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# The Canadian Entomologist.

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## THE PICKLED FRUIT FLY—*DROSOPHILA* *AMPELOPHILA*, LOEW.

BY G. J. BOWLES, MONTREAL.

In August, 1879, I met with a small Dipterous fly, *Drosophila ampelophila* Loew, in considerable numbers, and as the subject is of interest to entomologists, I give the result of my observations. I have to

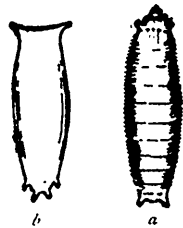


Fig. 10.—*Drosophila ampelophila*: Fly and Wing.  
Magnified 10 diameters.

Fig. 11.—*Drosophila ampelophila*:  
a, Larva; b, Pupa. Magnified 7 diameters.

thank Professor Hagen, of Cambridge, for the determination of the species and other information, and also Professor Lintner, of Albany, for a copy of his article in the "Country Gentleman" of 1st Jan'y, 1880, on this insect, and from which I have largely drawn.

With regard to the genus, Professor Lintner says: "Twenty-five North American species of *Drosophila* are catalogued, which have all, with the exception of three species common to Europe and America, been described by Dr. Loew, the distinguished Prussian Dipterist, and Mr. Walker, of the British Museum. They have not been studied by our American entomologists, and consequently nothing is known of their habits. I find no reference to a single determined species by any of our writers." In the "American Naturalist," vol. 2, page 641, an unknown species of *Drosophila* is noticed as infesting apples, preferring the earlier varieties. The larvæ penetrate the interior of the apple in every direction, and if there are several working together, render it quite unfit for use.

Dr. Packard, in his "Guide," page 415, figures an unknown species as the "Apple Fly," which is believed to be the above species. Mr. Walsh in vol. 2 of the "Practical Entomologist," also gives a brief notice of a larva supposed to be that of a species of *Drosophila*, and which also were injurious to an apple crop in Vermont to the extent of about half its value, by boring the fruit in every direction.

Professor Lintner further says: "The different species of *Drosophila* vary considerably in their habits, as we learn from European writers; and, indeed, the same species seems often to occur under apparently quite different conditions. The larvæ of the European *D. cellaris* occur in fermented liquids in cellars, as wine, cider, vinegar and beer, and also in decayed potatoes. *D. acetii* Kol. infests decayed fruits. Its larvæ occupy about eight weeks in attaining their growth, and their pupal state lasts for ten or twelve days. The flies appear in May and June. *D. funebris* has been reared from pupa taken from mushrooms. It is sometimes known as the vinegar fly. Another European species, *D. flava*, is stated by Curtis to mine the leaves of turnips, raising blister-like elevations on their upper surface."

The present species, *D. ampelophila*, is described by Loew in his *Centuria Secunda* (Dipt. Amer. Sept. indigena), No. 99, page 101. It is exceedingly common (Professor Hagen states) in the southern parts of Middle Europe and in Southern Africa, but the only localities given for it in America, in Loew and Osten Sacken's Catalogue, are the District of Columbia and Cuba. Professor Lintner, however, has bred it in New York; it also occurs in Pennsylvania, and now Montreal must be added to the list. I also think, from observations made in Quebec, that it, or an allied species, is found there. At any rate, this immense area of distribution for such an insignificant insect is very remarkable.

Like the other species of this genus, and so many other dipterous insects, the larva of *ampelophila* feeds on decaying or fermenting vegetable matter. Professor Lintner bred it from pickled plums; in Pennsylvania it fed on decaying peaches, and I found it in pickled raspberries. An earthenware jar had been nearly filled with this fruit and vinegar, prepared by the good housewife for the purpose of making that favorite drink (in Canada at least) called raspberry vinegar. On opening the jar about ten days afterwards (16th August, 1879) it was found to be swarming with the larvæ and cocoons of the insect. Hundreds of the larvæ were crawling on the sides of the jar and the under side of the cover, while pupæ were

found abundantly, singly and in clusters, particularly where the cover touched the top of the jar. The short time required for the production of so many individuals was surprising. I half filled a covered tumbler with the pickled raspberries and larvæ, and they continued to produce flies for several weeks. I regret not having more attentively observed the exact time required for the different stages, and can only say that its growth from the egg must be very rapid, and its pupal state does not last longer than ten or twelve days.

The larvæ, when full grown, are nearly one-fourth of an inch long, somewhat tapering towards the head, which is small; and are sparsely covered with minute hairs, particularly on the divisions of the segments. They have no feet, but can travel quite rapidly on glass, seeming to retain their hold by a glutinous condition of the skin, and moving by extending and contracting their bodies. They seemed to exist with ease either in the vinegar or the air, moving through the former in search of food, and sometimes coming out of it, and either resting or moving about on the glass sides of the vessel. Their bodies were quite transparent, and under the microscope their internal organs could easily be seen. At both ends of their bodies are curious projections or tubercles, which are also seen in the pupa.

The puparium is about three-sixteenth inch long, oval in shape, and yellowish brown in color, with the tubercles at head and tail before referred to.

The fly measures about one-eighth of an inch in length, with a large rounded thorax, long legs, and broad iridescent wings. The whole insect is yellowish in color, and very hairy, even to the proboscis. Some of the hairs on the head bear three or four branches. The wing forms a very beautiful object for the microscope.

Last year the flies were attracted to some raspberry wine in process of fermentation, hovering about the jars and alighting upon the corks, evidently seeking for an opening through which they might pass to lay their eggs. It is doubtless in this way that fruit is attacked by this or some allied species. The minute fly effects an entrance beneath a not closely-fitting lid, and deposits its eggs on the fruit, or upon the side of the jar, whence the young larvæ make their way to the fruit, or find their sustenance in the liquid.

During the past summer I was desirous of again testing the matter. A few raspberries, with a small quantity of vinegar, placed in a pickle

bottle with a loose cover, were quite sufficient. A fortnight afterwards, a number of larvæ were seen in the bottle, and several pupæ were attached to its sides. Absence from home, however, interfered with the carrying out of the experiment. It could easily be tried this season by some of our entomologists, and the time required for the transformations of this curious fly be determined, as well as the further extent of its distribution.

The outline drawings were made under the microscope, and give a fair idea of the insect. Every part of the fly is covered with hairs of different lengths, as indicated in the figure. The branched hair on the head is faithfully copied from a specimen, but in others it was not so largely developed. The wings are beautifully edged with hairs, and the membrane is also studded with them. The fly was drawn in the position given, so as to show its extremely long legs, and the curious shape of the thorax and abdomen.

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REMARKS ON AGONODERUS COMMA FAB., PALLIPES FAB.,  
RUGICOLLIS I. EC., AND TACHYCELLUS (*Bradycellus*)  
ATRIMEDIUS SAY.

BY JOHN HAMILTON, ALLEGHENY, PA.

Experience in exchanging Coleoptera shows that the first two and the last of these forms are greatly confused in collections. Their appearances are so similar as easily to deceive, and they are only to be separated by a close observance of two or three characters. *Comma* and *atrimedius* are abundant here, and *pallipes* is not rare. *Comma* and *pallipes* are usually confounded, the former being labelled *pallipes*; and *atrimedius* is often marked *pallipes* also. The typical *comma* has a black vitta on each elytron extending from the first to the fifth stria, which does not reach the apex, and may be more or less abbreviated anteriorly. The vitta on each elytron is therefore separated by a yellow suture. The scutellar stria is *long*. The typical *pallipes* has a broad black vitta on the disk of the elytra extending from the fourth stria on one side to the same on the other, and not separated by a yellow suture. It does not reach the apex and may be abbreviated in front, in which case it is narrowed towards the scutellum. The scutellar stria is *short*. The thoracic characters are

omitted here, being so inconstant as to be of no diagnostic value. Had all the specimens of each species the typical coloration as given, recognition by this character would be easy; but the extent of variation is so great as to render it absolutely useless. While I have not yet seen a specimen of *comma* without the yellow suture, many specimens of *pallipes* occur with it where the broad elytral vitta is abbreviated and disintegrated so as to form a short, narrow vitta on each side. The vitta of *comma* is similarly reduced, and the separation by color becomes impossible. In other specimens of each the colors are so suffused and blended as to present no typical characters.

The length of the scutellar striæ, then, is the only character to be relied on for separation. That of *comma* is said to be *long*; that of *pallipes*, *short*. Neglect to define the relative lengths, no doubt, gives rise to the confusion where the two species do not inhabit together, and material is not at hand for comparison.

In *pallipes* this stria may be termed rudimentary. The examination of near one hundred specimens shows it to be merely basal, and not to extend notably along the plane of the elytron behind the commencement of the declivity, while in *comma* it is quite conspicuous, and about half a line in length.

*Rugicollis* is Californian. The scutellar stria is as in *pallipes*. The typical specimens have a short black vitta on each elytron from before the middle backwards, and occupying the 2nd, 3rd and 4th striæ. Specimens of *pallipes* occur with exactly the same marking. Apart from a certain microscopic rugosity of the thorax, and a little less convexity of the elytral interstices, both of which may be evanescent in a large series, I see nothing to distinguish them, except locality.

*Tachycellus* (*E-rachycellus*) *atrime dius*.—Many individuals of this species simulate in the form of the thorax and in coloration of the elytra specimens of the foregoing. The scutellar stria is as in *pallipes*. This at once distinguishes it from *comma*. Besides the generic character of the mentum, the antennæ and hind tarsi separate it from *pallipes* readily. The three basal joints of the antennæ are *glabrous*, and the tarsi are *long* and *narrow*, the first joint being one-half longer than the second. In *pallipes*, etc., the same tarsi are short, the joints broad and hairy. The typical *atrime dius* has the hind angles of the thorax sharply rectangular, but in many specimens they are considerably obtuse, and the four species

approximate so closely in this respect in individuals that this character fails.

The above forms can all be very satisfactorily determined where they depart from typical marks, by the observance of the above characters, which may be thus stated :

Hind tarsi *short*, joints not longer than wide.

Scutellar striæ *long*. *Comma*.

“ *short*. *Pallipes*.

“ “ Thorax usually finely rugose (California). *Rugicollis*.

Hind tarsi *long*, joints narrow, first *one-half* longer than second.

Scutellar striæ short. Three basal joints of antennæ *glabrous*.

*Tachycellus atrimediis*.

This paper is not intended to touch on the question of whether the three first mentioned are species, or at most, varieties. Say did not separate *pallipes* and *comma*; the species now recognized as *comma* he describes by the former name, and his variety B is the true *pallipes* Fab., according to the bibliography.

The American Entomologist, vol. iii., p. 154, states, as the opinion of Dr. G. H. Horn, that *comma* and *rugicollis* are synonymous with *pallipes*.

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## NORTH AMERICAN GEOMETRIDÆ.

BY A. R. GROTE.

I have indicated in this short paper where the types of my Geometrid species are to be found, to the best of my knowledge, and I have given such additional information as I am possessed of with regard to the species. I have followed the classification of Dr. Packard, except in a few instances where I have found reasons to prefer other names. I refer to my paper, Can. Ent., 8, 152, for a review of the synonymy of certain species. Two species, one described by Dr. Harvey (viz., *Endropia Warneri*), have been re-named by Dr. Packard, who calls Dr. Harvey's species *Apiciaria*. As to whether we must put the terminations *aria* and *ata* (accordingly as the ♂ antennæ are pectinate or not) I cannot attempt to decide. I think it is advisable to bear this rule in mind when naming

species, but I would not change therefore any names already in use. Especially do I think it unadvisable to place the termination after a proper name. I should call the *Endropia*, *E. Warneri*, not *E. Warneraria*.

To the following names of our species the reference to the plate is given where they have been figured. The type of *Eutrappela* is the European *Lunaria*. I would therefore retain Guenee's name *Choerodes* for the genus of which *Transversata* is the type. With this, our highest Geometrid, I would commence the family. Dr. Packard begins with the lowest genera. The Brooklyn "Check List" is, in the main, a transcription of Packard, and, in this family, reverses its ordinary procedure, which is to commence with the supposed highest genera and end with the lowest.

*Tetracis Lorata* Gr. Proc. Ent. Soc. Phil., 3, 91, 1864.

This is a well known insect, the most simply marked and delicately colored of the genus, and also one of our largest species. The larva is described by Mr. Goodell, Can. Ent. 9, 62. It was found on the Sweet Fern (*Comptonia Asplenifolia*). The moth is figured in Dr. Packard's Monograph. Unless the types are in the Philadelphia collection, I do not know where they now are, the species being described so long (eighteen years) ago. It is of little consequence, as there is no doubt about it.

*Tetracis Coloradaria* G. & R., Ann. N. Y. Lyc. Nat. Hist., vol. 8, 1767, pl. 2, fig. 11, ♀.

Dr. Packard figures the ♂, plate 12, fig. 47, and refers the moth to *Tetracis*. The original figure is colored. The type may be in the Central Park collection, and is then probably injured, as the "Grote & Robinson" collection, deposited there, has had little attention. There is no doubt as to the species, which is not rare in Western collections.

*Drepanodes Puber* G. & R., Ann. N. Y. Lyc. N. Hist., vol. 8, 1867, pl. 1, fig. 1, ♂.

The original figure is colored. The type in my collection. Dr. Packard keeps our name, but the Brooklyn Check List puts *aria* after it quite unnecessarily. Dr. Packard figures the ♂, plate 12, fig. 35. I do not know the female.

*Drepanodes Sesquilinea* Grote.

Dr. Packard figures the ♂ under the name *varus*, plate 12, fig. 36.



The ♂ type is in my collection from Alabama. Dr. Packard says: "A careful examination convinces me that the males which I had heretofore regarded as distinct from *varus* (labelled *sesquilinea* by Mr. Grote) are really the males of *D. varus*, of which heretofore we have only had the females."

*Drepanodes Varus* G. & R., Ann. N. Y. Lyc. N. Hist., plate 15 A, fig. 2, ♀.

The type, with that of *aquosus*, was not returned by Dr. Packard to my recollection. The original figures of both are colored. They are regarded as forms of one species by Dr. Packard, who refers his *Funiperaria* as synonymous. I have little doubt that Dr. Packard is entirely correct and that we have to do with a single variable species, which Dr. Packard calls *Varus*, and which has received four names. The Brooklyn "Check List" calls the species "Varia," which is entirely inaccurate, the two words being quite distinct.

*Endropia Vinosaria* G. & R. Ann. N. Y. Lyc., pl. 15 A, fig. 4.

Identified by Dr. Packard with Mr. Walker's *Madusaria* and *Oponearia*; probably also described by him as *Astylusaria*. We had previously published the same facts, Tr. Am. Ent. Soc. 1868, p. 15, after our visit to the British Museum.

*Endropia Arefactaria* G. & R., Ann. N. Y. Lyc., pl. 15 A, fig. 7.

Larger than *Amoenaria*, of which in the Philadelphia collection I determined specimens. Considered the same by Dr. Packard. I am of the opinion that it is a variety, but not strictly the same as Gueneé's species, which is smaller and brighter. I do not think that Dr. Packard has seen the exact equivalent of Gueneé's species because (as I recollect) the Philadelphia specimens agreed fairly with his figure, while Dr. Packard says his material does not agree with Gueneé's figure, but perfectly with his description. Dr. Packard's figure is *Arefactaria*, agreeing with ours.

*Ellopia Bibularia* G. & R., Ann. N. Y. Lyc., pl. 15 A, fig 8, ♂.

*Ellopia Pellucidaria* G. & R., Ann. N. Y. Lyc., pl. 15 A, fig. 9, ♀.

Identified as sexes of one variable species by Dr. Packard and as previously described by Walker as *Ellopia seminudaria*. Dr. Packard says: "If I had had Mr. Grote's types alone of *bibularia* ♂ and *pellucidaria* ♀, I should have regarded them as distinct; but with the addition of other specimens of both sexes, I have felt compelled to unite them."

Our figures were colored and give a good idea of the species. I have not seen the types since they were sent to Dr. Packard; but they are now of relatively little importance.

*Ellopia Endropiaria* G. & R., Ann. N. Y. Lyc. N. H., pl. 15 A, fig. 10, ♀.

This distinctly colored species may be known by the greater number of transverse lines and the strong angulation of the hind wings. Our figure is colored. The type may be in the Central Park collection. There can be no confusion as to the species.

*Eucaterva Variaria* Grote.

This insect seems allied to *Caterva Catenaria*. The long linear black and white palpi, shorter in the female, are peculiar. It has the appearance of a *Cleoria*. Black and white. The male has a curved extra-basal and a straight outer median blackish band, and discal mark on fore wings. Ground white. The females are of two sorts; one white with sparse black dots over costa at base and collar, and along external margin, and singly elsewhere; the other has the middle of the wing dead black. Fringe spotted. Body white. Hind wings white, dotted or irrorate. Beneath the same. Collected in Arizona; collection of Mr. B. Neumoegen, who has a magnificent collection of *Lepidoptera*, in many respects the finest private collection I have had the opportunity to look over. The European genus *Zerene* does not occur in our fauna.

*Chloraspilates Arizonaria* Grote.

I have relied on the pale antennal stem, the minute annular discal marks and the obsolete t. p. line, to separate these from the Texan material described by Dr. Packard. Collection of Mr. B. Neumoegen. I am surprised that neither this genus nor *Stenaspilates* are acknowledged by the Brooklyn "Check List." They have many exclusive characters.

*Plagodis*.

Two species differ by the wider wings being fuller at external margin without the lower excision; the margin is angulate at the middle. In *P. Floscularia*, the short, broad palpi do not exceed the front. The male antennæ are stoutly bipectinate. The front is rather broad and subquadrate between the naked eyes. The tibiæ are not swollen. The hind wings are rounded and wide. In the shape of the fore wings there is a resemblance to *Antepione*, but they are sharper at apices, and, above all,

longer in this, not unlike typical *Plagodis*. *Floscularia* is of a brilliant yellow color, without inner line on fore wings; the outer line vague, nearly straight. There is an apical red-brown dot; the outer line red-brown on costa, followed by a pinkish-violet patch at internal angle. Hind wings concolorous, hardly paler yellow with linear patch at anal angle. A tender pinkish-violet shade on costa of fore wings above; at base marked costally with dark brown. Body yellow; face pinkish. Venter reddish-pink. Beneath also yellow with markings repeated. The ♀ type of *Floscularia* is in the collection of Mr. G. R. Pilate.

*Plagodis Rosaria* G. & R.

This species is figured by Dr. Packard as the *Epione Serinaria* of Gueneé, and referred to *Plagodis*. Our name for the insect was distributed now many years ago. One unset and somewhat defective type in my collection. Others must be in Central Park or in collections of correspondents. The species was named by us in 1867 or thereabouts. This insect is ochrey yellow and purely pink, not lilac or violet tinted, and without the red apical mark of *Floscularia*.

*Nematocampa Expunctaria* Grote.

Dr. Packard refers this to *Filamentaria*, without knowing my type from Alabama. This type is either in Philadelphia or in the Peabody Museum, Salem, to the best of my recollection. The texture of the wings seemed to me different, less smooth, closer and heavier than its ally. It appeared to me a decidedly distinct and a little larger species. I believe when the type is examined that it will be found a different species from *Filamentaria*, but as I have not met it again, I am unable to add anything to my original description, CAN. ENT., iv., 101, 1872.

*Heliomata* Grote.

Of the three lovely species belonging to this genus, *Infulata* and *Cycladata* are figured by Dr. Packard, and I have seen several specimens of them since originally figuring and describing them in the "Proceedings of the Entomological Society of Philadelphia." But the third, *Elaborata*, I have not seen again. The type is, I believe, in Philadelphia; I think my figure and description will serve to identify the species. The species of this genus are probably more or less active by day. They seem to be quite rare, for I have seldom met them in collections. I think I have seen *Cycladata* oftener than its ally. I have never been fortunate enough to find them myself.

*Byssodes Obrussata* Grote.

I have followed M. Gueneé's terminations in this tropical genus. Our Florida species seems allied to *Paradoxata*, but Gueneé does not mention the basal ochre metal-margined line; the third band at the middle is not marked with a "cellular spot" and I should not call the wings "narrow and elongated"; our species is also larger. There seems to be a number of species very similar; and, perhaps, geographical races rather than species. With *Rachecospila cupedinaria*, this species from Indian River shows that the *Geometridæ* of South Florida are allied to those of the West Indies. The same fact is exhibited by the representatives of other families of Lepidoptera.

## A PHYSIOLOGICAL ARRANGEMENT OF INSECTS.

BY A. H. SWINTON, GUILDFORD, ENGLAND.

Extracted from *The Entomologist*, vol. xi., p. 255; and *Yorkshire Naturalist*, vol. vii., p. 45; with author's revision.

Having in times gone by perused with interest certain essays from the pen of the late Edward Newman on the subject of a true or physiological arrangement of Insecta, may I now be allowed to call attention to the additional evidence adducible from the recent investigations of their organs of sensation, a matter I had lately the honor of placing before public attention in my book, *Insect Variety*.

Viewed in this new light, the presence of auditory organs and well-developed eyes place the Orthoptera first in this list; and these would be followed by a group of the Homoptera, the *Cicadidæ*, where we find the auditory organs are highly developed, but sight less potent. Next to these appear to come Lepidoptera, where the *Nocturni* stand first as having well-defined auditory organs, and the *Diurni* second from reason of their excellent optic organs. Then would follow Coleoptera, which as far as Europe is concerned, certainly give evidence of possessing auditory apparatuses in two of their groups, the *Lamellicornia* and *Longicornia*, although in the latter the visual organs are imperfect. As far as I can learn, the species of Hymenoptera, Neuroptera and Diptera, have the

auditory sense, if present, much less potent ; but sight, smell and touch are evident and variously developed. This perfectly harmonizes with Newman's circular view, given in the *Entomologist*, vol. iv., p. 236.

Next, it has been a long standing practice with the authors of works on British Butterflies to treat of the five groups represented in these islands in the following order : *Papilionidæ*, *Nymphalidæ*, *Erycinidæ*, *Lycænidæ* and *Hesperidæ* ; but since the first family has close affinity with the last, according to Dr. Scudder and others, the method is only plausible on the principle of extremes meeting ; the better arrangement every way being this, *Nymphalidæ*, *Erycinidæ*, *Lycænidæ*, *Papilionidæ* and *Hesperidæ*. Then if physiological reasons could ever be got to prevail over the fancy for having the butterflies first, I would likewise suggest a further arrangement of five groups of moths, showing the development of that structure at the base of the abdomen I attribute with the faculty of hearing, the highest of insect senses, thus : *Nectuina*, *Bombycina*, *Geometrina* and *Sphingina*. Between the *Geometrina* and *Sphingina* come as I consider the butterflies, springing from either group in the species of *Urania* and the *Hesperidæ* respectively. At the best, however, must it appear that any such linear system is to be inferior to the Darwinian method of a theoretical descent, for if lines are not to meet somewhere, what can be made out of case-bearing *Bombycina*, and case-bearing *Tineina* that harmonize like the species of *Incurvaria* ; and why is our ghost moth such a strange anomaly ? One warm, still evening at the commencement of July, 1881, wandering out butterfly net in hand to watch for the comet to appear over our chalk hill, I came on a spot where an elder bush stood clearly defined against the full harvest moon, over whose ivory blossoms several males of this moth were dancing sideways, little fans full of whimsicality glowing in the dusk like whiting on the hook or calico caught by the sunshine. It was a beautiful and saintly apparition, that held me long before courage was mustered sufficient to catch a couple for the cabinet. Two ghosts however were eventually boxed, and as I spread these out on the setting board I became much struck by the circumstance how little they gave me the idea of a moth, and how little they harmonized with the moths of the group to which they are accredited. Their four wings all alike, wanting the hook and eye to link them, suggested most those of a dragon-fly, and seemed to point to a greater development of the mesothoracic muscles to sustain their increased exertion. Their expansile fans on their hinder femora, and their subterranean larvæ, brought one back to the owl moths

of the Brazils and the red under wings of the genus *Catocala*; which in their great wing expanse, semi-looping caterpillars, and scent pencils, bridge over the gap between the *Noctuina* and *Geometrina*. Yet as their wings want the *hook*, so do their fans want the *pouch* that conceals them in these moths. Indeed the ghost moths, and the family of the *Hepialidae* to which they belong, want so many of those characters that characterize lepidoptera, that one is led on to the supposition that their progenitors never acquired them; and they belong to an older race, that in time past has disseminated itself from Europe to the antipodes of the Maories. Other races, as the species of *Psychidae* and *Coleophora*, whose distribution is equally great, are in their economy scarcely indeed less curious; and the worm-like females of the first, sitting on their caddis-cases composed of straws, bring us very low down indeed in the scale of insect organization and adaptation, while they seem at the same time to transport us back in geological time.

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#### ENTOMOLOGY FOR BEGINNERS.

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#### *THE GREAT LEOPARD MOTH—Epantheria scribonia* Stoll.

BY THE EDITOR.

The larva of this insect is comparatively abundant in the autumn throughout most of the Northern United States and in many parts of Canada. It is found feeding on various species of plants, but most commonly on the wild Sunflower, *Helianthus decapetalus*. It is about two and a half inches long, with a shining black head shaded with reddish on the sides, and a brownish black body. Each segment has an irregular transverse row of tubercles from which spring tufts of rigid shining black hairs, while the spaces between each segment from the fourth to the tenth inclusive are banded with red, the bands being widest and most conspicuous from the sixth to the ninth inclusive. These bands are a striking feature in the appearance of the caterpillar, especially when it is coiled up as shown in figure 12 (after Riley). The color of the under side varies

from reddish to yellowish brown, feet reddish, prolegs brown, thickly clothed with short hairs.

This larva attains its full growth in the autumn and hibernates during the winter under logs, the loose bark of decaying trees, or other suitable hiding places. By the genial warmth of spring it is aroused from its torpid condition and feeds for a few days upon grass, or almost any other green thing it may meet with. It then constructs a loose cocoon, within which it enters the chrysalis state.

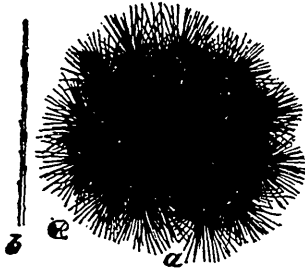


Fig. 12.

extremity, which is tipped with a few bristles.

The chrysalis is black with a beautiful bloom on its surface, which is easily rubbed off; it has a flattened projection at its hinder

After remaining about a fortnight in the pupa state, it appears as a unique and very beautiful moth. In figure 13 (after Riley) *a* represents

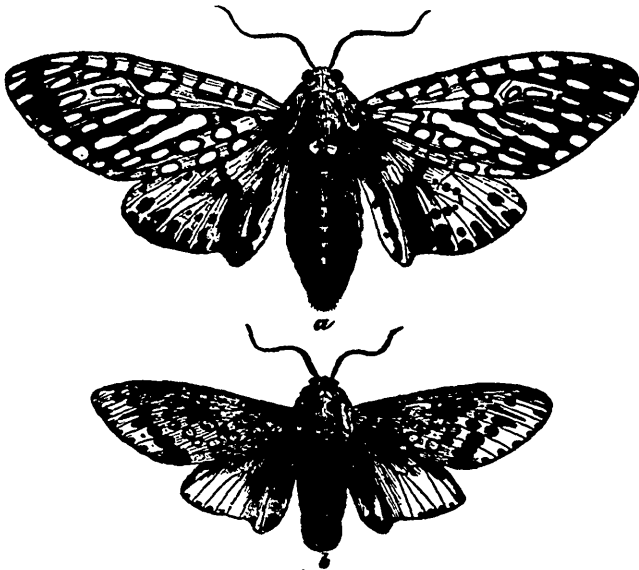


Fig. 13.

the female, *b* the male. The wings are white, ringed, streaked and spotted with dark brown as shown in the figure. The thorax has ten or twelve

black spots with a bluish white centre ; the upper portion of the body is steel blue, streaked along the middle and sides with yellow or orange ; legs white, ringed with black at the extremities. The male differs from the female mainly in his smaller size and narrower abdomen.

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PROFESSOR FERNALD'S SYNONYMICAL CATALOGUE OF  
NORTH AMERICAN TORTRICIDÆ.

BY A. R. GROTE.

The reader of the CANADIAN ENTOMOLOGIST will recall the first paper on the *Tortricidæ*, by Professor Fernald, who has been kind enough to send me advance sheets of his Catalogue of the Family now being published in Philadelphia.

At the time when Professor Fernald commenced his studies he paid me the compliment of asking my advice as to the group of Lepidoptera he should work upon. In advising him to take the *Tortricidæ*, I was influenced by my belief in his patience and scientific ability. No family of Lepidoptera which I have studied, except perhaps the *Phycidæ*, are as difficult as the *Tortrices*, or call for more diligent examination and careful manipulation. I had been bringing together material for a study of the *Tortricidæ*, and had described a few species and the genus *Phacasiophora*, when Professor Fernald wrote to me. I was thus in a position to be of the slight assistance which Professor Fernald has, I am afraid, overestimated in his original paper alluded to above. But it is difficult to overestimate the importance of Professor Fernald's work and the excellence with which it has been performed. With the valuable aid of Lord Walsingham, Professor Fernald was able to examine personally almost every one of Mr. Walker's types. The types of my friend, the late Mr. C. T. Robinson, had been placed in Professor Fernald's hands before his visit to London, and I had given him all the material brought together by myself, so that no one was in so favorable a position for ascertaining what had been described and what was yet new among our *Tortrices*. Every American paper which I have seen on the family, since that time, has been issued after the material on which it was based had been determined



by Professor Fernald, who is our authority on the *Tortricidæ* without a rival. And this position is not an easy one to gain. The little delicate insects are very variable, and in the genus *Teras*, for instance, they change pattern and colors like a kaleidoscope. The genera, as in the *Deltoids*, *Phycids*, etc., have to be limited by characters offered by the males alone, quite often, and in all cases the entire structure has to be carefully noted in order to locate the species to the best advantage.

All the requirements have been met, and, as a proper conclusion to his labors so far, a breathing place where one can survey the road travelled over, Professor Fernald gives us his very useful *Catalogue*. Having ourselves written a synonymical *Catalogue* of the *Sphingidæ*, we have a lively sense of the work to be performed in a Family yet more numerous in species and more intricate in synonymy. The student can, however, use Prof. Fernald's *Catalogue* with the certainty that it is as accurate as it can be made, and he will be very unappreciative if he feels no gratitude to its accomplished author, who has spared no labor in completing his self-imposed task. Professor Fernald, by his moderate views and careful methods, has proved himself a safe guide; at the same time he has shown himself possessed of talents which carry him easily in the front rank among living Entomologists. It would be well if such proofs as Professor Fernald has offered of knowledge of the subject were demanded of all writers of Lists and Catalogues; but I will not pursue this view of the subject any further, nor burden a proper praise of Professor Fernald with remarks which he is too amiable to sanction.

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## MR. S. H. SCUDDER'S NOMENCLATOR ZOOLOGUS.

BY A. R. GROTE.

Science is much indebted to Mr. Scudder for a great deal of very dry and tiresome work in the preparation of Catalogues. We have already from his pen a list of the generic names used for Butterflies, and now in a thick octavo volume of 376 pages we have a "list of generic names employed in Zoology and Palaeontology to the close of the year 1879, chiefly supplemental to those catalogued by Agassiz and Marschall, or indexed in the Zoological Record."

The list is beautifully and clearly printed and the proof reading has been exceedingly careful. After having gone over a number of names and after spending some hours with the book, I have found but one error of spelling. The labor of compiling the list has been evidently great, and Mr. Scudder speaks of it in terms which shows how arduous it really was. The author was helped by those to whom he applied for lists of the generic names proposed by them, however, and Prof. Marsh went to the trouble of printing the references to his own numerous genera.

The list can hardly be thoroughly tested by any one student, who can only be expected to know his own genera and those of others in his specialty. In the *Noctuidæ* and the Moths generally I find a larger number of omissions than I should have expected. In the Butterflies I find no reference to the genus *Fenisea*, a name used by Mr. Scudder and all who have written on *Tarquinius* since it was proposed. I also find two mistakes which should not have been made. The genus *Euclemensia* is given as = *Hamadryas* of Boisduval, whereas it was proposed for *Hamadryas* of Clemens, preoccupied by Boisduval and Hübner. Also the genus *Copablepharon* is credited wrongly to me, and the original citation for *Argyrophytes* is not given. If these are fair samples of the reliability of the work, it would be wrong to praise it and its usefulness might be considered doubtful. It is probable, however, that the intention was not to give all the genera (as they have not, I think, been all collated out of the books of which Mr. Scudder gives a list), and the mistakes above pointed out may be exceptions. Of this each student will be able to judge, and it would be well for the work to be publicly examined by different scientists and the mistakes pointed out before Mr. Scudder publishes again on the subject.

The error of spelling alluded to above is on page 130, where *Eufitchia* is written *Eufichia*. It will be of course impossible to get all the names, but about twenty-five names proposed for genera of *Lepidoptera* which I looked for, I could not find in the List. These names were published within twenty years up to 1880. This number is very likely less than the real omissions of names for genera in the order *Lepidoptera*. There has been probably too great reliance placed on the contributions of authors, at the expense of personal research. We cannot suppose that there has been any private influence brought to bear on a compilation of this character, but there has been an effort to display very fully the generic names of certain authorities, while the genera proposed by those who have not

written much are apparently neglected. But it is precisely such genera which should be brought together in a work of this kind. A number of genera of which it may with confidence be predicted that they will never come into use, are cited, while genera now in constant use are omitted.

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### BOOK NOTICES.

Bulletin No. 7. Insects Injurious to Forest and Shade Trees, by A. S. Packard, jr., M. D. Issued by the Department of the Interior, U. S. Entomological Commission.; 8vo., pp. 275, with 100 illustrations.

The object of this Bulletin, as stated in the introduction to it, is to give to the public a brief summary of what is up to this time known of the habits and appearance of such insects as are injurious to the more useful kinds of trees. Beginning with the insects injurious to the various species of Oak, the author treats of those which injure the Elm, Hickory, Butternut, Chestnut, Locust, Maple, Poplar, Linden, Birch, Beech, Tulip Tree, Horse Chestnut, Wild Cherry, Ash, Alder, Willow, Pine, Spruce, Balsam, Juniper, Tamarack, Arbor Vitæ, and others. A large proportion of the work is occupied with descriptions of those insects which injure the more important forest trees, such as the Pine and Oak. This is a most useful synopsis of our knowledge in this department, and its issue will no doubt greatly stimulate the progress of Entomology in this practical direction, for while it shows that much has been done in some of the most important departments, in many others our knowledge is extremely scanty. This work is conveniently arranged, and like the other works of this distinguished author, well written in a plain and popular style, and will commend itself to all who are interested in preserving our forests and useful shade trees from destruction by insect foes.

(A Fragment of a) Guide to Practical Work in Elementary Entomology. An outline for the use of students in the Entomological Laboratory of Cornell University, by J. Henry Comstock; 8vo., pp. 35.

This work is divided into two chapters, the first of which treats of the terms denoting the position and direction of parts in insects, the second of the external anatomy of a grasshopper, *Caloptenus femur-rubrum*. A useful guide to all those entering on the study of Entomology.

Tenth Report of the State Entomologist of the Noxious and Beneficial Insects of the State of Illinois, by Cyrus Thomas, Ph. D., 8vo., pp. 244, illustrated with two plates and 79 wood-cuts; containing articles on the Army Worm, *Leucania unipuncta*; a new Corn Insect, *Diabrotica longicornis*; the Relation of Meteorological Conditions to Insect Development; Descriptive Catalogue of Larvæ; the Larvæ of Butterflies and Moths; and the Hessian Fly. This Report contains much that is new in reference to these several subjects, and is a valuable contribution to Entomological literature.

A Bibliography of Fossil Insects, by Samuel H. Scudder, 8vo., pp. 47, being a complete list up to the present time of all known works and papers on fossil insects, arranged in alphabetical order.

Synopsis of the Catocalæ of Illinois, by G. H. French, Carbondale, Ill., containing references to fifty-eight species, followed by instructions for capturing Catocalæ, 8vo., pp. 11, with one wood-cut.

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#### CORRESPONDENCE.

In reply to Mr. John Smith's remarks upon *Capis*, I would state that every student ought to know that in the Deltoids the eyes are always naked, the tibiæ unarmed. It was not necessary to recapitulate characters common to the Group. As I have given a large number of generic descriptions and reviewed in different papers and works the structure of the *Noctuidæ*, for the past twenty years, I think it probable that I gave all the necessary characters, for the moment at least, until the male is discovered, to establish the genus. In the Deltoid *Noctuidæ*, as in the Phycids and Tortricids, sexual structure is of generic value. It is very easy now for Mr. John Smith to have his *Noctuidæ* named, and in response to a private letter from him, I offered to name his material more than a year ago. I am glad he seems to be studying the group, and I shall be happy at any time to name his material and afford him any information in my power. I think if he had applied to me I should have been able to give him the facts as to *Capis* and the Deltoid genera which would have rendered his article unnecessary. For, the structural details mentioned in Mr. John Smith's letter, cited in the paragraph before the last, and for not giving which in connection with *Capis*, I am blamed, are uniform throughout the North American Deltoids so far as I have observed.

A. R. GROTE.

## NOTE ON PAPILIO POLYDAMAS, LINN.

In the Revised Synopsis of Species, commenced in Part 10, Vol. 2, But. N. A., I struck out *Polydamas*, *Villiersii* and *Serion*, for want of authentication. I believe these species have been credited to our fauna on authority of Dr. Boisduval, but if examples of either have been taken within the U. S. during the last twenty-five years, and up to the printing of my Revision, I am not aware of it. However, within the last two months, Dr. Wittfeld, of Indian River, Florida, has taken half a dozen *Polydamas*, one of which he sent me for identification. Although collecting butterflies assiduously for two years past, Dr. Wittfeld had not observed this species before. The larva, according to Boisduval, feeds on *Aristolochia*. *Serion*, Fabr., is a Jamaican species, and is not likely to have been seen in Florida. *Zonaria*, Butler, = *Serion*, Cramer, is Cuban, and may be also Floridian, but until properly authenticated, I should reject it.

## NOTE ON CHIONOBAS TARPEIA, ESPER.

I have recently received from Dr. Staudinger six Siberian examples of this species, showing variation, and am satisfied that I myself have seen nothing American which can be called *Tarpeia*. It resembles on upper side *C. Uhleri*, but differs widely on under side. Mr. Butler, in Cat. Satyr., credits *Tarpeia* to Arctic America, and of course his authority decides that question, as he had the British Museum example before him.

W. H. EDWARDS.

## A NEW VARIETY OF CATOCALÆ.

*Catocala Paleogama* Guen.

N. Var. *Annida*.—The whole of the posterior margin, nearly to the middle, of the primaries brownish black. The terminal space brownish gray with a light shade across the middle. The white marking along the *t. p.* and *t. a.* and subterminal lines very prominent.

In the more common form the whole wing is pale brownish gray, except the reniform and subterminal space, from which this var. may readily be distinguished.

This var. is to *Paleogama* what var. *Evelina* is to *Lachrymosa*.

I have made my description from three male specimens.

D. B. FAGER, Carbondale, Illinois.