commencing at page 249) :

"All the individual crayfish referred to thus far, therefore, have been sorted out, first into the groups termed *species*; and then these species have been further sorted into two divisions, termed *genera*. Each genus is an abstraction, formed by summing up the common characters of the species which it includes, just as each species is an abstraction, composed of the common characters of the individuals which belong to it; and the one has no more existence in nature than the other. The definition of the genus is simply a statement of the plan of structure which is common to all the species included under that genus; just as the definition of the species is a statement of the common plan of structure which runs throughout the individuals which compose the species.

"Again, crayfishes are found in the fresh waters of the southern hemisphere. * * * * The southern crayfishes, like those of the northern hemisphere, are divisible into many species; and these species are susceptible of being grouped into six genera * * * on the same principle as that which has led to the grouping of the northern forms into two genera. But the same convenience which has led to the association of groups of similar species into genera, has given rise to the combination of allied genera into higher groups, which are termed *Families*. It is obvious that the definition of a family, as a statement of the characters in which a certain number of genera agree, is another morphological abstraction, which stands in the same relation to generic, as generic do to specific abstractions. Moreover, the definition of the family is a statement of the plan of all the genera comprised in that family.

" * * * These two families (the northern crayfishes and the southern crayfishes) have in common all those structural characters, which are special to neither; and carrying out the metaphorical nomenclature of the zoologist a stage further, we say that the two form a *Tribe*—the definition of which describes the plan which is common to both families." (p. 252).

Given a restricted group of insects of wide geographical distribution, it would be possible to work up the subject in a similar way to that which Professor Huxley has adopted in treating of "The Crayfish."

First we are introduced to the living crayfish, till we gradually seem to acquire an intimate acquaintance with it; we watch its career from its earliest development till it begins to suffer from old age; then we are treated to its anatomy, its physiology and the homologies of its various segments; next we have all its nearest relations paraded before us, and necessarily therewith comes their geographical distribution over the surface of the globe, and whilst we learn distinctly where these animals *do* occur, we feel that the regions where none have at present been observed cannot be pronounced with equal confidence as regions in which they *do not* occur. For, as Professor Huxley well observes, "it is always difficult to prove a negative."

Unfortunately, no insects can expect to have their ancestry as well preserved as are the fossil remains of crayfish, and the genealogy of any group of insects must, therefore, remain much more involved in obscurity.

Mountsfield, Lewisham :
March, 1880.

NOTES ON UNKNOWN OR LITTLE-KNOWN LARVÆ OF MICRO-LEPIDOPTERA.

BY E. L. RAGONOT.

(continued from p. 155).

Scopula decrepitalis, H.-S.

The larva is quite unknown, the moth flies from June to August in alpine countries.

Lemiodes pulveralis, Hb.

The larva has been found by Herr Mühlig on *Mentha aquatica*, in August, but it does not seem to have been described. The moth flies sometimes abundantly in damp marshy localities where *Mentha* grows, end of June and in July.

Stenopteryx hybridalis, Hb.

The larva has been described by Mr. Geo. T. Porritt in this

Magazine, but as the larvæ were bred from ova, the habits and mode of feeding of the larvæ at large are yet to be described. M. Constant bred the moth from larvæ found under stones, where, no doubt, the larva fed on low plants. M. Cuny y Martorell says that the larva feeds on *Polygonum aviculare*, which is just the plant with which Mr. Porritt fed his larvæ.

The moth flies from the end of May to October, and it hibernates; there are probably two or more broods.

Scoparia.

The larvæ are all moss feeders, and they have been but little bred, only those of *murana*, *lineola*, *cratægella*, and *angustea* (*coarctalis*) having been described.

S. ambigualis, Tr.

The larva, still undescribed, feeds at the beginning of April in moss on tree trunks; the moth appears from June to August sitting on the trees.

S. basistrigalis, Knaggs, *ulmella*, Dale, *atomalis*, Db., *gracilalis*, Db., and *alpina*, Dale, all appear in July (the three latter in Perthshire), and the habits of the moths and the larvæ are quite unknown.

S. Zelleri, W. K.

Larvæ unknown, the imago is taken in August, by beating hedges.

S. cembræ, Hw.

Larva unknown, the moth sits on fir trunks in July and August.

S. scotica, Buc. White.

According to Mr. Barrett, this would be a synonym of *Zelleri*.

S. dubitalis, Hb. (*pyralella*, Hb.).

The larva of this common species is still "wanted;" it feeds in March and April in moss, and the moth is fond of damp places in June and July.

S. ingratella, Z.

Larva unknown; the moth flies in July and August in the Alps, and in June and July at Folkestone.

S. frequentella, Stt.

Only a short description of the larva is given in the "Manual." It feeds in moss in March and April, and the imago appears from June to August sitting on tree trunks.

S. resinea, Hw.

The larva, undescribed, feeds in spring in moss and lichens on ash and apple trees, and the moth appears in July and August.

S. phæoleuca, Z.

Nothing is known of the larva, the moth flies in July and August.

S. truncicolella, Stt. (*mercuriellus*, Zk., Tr.).

The larva has been found by Fischer von Röslerstamm, who says it resembles that of *Crambus falsellus*, and gives a short and insufficient description. He says that it forms galleries under the thick earthy moss on stones in the spring, and the moth appears in June and July sitting on stones and fir trunks.

S. pallida, Stph.

The moth flies in boggy meadows, where rushes grow, in July and August; the larva is unknown.

(*To be continued*).

NEW SPECIES OF *ALCIDION*, A GENUS OF LONGICORN COLEOPTERA.

BY H. W. BATES, F.L.S.

Alcidion is a tropical American genus allied to the European *Leiopus*, but well-defined by its unarmed thorax and sub-triangular elytra, the disc of which bears on each side a longitudinal carina ending in an apical spine. Many species exist undescribed in collections.

ALCIDION PULCHRUM.

Tomento olivaceo-ochraceo vestitum, elytris fasciis tribus undulatis nigro-fuscis pallido-marginatis: antennarum scapo gradatim incrassato, subtus paullulum planato: thorace postice quam antice latiori, lateribus rotundatis: elytris humeris conicis minus extantibus, tuberculo centro-basali utrinque conico, apice oblique truncatis, angulo suturali vix acuto. Long. $5\frac{1}{4}$ lin.

Frontino, New Granada (Salmon).

The dark elytral fasciæ are broad and angulated; the second is sometimes broken into three transverse spots (one on the suture), and the third does not reach the suture.

ALCIDION LÆTULUM.

A. bispino affine at minor, humeris minus extantibus, articulo basali antennarum apice haud clavato infra longe sinuato. Subtrigonum, fuscum, elytris griseo lâte variegatis; thorace medio angulato dorso obtuse bituberoso; elytris humeris vix prominulis apice ut in A. bispino et dorso acute carinatis, carina centro-basali brevi nigro-penicillata; pedibus testaceo-rufis tibiis nigro-biannulatis antennis testaceo-rufis articulo basali cæterisque apice tantum nigris; corpore subtus rufescens; abdome ut in A. bispino et affinibus apice bispinoso. Long. $3\frac{1}{2}$ lin.

Bahia (Edw. Reed).

ALCIDION DELETUM.

A. bicristato proxime affine, at multo brevior et lator. Obscure fulvum; thorace antice et postice constricto medio transversim convexo lateribus tumidis dorso bituberoso; elytris subtrigonis apice oblique sinuato-truncatis angulo suturali distincto, exteriori longe late producto acuto, carina centro-basali brevi fortiter elevata culmine breviter dense ciliata, disco obtuse pluri-costatis, costis 1 et 2 ante apicem conjunctis ibique griseo-lineatis et interstitiis nigro notatis; antennis rufo-testaceis articulis apice fuscis.

Long. 5 lin.

Cayenne. Sent to me from Paris as *Alcidion deletum*, Dej.

ALCIDION VENOSUM.

A. bispino forma similis, elytris versus apicem rectius angustatis. Oliraceo-griseum, thorace lateribus antice paulo tumidis, supra laevi; elytris trigonis, basi rectis, humeris elevatis sed non lateraliter prominulis, deinde usque ad apicem recte attenuatis, apice brevissime oblique truncatis angulo suturali haud armato, exteriori longe spinoso, supra lineatim punctatis, carina centro-basali brevi antice fortiter elevata, postice declivi nec pilosa, disco obtuse bicarinato carinis ante apicem conjunctis unaque ad spinam continuatis griseo-lineatis; antennis pallidis articulis apice obscurioribus; femoribus fusco-nigris basi rufis; abdomine rufo medio nigro.

Long. 4½ lin.

Rio Janeiro (Petropolis). Rev. H. Clark.

ALCIDION HUMEROSUM.

A. bispino affine at humeris multo magis prominulis. Subtrigonum, capite et thorace piceis late flavo-sericeis, hoc lateribus simpliciter leviter rotundatis supra laevi; elytris grosse punctatis, humeris maxime extantibus conicis apice sinuato-truncatis angulo suturali prominuli exteriori longe spinoso, supra carina centro-basali brevissima conica apice penicillata disco carina acuta usque ad apicem extensa alteraque abbreviata si exteriori, nigro-fuscis, late cinereo-marmoratis basi et humeris rufis aureo-sericeis; antennis nigris basi infra ciliatis; femoribus et coxis viridi-testaceo-glaucis tibiis et tarsis nigris; corpore subtus nigro glauco-pubescenti.

Long. 4½ lin.

Macas, Ecuador (Buckley).

ALCIDION NEBULOSUM.

A. bispino proxime affine et humeris magis extantibus conicis subfalcatis articuloque basali antennarum apice haud clavato subtus biflexuosa. Subtrigonum, capite thoraceque fuscis hoc lateribus medio angulatis dorso grosse et obtuse bituberculato; elytris lineatim pauciter punctatis, humeris valde prominulis oblique conicis apice sinuato-truncatis, angulo suturali prominulo, exteriori longe spinoso; supra carina centro-basali brevissima conica apice longe nigro barbata, disco carina acuta usque ad apicem extensa alteraque ci exteriori obtusissima, fulvo-griseis basi rufescentibus, prope basin fascia nigro-fusca, ante apicem fusco-nebulosis et punctatis; antennis rufo-testaceis, corpore subtus et pedibus glauco-testaceis.

Long. 4½ lin.

Macas, Ecuador (Buckley).

Bartholomew Road, Kentish Town:

April, 1880.

Saprinus immundus and other beetles, &c., at Hunstanton, Norfolk.—At the end of July and beginning of August last year, I spent some little time at Hunstanton, Norfolk, near the mouth of the Wash: in spite of the bad season Coleoptera were by no means scarce:—the most interesting capture perhaps was *Saprinus immundus* in considerable numbers. Gyllenhal, who first described the insect, and other writers (including Thomson), give as the great distinction of the species the fact that the sutural stria is abbreviated, and not united to the second dorsal stria: the specimens at Hunstanton were, however, in all stages, some having the sutural stria entirely connected with the dorsal stria, some having them indistinctly connected, and some entirely disconnected: one or two had slight traces of aberrant striae on the clear space on the elytra: all the specimens were perfectly mature and in good condition.

I also took *Saprinus rugifrons*, *metallicus* (two specimens), *maritimus* (one specimen), and *nitidulus*. The *Necrophori* were represented by *N. vestigator* and *interruptus*, and the *Aphodii* by *A. scybularius*, *fætens*, *nitidulus*, and *rufescens* (the latter being accompanied by a peculiar dark form). *Choleva Watsoni* also occurred. *Staphylinidae* were not very abundant and seemed chiefly to consist of *Philonthus bipustulatus* and *varians*. I found, however, *Bledius opacus* in some numbers and one *Bledius tricornis*. All these beetles I obtained on the sandhills, those to the north of the town being far the most productive: many others also occurred, among the most noticeable being *Masoreus Wetterhalli*, *Harpalus servus*, *Pterostichus picimanus*, *Bryaxis Helferi*, *Nacerdes*, *Crypticus*, *Cillenus*, &c.

From brackish brick-ponds not far above high water mark, I obtained *Berosus affinis* in numbers, *Berosus spinosus*, and several species of *Ochthebius* (*bicolon*, *aeratus*, *marinus*, &c.), but only one species of *Agabus* (*conspersus*), and two of *Hydroporus* (*confluens* and *planus*).

On the top of the cliffs *Podagrion fuscicornis* literally swarmed on mallow accompanied by the usual *Apion malvae* and *rufirostre*, and a few *Brachypterus gravidus*, *Aphthona hilaris*, &c.

I did not do much inland collecting, but found a good many things, the best perhaps being small *Anisotoma dubia* (? *sciba*), *Salpingus castaneus*, *Ocypus compressus*, and *Mordellistena inæqualis*, and a single specimen of the now apparently rare *Apion simile*. *Engis humeralis* and *rufifrons* and *Cis nitidus* also occurred in fungus at the foot of alders.

In the window of one of the rooms of the house where I was lodging, I found a specimen of the very rare *Trichopteryx Guerini*, and also *T. Montandoni* and *anthracina*.

A specimen of *Micrus filicornis*, a species which has only, I believe, been taken in England by Mr. Matthews, was, I feel sure, taken on the same window, but I unfortunately omitted to attach the locality to it, and so cannot with absolute certainty say where I found it.

Corixæ were swarming in every stage in the brick-ponds above mentioned. Mr. Douglas has kindly looked over a number of those I took and found among them *C. Geoffroyi*, *Panzeri*, *affinis*, *nigrolineata*, *hieroglyphica* (light and dark forms), *lugubris*, *præusta*, *concinna*, and a doubtful species. Other Hemiptera were not abundant, the only ones at all worth notice being *Dictyonota crassicornis* and *Calyptonotus lynceus*.—W. W. FOWLER, Repton, Burton-on-Trent: March 15th, 1880.

The rearing of Arctia caja in coloured light.—A batch of eggs of the common tiger-moth was divided into three equal portions, and placed, under precisely similar conditions, in three separate larva-cages covered with glass, of which the colour was red, blue, and violet, respectively. Those under the violet-colour were soonest hatched ; the voracity of the larvæ was enormous, the quantity of the food eaten by them being quite double that consumed by the others, and their growth was somewhat quicker. There was very little variation among the moths developed, and it was apparent in the greater or less marginal extension of the white markings of the fore-wings, which was in nowise referable to the difference in the light ; but all the pupæ under the violet glass were developed fourteen days before those under the red and blue covers.—G. SCHOCHE (in the *Mittheilungen der schw. entom. Gesellschaft*, v, 540 [1879]).

[The accelerated germination of seeds and development of roots in cuttings of plants under blue glass has long been known, and is attributed to the favouring influence of the actinic rays of solar light, when the calorific and luminous rays are excluded by a blue medium. It is interesting to find that an analogous acceleration, presumably by the action of the same principle, is also caused in insects, under like conditions.—J. W. D.]

Description of the larva of Cidaria fulvata.—I did not know the larva of this common species until June 16th, 1877, when, on the occasion of an excursion of the Yorkshire Naturalists' Union to Sharlston, near Wakefield, I beat one out of rose. Since then I have found it easily enough.

Length, about five-sixths of an inch, and of average bulk in proportion ; head rather narrower than the second segment, it has the lobes rounded, and when at rest appears to be notched on the crown, the notch, however, is really on the second segment, being formed by an extension of the skin into two prominences above the top of the head, and thus forming the notch. Body of nearly uniform width, rounded above and below, but the two portions divided by a wrinkled lateral ridge ; the skin has also a wrinkled appearance, and the segments are very distinctly divided.

Head, and the ground colour of the body, uniformly bright pale green ; dorsal stripe composed of a double grey line ; sub-dorsal lines of the same colour, but more boldly defined ; a yellow margin extends along the lateral ridge forming the spiracular line ; and the segmental divisions are also yellow. Ventral surface, legs and pro-legs, bright pale green, the posterior segments yellower, and all the segmental divisions yellow.

On the 25th of the same month the larva changed to a pupa amongst the leaves of its sprig of rose ; this was about three-eighths of an inch long, the colour almost uniformly a dull green. From it an imago emerged on the 13th of the following month.—GEO. T. PORRITT, Highroyd House, Huddersfield : April 2nd, 1880.

Papilio Hector, L., roosting in flocks.—My brother, R. S. Eaton, C.E., informs me that, in the Bombay Presidency, during the latter part of the "rains" (Sept.—Dec.) in the beginning of the cold weather, this butterfly commonly roosts in flocks. About sunset they betake themselves to trees—usually the "Babul" (a species of gum acacia)—clinging to the under-side of the subpendulous branches towards their extremities in crowds of many hundreds ; and there they rest until the sun is well up.—A. E. EATON, 51, Park Road, Bromley, Kent : 15th April, 1880.

Occurrence of Limnophilus subcentralis, Brauer, in Britain.—I have received from Mr. J. J. King, of Glasgow, a ♂ of this insect, captured by him at Aviemore, Inverness-shire, in 1878. Considering its authenticated continental distribution, it is surprising it had not sooner been detected in these islands. In general appearance it is very like *L. lunatus*, yet unlike the ordinary dark British form of that insect. Its structural characters are *very* different: for these I refer to my "Revision and Synopsis," p. 64, pl. viii. These structural characters have suggested a difficulty. I received from Finland both *L. subcentralis* and *borealis*, under the latter name, as determined from my figures. The suggestion was significant, although not intended. There is great structural affinity between *subcentralis* and *borealis*. Yet, no one seeing the two insects side by side, would, I think, venture to suggest specific identity. Nevertheless, it is convenient that *subcentralis* be removed from its immediate local position as regards *lunatus*, and be placed close to *borealis*, and such a position will be given to it in the Systematic Catalogue at the end of my work.

The name "*subcentralis*" is not altogether new to us. It appeared in vol. ii of this magazine, p. 158 (December, 1865), but erroneously, as is indicated at p. 183 of the same volume (January, 1866).

L. subcentralis is liable to be mistaken for *L. lunatus* by markings; it has proved itself liable to be mistaken for *L. borealis* by structure. It is a much narrower insect than the latter, and I do not think it possible there can be any specific connection; yet there is undoubtedly close affinity.—R. McLACHLAN, Lewisham: April, 1880.

Notes on two British Trichopterous insects.—Having on three or four occasions found *Anabolia nervosa* deviate from its habit of "not flying till it is quite dark" (Revis. and Synopsis, p. 103), it seems right I should give some account thereof. As the strangest deviation occurred only once, many years ago, I should not be justified in hoping to repeat the observation now, in the fag end of life; I, therefore, give you my experience for what it is worth.

In October, 1858 or 1859, in a meadow a few yards from Langherne Brook, Hallow, early in the afternoon of a fine day, I saw some twenty specimens of this insect flying to and fro beneath the boughs of two or three young ash trees in a hedge row, at a height of one to eight feet from the grass. I caught some half-dozen specimens, which remained the only representatives of the species in my collection till within the last ten years, when they were replaced by fresh specimens.

In 1871, I saw a specimen flying by day, which was caught and kept.

In 1875, I again caught a specimen flying by day.

Last autumn, I was by the river Teme, on a fine but slightly hazy day, when I saw three specimens flying, between noon and 2 o'clock.

In all but the first mentioned instance, the specimens flew singly, and seemingly only for change of resting place. The day in every case was calm, and there were no visible disturbing influences at work, my collecting at the time being conducted quietly, by watching and observation.

I met with many specimens of *Chætopteryx villosa* last autumn, by sweeping bushes and herbage, and by observing them sitting *in copulâ* on leaves, chiefly of alder; they sat quite exposed on the upper-side of the leaf, indifferent to the full daylight and to enemies (if they have any but man).—J. E. FLETCHER, Happy Land, Worcester: 30th March, 1880.

Abundance of Nematus ribesii in 1880.—With the beginning of the second third of this month *Nematus ribesii* appeared in immense numbers. On the 13th, I killed fifty ♀ in half an hour (all the time I could spare), yet there seemed no diminution of their numbers.—*Id.*

Effect of sudden change of temperature upon hive-bees.—On taking a walk yesterday afternoon, up towards the Merrow Downs, I found the roadway strewed with what seemed to me dead bees; thinking the circumstance of interest, I put a few into a pill-box to examine at leisure, but no sooner was I within doors, than the increase of temperature caused the bees to come to life again.

I have often observed this temporary torpor in *Hymenoptera* before on this elevated tract of Chalk Hill, but at the present moment it appears to furnish an instructive illustration of the sudden change of temperature, and fall in the thermometer, ushered in by April, after the warm March suns. Thinking the subject of interest, I enclose the editors of the Ent. Mo. Mag. a few of the sufferers in an alive and dead state.—A. H. SWINTON, Binfield House, Waterden Road, Guildford : April 12th, 1880.

Gastrodes abietis in Worcestershire.—Mr. Norman's notes on this insect having attracted my attention, I venture to give an account of the little I know of it here. In the early spring of the year 1857 it was common on *Abies excelsa*, at Peg-house Wood; but, as that place has long been closed against collectors, I have not obtained it there since. In March last, I beat two specimens from spruces at Old Hills, and obtained three others from cones of the same tree at Stanbrook.

I have eight specimens of the first lot, which I shall be glad to give to any one requiring the species.—J. E. FLETCHER, Happy Land, Worcester : April 14th, 1880.

Review.

NOTES OF OBSERVATIONS ON INJURIOUS INSECTS. Report, 1879. By E. A. ORMEROD ; pp. 44. London, W. Swan Sonnenschein and Allen, 1880, 8vo.

Miss Ormerod and her assistants have continued their useful task of recording the amount of damage occasioned by various injurious insects, and the present Report is considerably more bulky than those preceding it. A large amount of useful information has been collected, especially interesting in connection with the weather of 1879. It was a season remarkable for the paucity of most insects, and yet it must have been noticed by even the least-observant that a few specially noxious species were pre-eminently destructive. We consider this to a large extent due to the fact that the vital energy of the plants was lowered by the meteorological conditions, and that the same numerical abundance of their insect enemies would not have caused an equal amount of damage in an ordinary season, and would not then have been so noticeable. We throw out this suggestion as exemplifying the principle we have always held, viz., that the damage occasioned by insects is usually in proportion to the condition of the plant, vigorous health in the latter often successfully combatting the action of the former. 1879 was a season in which we think market-gardeners might have advantageously tested the value of the much-vaunted "Paris-green," especially with regard to the pre-eminently abundant

celery-fly, which, to our knowledge, rendered acres of celery fields of no value. It is possible the judicious application of a *preservative* at a critical moment might have saved much of the crop. A few words as to prevention and cure. We have little faith in the possibility of the latter, because absolute concerted action over a large district cannot be obtained, and without it all attempts are useless; the former should be regarded as the main object to be held in view.

Obituary.

Samuel Constant Snellen van Vollenhoven, the worthy successor of De Haan, as Director of the Entomological portion of the Royal Museum of Natural History, Leyden, departed this life on the 22nd of March, 1880.

He was born at Rotterdam on the 18th of October, 1816, and was consequently in his 64th year at the time of his decease. The last letter received from him by the writer was written at the end of December last, in which he complained that he was "miserably sick and ill," his illness being caused by "nothing else than the natural influence of the detestable weather of this month."

To entomologists who did not know Vollenhoven personally, it must suffice to say that his was of a most genial disposition, ever ready to assist the student, and whose loss in Holland it seems almost impossible to replace. The portrait of him, published in the Transactions of the Dutch Entomological Society, although a tolerable resemblance, gives no idea of the pleasant expression of his features.

The large collections of insects which from time to time have arrived at the Leyden Museum from the possessions of the Dutch government in the Eastern Ocean, enabled Vollenhoven to continue the work commenced by De Haan, on the *Crustacea* and *Papilionidæ*, in a series of "Essais d'une faune entomologique de l'archipel Indo-Néerlandais," one of which, on the sub-family *Pierides*, with 7 plates,* he dedicated to the unworthy writer hereof. Two other of these "Essais" were devoted to the Hemipterous sub-families *Scutellerides* (1863) and *Pentatomides* (1868), each with four coloured plates.

The insects of the Order *Hemiptera* were indeed especial favourites with Vollenhoven, who published, in 1878, a fine volume, entitled, "Hemiptera-Heteroptera Neerlandica," with 22 plates, 8vo, 'S Gravenhage, containing descriptions of all the species which have been found in Holland; and, in his last letter to the writer, he stated that he was engaged in preparing a Memoir on some *Hemiptera*, having received a large series of insects from M. Lansberge, which he was then engaged in arranging. But it will be by his Memoirs on the transformations of different species of saw-flies (*Tenthredinidæ*) that Vollenhoven will be best known in England: the text of these very careful and excellently illustrated life-histories having from time to time been translated by Mr. May (whom the writer had the pleasure of first meeting at the house of Vollenhoven, in Leyden), and published in the "Zoologist," of Edward Newman.

The *Ichneumonidæ* were also carefully studied by Vollenhoven; and, besides his "Schetsen ten gebruik bij de Studie der Hymenoptera" (a series of extremely useful plates, containing outline figures of all the modern genera of the Linnean *Ichneumones*, including the *minuti*), he undertook an extensive work, with the title of

* Published in large 4to, by Martinus Nijhoff, La Haye, 1865.

"Pinacographia: Illustrations of more than 1000 species of North-West European Ichneumonidæ, sensu Linnaeano," of which eight parts in large 4to have appeared, with 40 plates, each containing from 8 to 12 insects, so that nearly half the work has been published. The figures are beautifully drawn, the chief part being magnified. A separate Memoir on certain exotic species of *Ichneumonidæ*, also from his pen, recently appeared in the Stettin. ent. Zeitung.

English Lepidopterists ought also to be grateful to the memory of the deceased for the continuation of Sepp's great work on the *Lepidoptera* of Holland. A second series of this work, with 150 coloured plates, containing beautiful illustrations of the transformations of Dutch species of butterflies and moths, having already appeared,

He also published a list, with descriptions, of the new species of insects collected in Madagascar by M. Pollen, in the great work undertaken by that traveller.

Vollenhoven was one of the editors of the *Tijdschrift voor Entomologie*, published by the Dutch Entomological Society, to which publication he contributed numerous Memoirs, for the most part illustrated by his own pencil.

Enough has been said to prove that Vollenhoven was an entomologist in the truest sense of the word.

His last letter to the writer concluded with the words, "Vale ac me semper inter amicos habe,"—but

"Friend after friend departs: who hath not lost a friend?"

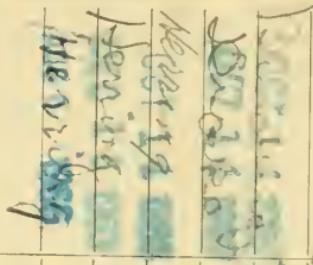
—I. O. W., Oxford: 1st April, 1880.

E. A. Hellmuth von Kiesenwetter.—This celebrated Saxon entomologist died recently at Dresden, at the age of 60, he having been born in 1820. The first notice of any published article by him dates as far back as 1842, in which year he communicated a paper to the Stettiner entomologische Zeitung on a species of *Colymbetes*. In the same Journal, and in the Berliner entomologische Zeitschrift, are very numerous memoirs from his pen, chiefly on *Coleoptera*, and especially on the groups of that Order at which he more particularly worked, and also giving the entomological results of many and varied excursions in different parts of Europe, and more especially in mountainous districts. Notably a Coleopterist, he yet did not by any means confine his attention to beetles, as the list of his published papers shews. Apart from his separate papers, his memory will always be respected in connection with the "Naturgeschichte der Insecten Deutschlands," only the Coleopterous portion (and that incomplete) of which has yet appeared. He undertook the Malacoferms, and two volumes on that division have been published, at long intervals—the last in 1877.

All his works have successfully stood the test of criticism, which time only can render justifiable on such subjects. He was a conscientious labourer in the field of natural science—would that there were more Kiesenwetters in these days of machine-work in Entomology!

In his native kingdom of Saxony, he will be long missed, not only as an entomologist, and a prominent one, but also privately, and officially, as one of the King's Privy-Councillors. He has died before completing his part of the great work on which he was engaged. Let us hope some one will be found to succeed him.

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