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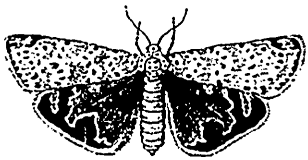
THE CANADIAN

ENTOMOLOGIST.

VOLUME XXV.



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London, Ont.:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

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The Canadian Entomologist.

VOL. XXV. LONDON, JANUARY, 1893. No. 1.

DESCRIPTIONS OF FOUR NEW WEST AFRICAN BUTTERFLIES.

BY W. J. HOLLAND, PH. D., PITTSBURGH, PA.

EURYPHENE, BOISD.

1. E. castanea, sp. nov.

♂. The form of the wings is exactly like that of *Senegalensis*, H.-S. UPPERSIDE.—The ground colour is rich chestnut-brown, marked by broad black series of spots and bands. Upon the primaries these markings are as follows :—In the cell a longitudinal basal streak, a transverse line, a figure 8, a twice curved transverse line, and a broad bar at the end of the cell constricted in the middle; below the cell there is a short basal band curving inwardly; beyond the cell there is a wide band running from the costa toward the outer margin as far as the lower radial, and then abruptly turning and extending to the middle of the inner margin; beyond this is a broad band of diffuse spots, wide on the costa, narrower beyond the end of the cell, and gradually widening as it approaches the inner margin; beyond this is a submarginal series of very black round spots. The outer margin is black. All of these lines are continued upon the secondaries parallel to the outer margin, and in addition there is a narrow, submarginal black line. In the cell of the secondaries there is a round spot at the base, a figure 8, and a constricted annular mark at the end. UNDERSIDE.—The prevalent colour on the underside of the wings is pale fuscous, shading into ashen grey upon the cells of both wings. The markings of the upper surface scarcely reappear upon the lower side, except the submarginal band of round spots, which reappear upon the primaries as faint blackish marks, and upon the secondaries as ocelli with pale ashen margins. In both wings there are in the cell a black basal dot, a figure 8, and a narrow constricted annular mark at the end. In addition, upon the primaries the costa near the base is white, and there are a couple of small white marks at the apex; upon the secondaries there is a narrow white bar extending from near the middle of the costa to the first subcostal nervule.

Expanse 58 mm. Habitat Kangwé, Ogové Valley.

2. *E. suffumigata*, sp. nov.

♀. The form of the wings is like that of *E. eliensis*, Hew. UPPERSIDE.—Both wings are dark smoky-brown, shading into black at the apex of the primaries and clouded on the costa and cell of the primaries, with obscure black markings. There is a broad yellowish subapical band on the primaries, running from the costa and terminating before the outer margin above the third median nervule. Upon the secondaries there is a continuous slightly undulating dark brown submarginal line. UNDERSIDE.—The ground colour is light green, or glaucous. The costa of the primaries at the base, the apex, the costal portion of the subapical band of the primaries which reappears upon the lower side, and a narrow bar running from before the middle of the secondaries from the costal to the first subcostal, are all white. The outer half of the wings is suffused with a fuliginous shade defined inwardly by a curved line running from the outer margin of the primaries below the apex to the origin of the third median, and thence to the middle of the inner margin, across the secondaries beyond the end of the cell, sweeping inwardly from the origin of the third median to a point above the anal angle on the inner margin. Faint traces of a submarginal band of ocelli appear upon the secondaries. Body and legs concolorous.

Expanse 75 mm. Habitat Talaguga, Ogové Valley.

This noble and well-marked species is represented in my collection by a single specimen taken in the spring of the present year. It is likely to be confounded with *E. Phantasia*, Hew., from which it may, however, be at once distinguished by the absence of the broad blue submarginal band running from above the first median nervule on the primaries to the anal angle of the secondaries in the female.

ATERICA, BOISD.

3. *A. fuliginosa*, sp. nov.

♀. Antennæ black. Body above dark brown. Underside of palpi, thorax and abdomen light grey. UPPERSIDE.—The ground colour of the upper side of the wings is smoky-brown, shading into dark brown near the apex of the primaries. There is a series of four minute white spots extending from the costa before the apex to the third median nervule. A broad oblique subapical yellow band runs from the first subcostal nervule beyond the cell toward the outer margin, terminating upon the first median nervule. The inner margin of this band is moderately straight; the outer margin is irregular, being indented upon the lower radial and the second median nervules. The usual markings appear obscurely in the cell. The posterior wings are ornamented by a submarginal band of obscure ocelli running parallel to the outer margin. These spots are lighter than the rest of the wing and ringed about with dark brown, and have in the centre dark brown subhastate pupils. UNDERSIDE.—The underside is obscurely brownish-grey. The markings of the upperside reappear, and on the underside of the secondaries the submarginal band of ocelli is indicated by a series of minute white spots located on the inner edge of each ocellus. There are seven of these minute white spots on each secondary. The base of the secondaries has a few obscure markings characteristic of the genus, the most prominent of which is an annular mark in the middle of the cell.

Expanse of wings 68 mm. Habitat Kangwé, Ogové Valley.

I hesitated to describe this species from the solitary ♀ specimen, but it is wholly unlike the female of any species known to me, and does not exist in any of the English collections which I have consulted, and was pronounced by Mons. Mabille, to whom I showed it, as undoubtedly a new species. It comes nearest to *A. aridatha*, of Hewitson, but it is totally distinct, being much larger and quite differently coloured, and the subapical band of the primaries having an altogether different form.

EUPHAEDRA, HUBN.

4. *E. imitans*, sp. nov.

♂. Very closely allied to *E. Eusemoides* recently described by Smith & Kirby, but readily distinguished from that species by the fact that the yellow spots on the middle of the primaries are not widely separated as in Eusemoides, and that the base of the primaries is adorned by a number of *blue spots*, and that along the inner margin of the primaries there is a *long yellow streak*. The secondaries have a *yellow spot on the base and three black spots in the cell*, and the broad black border is interrupted by a *marginal series of obscure geminate blue spots*. The underside has a spot at the base of the secondaries pupilled with yellow, in addition to the spots which appear upon the underside of *E. Eusemoides*.

♀. The female is like the male, but much larger, and the marginal blue spots upon the upperside of the secondaries are brighter and larger.

Expanse ♂, 58 mm.; ♀, 85 mm. Habitat Talaguga, Upper Valley of Ogové.

Represented in the collection of the author by two males and one female. It is a very close mimic of *Xanthospilopteryx longipennis*, and even more so of a species of this genus in the collection of the writer which has not yet been named.

Pittsburgh, Nov. 30, 1892.

SOME NEW ADDITIONS TO THE GENUS CLISIOCAMPA, CURT.

BY B. NEUMOEGEN, NEW YORK.

C. Mus, nov. spec.

♂. Head, palpi and thorax whitish gray. Antennae brown, with whitish stems. Abdomen gray, intermixed with black hair. Primaries dark gray, with veins indicated more or less by white. A broad blackish transverse band between two whitish lines, which are slightly toothed at intersections of veins. Basal space whitish, with black tings along costa. Fringes gray, with brown accentuations at terminus of subcostal and median veins. Secondaries dark chestnut-brown, fading into whitish tinges along anal margin and in basal space. A faint, whitish mesian line. Fringes gray and brown alternating.

Below. Primaries dark brown, dusted with gray in submarginal space and along costa. The outer transverse line well marked. Secondaries whitish gray. The mesian line well curved and prominent. Legs brownish-gray. In some specimens there is a shading from gray into light brown, and the white veins are less prominent on upper surface of primaries.

♀. Antennae, head and thorax whitish gray. In some specimens exceptionally blackish-brown. Abdomen whitish gray. Primaries dark gray. A broad, blackish transverse band enclosed in white transverse lines, slightly toothed at veins. The latter appear as white horizontal lines, in crossing this band. Basal space whitish. Fringes as in ♂. Secondaries of chestnut colour, fading in basal space, with black dashes, especially along costa. Fringes alternately brown and gray.

Below. Primaries and secondaries light chestnut-brown, slightly dusted with gray granules. Basal spaces of whitish tinge. The outer transverse line of primaries indicated in dark brown. Legs and abdomen yellowish-gray, dusted with black.

Types, ♂ ♂ and ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 24-25. mm.; ♀ 36-37. mm.

Length of body: ♂ 8. mm.; ♀ 10. mm.

Habitat: Southwest Utah (about 30 specimens) and Arizona, (Prescott, one specimen.) Easily recognizable by its gray primaries with dark band, traversed by white veins.

C. Mus. var. *discolorata*.

♂. Antennae, head and collar dark brown. Thorax and abdomen brownish-gray. Wings light brown. The two transverse lines of primaries dark brown, with an outer tinge of yellowish.

Below. Primaries light brown. The outer transverse line well marked in darker brown. Secondaries of a somewhat lighter tinge, with yellowish dust. Brown mesian line. Legs and abdomen dark brown.

Type, 1 ♂ from S. W. Utah. Coll. B. Neumoegen.

Raised out of a lot of about 50 typical *C. Mus* by Mr. Chr. I. Weidt. It seems to be rare.

♀. Antennae dark brown. Thorax and abdomen brownish-gray. Wings chestnut, with somewhat lighter dusting along anterior margin, and in basal space. Well marked dark brown lines encircling transverse band of primaries. Secondaries with lighter basal shades.

Below. Wings light chestnut, with grayish granules along anterior margins and basal spaces. Outer transverse line of primaries, and mesian line of secondaries slightly indicated.

Types coll. B. Neumoegen.

Several specimens raised by Mr. Weidt in S. W. Utah, and one specimen from Prescott, Arizona, tallying with the foregoing, but being of somewhat lighter colour in its wings.

C. Azteca, nov. sp.

♂. Antennae brown. Head and thorax grayish-brown. Wings and body of a peculiar blackish-brown tint. Primaries: apex sharply pointed. A transverse band of still darker shade, the two border lines of the same especially dark, the outer line relieved by a yellow streak. Running parallel with the latter, from costa to inner margin, a subterminal undulating irregularly shaped band, giving the wing the appearance of having three transverse lines. The inner line, encircling basal space, well curved towards base; the anterior line somewhat outwardly curved in its course through median space. Secondaries uniform in colour. Fringes of both wings alternating with yellow.

Below. Legs and body grayish-brown. Wings of a lighter brown shade, powdered with yellowish grains along anterior margin of primaries and over the entire surface of secondaries. Primaries show the outer transverse line, and secondaries a well curved mesian line. Basal spaces the darkest in both wings.

♀. Blackish-brown, lighter in shade than ♂. Body concolorous. Antennae, head and thorax grayish-brown. Primaries with broad transverse band, the inner line well curved towards base and of grayish colour. The outer line grayish, somewhat bulging at centre and slightly dentated at veins. Secondaries uniform in colour, showing a faint trace of a mesian line. Fringes in both wings alternating with faint yellow.

Below. Wings uniform in colour, but of lighter tint than primaries, which show faintly the outer line of transverse band. Secondaries with a somewhat darker undulating mesian line.

Types: 2 ♂ ♂ and 2 ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 31. mm.; ♀ 36. mm.

Length of body: ♂ 6. mm.; ♀ 10. mm.

Habitat: City of Mexico and vicinity. Caught by Mr. Moonz.

This is the darkest coloured American Clisiocampa and easily recognizable.

DESCRIPTION OF A NEW TOLYPE.

BY B. NEUMOEGEN, NEW YORK.

P. tolteca, nov. sp.

♂. Antennae light brown. Eyes black. Head, prothorax and thorax snowy white. Tegulae snowy white, with black hairy centre band, connecting it with the black haired abdomen, just like in *T. velleda*, Stoll. Abdomen metallic black, clothed with long hair and long drawn out anal tuft. The latter intermixed with white hair. Primaries dark slate, especially in the interspace formed by a marginal and a double central transverse line, as well as along costa and internal margin. Veins white. A lunulate white discal spot, and whitish tinges around it. Three transverse, undulating, white lines, two of which are double, the discal space being enclosed by these double lines, and the marginal transverse line being single. The latter crosses from apex the subcostal veins in a straight line, parallel with anterior margin, but becomes undulating in traversing the median veins. A thin, dark line indicates anterior margin. Fringes light brown. Wings show irridescence in a slanting position. Secondaries dark slate, with gray fringes; anterior margin indicated by a thin black line.

Below. Palpi black below. Abdomen and legs snowy white, the latter pilose, having the tibiae dotted with black. Wings blackish slate, especially dark along costal and in basal spaces, with veins and undulating marginal lines of grayish white.

♀. Much larger and of lighter shade than ♂. Antennae, head, thorax and central thoracical streak the same as in ♂, but the hairy body snowy white, with gray segmentary tuft. The same transverse lines on primaries, the one near base and the central line, which enclose disc, being double, and only the marginal line being single. Basal area tufted with snowy white. Costa whitish. Fringes light brown. Veins white. Secondaries dark slate, with basal white tuft, a white undulating marginal line and grayish-brown fringes.

Below. Black palpi. White abdomen and legs, the tibiae with black dots. Anal portion of body covered with light brown hair. Wings slate colour with white nerves. Primaries showing the white double central and marginal, the secondaries only the marginal line. Basal areas and sections along marginal lines the darkest.

Types, 2 ♂ ♂, 2 ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 30. mm.; ♀ 45. mm.

Length of body: ♂ 10. mm.; ♀ 21. mm.

Habitat: City of Mexico and vicinity. Collected by Mr. Moonz.

This insect greatly resembles *T. velleda*, Stoll., but its transverse lines on primaries differ and it is easily distinguished by its smaller size and darker colour, especially on the secondaries.

CAN THE DIPTERA BE CONSIDERED THE HIGHEST INSECTS?

BY C. H. TYLER TOWNSEND.

In the Nov., 1892, number of the CANADIAN ENTOMOLOGIST, pp. 269-70, there is printed a paper which was read by Professor H. Osborn before the Entomological Club of the A. A. A. S. at its Rochester meeting in August, 1892. It is entitled: "Honey-bee or House-fly." In this article Professor Osborn questions the view, first advanced by Hyatt and Arms, that the Diptera are to be considered the highest insects. At the end of the paper appear the following remarks, which were made at the time the paper was read before the meeting:—

"Mr. Smith thought that the line of argument adopted by Messrs. Aldrich and Townsend was inconclusive, and that the article referred to carried with it its own refutation. He thought Mr. Osborn was correct in that the orders should be placed parallel, but that groups or families were more highly developed in some orders than in others. Mere specialization is never a test of rank in itself, and any line of argument that places the Hippoboscidæ at the head of the insects as the highest in rank is simply unworthy of attention, since it omits the intellectual or nervous development as a factor."

The over-confident and assuring manner in which the above paragraph disposes of the subject is rather ludicrous. One might fancy the question finally answered, and consigned to oblivion. I feel safe in saying that such a hasty and incompetent dismissal of the subject will command little attention from anyone who is well informed in insect embryology.

Professor Osborn's paper simply makes the point that there are objections to attempting an expression of lineal rank or descent in groups of animals, but that the orders of insects are divergent, or more or less parallel developments from a common form.

The writer, in his note on the subject in *Science* (June, 1892), did not attempt to express the idea that the orders of insects led up in a natural or any other series to the Diptera; nor is any such view held by Hyatt and Arms, or Professor Aldrich, in what they have written on the subject. I desire to say also that I have not in any way upheld the view that the Hippoboscidæ should be considered the culminating point, but have rather pointed to the cyclorrhaphous families as occupying that position.

It is very conclusively shown by Hyatt and Arms, Insecta, pp. 273-4, 287-8, that the Diptera are by far the most specialized insects, and that they should therefore be considered the highest in rank. If any one still doubts that they are the most specialized, he may be referred to the late edition of Lowne's Anatomy etc., of the Blow Fly, part I., Oct., 1890. The wonderful development of the muscid pupa from the imaginal discs, all the larval organs undergoing disintegration, is not paralleled in any other order of insects. I contend that specialization, as deduced from the ontogeny of the insect, is the best and only reliable criterion of rank. Let those who believe otherwise point out a better one. To talk of an intellectual development in insects is absurd. I do not admit that the actions of the social hymenoptera are in any way actuated by reason or intellect. It is, rather, inherited habit.

As to the ubiquitousness of the House-fly, this is rather a point in its favour. It has, entirely on its own resources, become emphatically cosmopolitan, and even man "in all his glory" is unable to reduce its numbers, or in any way to cope with it. On the other hand, the Honey-bee has for ages been cultivated, cared for and protected by mankind. Yet I would not by any means suggest the House-fly as the climax of insect development.

Man is the highest animal, because of his immense cerebral specialization. There is no such contrast in cerebral development between the lowest and highest insects as there is even between the anthropoid apes and man. Consequently I believe that the same factor should not be used as a criterion of rank in insects. At the same time, man is farthest removed from the ancestral mammalian form in his general structural development, as deduced from his ontogeny, and this can and should be used as the basis of argument, not only in insects, but in all other groups of animals.

This line of reasoning puts the Diptera at the head of the insect body, inasmuch as their larval stages show greater specialization or development than the larvæ of any other order of insects, while their perfect form points them out still more emphatically as the farthest removed from the ancestral thysanuriform type.

If there is an objection on the part of some to the term "highest", let the expression "most specialized" be substituted therefor. I cannot help believing that the use of the latter would be preferable.

A NEW ARRANGEMENT OF THE COLEOPTERA.

BY WM. HAMPTON PATTON, HARTFORD, CONN.

Coleoptera may be described as Mandibulate Insects, with the fore-wings horny and the two basal abdominal joints invisible on the venter.

A reduction in the number of abdominal joints at the tip and in the number of joints in the tarsi indicates advancement in rank among Coleoptera. Likewise, a specialization of the antennae to clavicorn or lamellicorn indicates advancement, as well as does the degradation of the larva. The Lampyridæ are the lowest in rank, shown by their lax structure. The Heteromera and Phytophaga show high development in the specialization of their tarsi. The Rhynchophora are especially aberrant, and there is evidence of advanced type shown in the low development of the apodous larvae, greatly specialized prosterna and concealed ventral segments. A few Heteromera, the Buprestinae and the Lamiinae resemble them in their larvae. The larvae of Bruchidae are similar to those of *Brenthus* and *Anthribus* in their minute legs. The Weevils may be placed ahead of the other Coleoptera, although the Chafers are nearly as high.

The Cicindelidae present a character not elsewhere found in the Dolichogastres, *i. e.*, a dilation of the metapleura. A similar, but more extended, dilation is characteristic of the Rhynchophora and Phytophaga.

The arrangement below is verified in the preceding paragraphs.

SYNOPSIS OF COLEOPTERA, TWO SERIES.

DOLICHOGASTRES.—Six or more ventrals visible (exc. Elateridae and Buprestidae).

= Metapleura not widened (exc. Cicindelidae). Pentamerous (Normopleura).

First visible ventral entire. Series *Serricornia* (Malacodermes, Sternoxi). Series *Monilicornia* (Brachyelytra).

First visible ventral divided by the coxæ. Series *Filicornia* (Adephaga).

BRACHYGASTRES.—Only five ventrals usually visible.

= Metapleura not widened. Six ventrals in many families (Normopleura).

Heteromerous. Series *Heteromera*. First visible ventral not divided by coxae. Antennae various.

Pentamerous.

Series *Clavicornia* (Philhydrida, Necrophaga).

Series *Pectinicornia*. Series *Lamellicornia*.

= Metapleura widened (Tetramera). Never more than five ventrals. (Platypleura).

Series *Phytophaga.*

Series *Rhynchophora.*

The conclusion which may be drawn from this synopsis is that the Tetramera are the equivalent of all other beetles taken together. Those who follow LeConte's views would place the Rhynchophora apart from all others; then the division would be into Tetramera and Pentamera, the last including the Heteromera and Trimera.

A GENERAL SUMMARY OF THE KNOWN LARVAL FOOD-HABITS OF THE ACALYPTRATE MUSCIDÆ.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In a short paper published in the Trans. Kans. Acad. Sci., Vol. XIII., on the occurrence, in a single restricted locality in Arizona, of a species of *Micropeza*, I gave a very brief resumé of the food-habits of some of the better known families of Acalyptrate Muscidæ, with the view of suggesting the possible habit of the species there considered. This prompted me later to bring together all available notes on the subject. As these small flies are of much economic importance, both as being injurious and beneficial, I have felt that a quite complete summary of their larval food-habits would be of much use to the working entomologist, besides being of no little importance to those who may be making a special study of the diptera. I should acknowledge drawing a considerable number of the notes from Schiner, Westwood and other European authors. All such refer to European species but often apply equally as well to American species, when such exist in the genera named. All are of importance as indicating the great range and variety of the food-habits in this section of the Muscidæ The only families of whose larval habits nothing seems to be known are the *Micropezidæ*, *Phycodromidæ*, *Opomyzidæ*, *Leiopsidæ*, *Asteidæ* and *Geomyzidæ.*

According to their habits, the larvæ of the Acalyptratæ may be grouped in three categories: Scavengers, phytophagic species, and entomophagic or parasitic species. These groups may be separated into sub-groups, as will be seen from the accompanying synoptic view:

Synopsis of larval habits of the Acalyptrate Muscidæ.

- Scavengers.
  - Coprophagous species or dung-feeders.
  - Feeders on decaying vegetable matter.
    - In decaying fruits.
    - In decaying wood and under bark of trees
    - In decaying plants and leaves.
    - In decaying roots and tubers.
    - In fungi.
  - Feeding in fluids.
    - Salt or alkaline water and mud.
    - Urine.
    - Vinegar.
    - Sap from wounds of trees.
  - Feeders on animal matter.
    - Cheese.
    - Animal fats.
- Phytophagic species.
  - Gall makers.
  - Fruitfeeders
    - Infesting soft fruits.
    - Living in pods, seeds and berries.
    - Living in flower heads.
  - Leaf miners.
    - In water plants.
    - In foliage of trees and land plants.
  - Feeders in stems of plants and holms of grasses.
  - Root feeders.
  - Feeding in seaweed.
- Entomophagic species, or group with a parasitic tendency.
  - Parasites?
    - In scales.
    - In plant lice.
  - Pseudo parasites?
    - On scale insects.
    - On plant lice.
    - On larvæ.
  - Inquilines in bees' nests.

Summary of larval habits.

Fam. CORDYLURIDÆ:

Norellia spinimana; larva found on an anthomyiid larva (Bremi).

Cleigastra apicalis; larva in noctuid caterpillar (Boié). *Cl. suisterci;* bred from larvæ in swine dung (Townsend, CAN. ENT.)

Scatophaga; larvæ in dung and human excrement, also in water (Sch.).

Fam. THYREOPHORIDÆ:

Thyreophora; larvæ found in anatomical preparations (Rob. Desv.)

Fam. HELOMYZIDÆ:

Helomyza; larvæ in fungi and truffles (Westw.)

Leria serrata; larvæ in dung (Bremi), in fungi (L. Dufour).

Thelida; a species on bat dung (Rob. Desv.)

Fam. HETERONEURIDÆ:

Clusia; pupæ in mouldered tree trunks (Staeger).

Heteroneura; larvæ and pupæ under bark of trees and in decaying tree trunks. *H. albimana;* bred by Schiner from pupæ found in trunk of a weather-beaten willow.

Fam. SCIOMYZIDÆ:

Dryomyza; larvæ in fungi (Meq.)

Actora; breeds in seaweed (Boh.)

Tetanocera ferruginea; larvæ live between the leaves of Lemna and Callitriche in water (L. Dufour).

Fam. DORYCERIDÆ:

Dorycera; larvæ live amongst leaves of water plants, several species being subcutaneous (Westw.) *D. graminum;* larvæ in water (Geoffr.)

Fam. PLATYSTOMIDÆ:

Platystoma umbrarum; larvæ live in decayed wood underground (Perris).

Fam. ORTALIDÆ:

Herina (Ortalis) frondescentiæ; larvæ feed on pulp of cherry (Réaumur).

Tritoxa (Ortalis) flexa; larvæ live in onions.

Psairoptera; larvæ of a species found under bark of Pinus, and Populus tremula (Sch.)

Chloria (Ulidia) demandata; larvæ in old horse dung, where they passed the fall and winter (Bouché).

Chaetopsis aenea; bred from larvæ found July 5 burrowing in the centre of a stalk of corn (Gillette).

Fam. LONCHÆIDÆ:

Lonchæa nigra; larvæ in the stems of Verbascum, Angelica and Carduus. *L. parvicornis;* larvæ in suckers of Triticum repens, on which they cause galls with a scale-like covering, the dead leaf-sheath (Perris). *L. lasiophthalma;* larvæ under similar circumstances on suckers of Cynodon sp. Larvæ of other species under bark of trees (Giraud).

Fam. SAPROMYZIDÆ:

Sapromyza; larvæ under decayed leaves (Bouché), in rotten straw (Perris), and in fungi (L. Dufour).

Fam. TRYPETIDÆ:

Platyparea; larvæ of a species in asparagus (Sch.)

Euphranta; larvæ of a species in pods of Vincetoxicum officinale, pupating in the earth (Giraud).

Aciura femoralis; bred from larvæ found in Phlomis fruticosa (v. Frauenfeld).

Acidia; larvæ of a species in leaves, which they mine (Sch.) Larvæ of another species in fruit of Lonicera xylosteum (Lev.) *A. artemisiæ;* larvæ mine leaves of Chrysanthemum (Westw.)

Spilographa; larvæ in fruits or berries, while some mine leaves (Sch.) *S. alternata;* larvæ in berry of Rosa villosa (Bouché, quot. by Westw.)

Orellia wiedemanni; larvæ live in leaves of Bryonia (Sch.)

Trypeta; larvæ of many species live in flower heads of various compositæ.

Rhagoletis (Trypeta) pomonella; larvæ in apples (Wlsh.)

Acrotoxa (Trypeta) ludens; larvæ in oranges (Riley).

Eurosta (Trypeta) solidaginis; larvæ in galls on stems of solidago (Fitch).

Urophora; larvæ of many species live in various parts of composite plants (Sch.) *U. cardui;* larvæ in large galls on thistle (Westw.)

Myopites; larvæ in flower-heads of Mula sp. (v. Frauenf., v. Roser).

Ensina sonchi; larvæ live in flower-heads of Sonchus, Apargia, Senecis, Tragopogon, Podospemum (Sch.), Carduus (v. Frauenf.)

Carphotricha; larvæ live in Compositæ, preferably Ligulifloræ (Sch.)

Euleia onopordinis; larvæ mine in leaves of celery (Westw.)

Oxyphora; larvæ in flower-heads of various Compositæ (Sch.)

Tephritis; larvæ in flower-heads of Compositæ (Sch.)

Anomoia; larvæ of a species in berries of Crataegus oxyacantha (Sch.)

Ceratitis capitata; larvæ in peaches, oranges and other citrus fruits (Westw.)

Dacus oleæ; larvæ in olives, two or three larvæ in a fruit, pupating in the earth.

Eutreta diana; larvæ in gall on wild sage, Artemisia tridentata, in Mo. (Riley, Osten Sacken).

Straussia (Trypeta) longipennis; the fly oviposits in stalk of Helianthus (sunflower) near tip, in June and July (Lintner, 3d. Rep.)

Fam. SEPSIDÆ:

Nemopoda cylindrica; larvæ in human excrement (Bouché, West., Sch.)

Themira putris; larvæ in slimy water and mud (Sch.)

Fam. PIOPHILIDÆ:

Piophila; larvæ in cheese, ham-fat and fatty animal matter in general (Swamm.). In salt (Germer).

Fam. PSILIDÆ:

Chyliza leptogaster; bred from irregular galls the size of a walnut on the stems of Spiræa opulifolia—not known that the galls were caused by these flies (Scholtz).

Psila rosæ; larvæ in roots of Daucus (carrot) and Brassica (Sch.)

Fam. OSCINIDÆ:

Platycephala; pupæ of one species in reed stems (Boié)

Meromyza americana; larvæ in stems of wheat, rye and probably in grasses (Riley, Webster and others).

Chlorops; larvæ of several species live in holms of grasses and cereals. *Chl. pumilionis*, *Chl. glabra;* larvæ injuring wheat (Bjerkander, Westw.)

Chloropisca prolifica; supposed by Dr. Lintner to breed in grass of lawns (7th Rep. N. Y. Ent., p. 239).

Lipara; larvæ in reed stems, causing large galls near the tops, in which they pupate (Sch.)

Oscinis; larvæ live in holms of grasses and cereals. *O. frit;* larvæ in husks of barley in Sweden (Linn.) Species in wheat in U. S. (Garman, Webster).

Siphonella; larvæ in grasses, also in other plants (Sch.) Two species in flower-heads of various Cynerocephalæ (Egger, v. Frauenf. Larvæ of one species in worm-eaten nuts, in company with curculionid larvæ (Perris, v. Frauenf)

Elachiptera; pupæ on a species in large quantities under the bark of old poplars (Sch.)

Gampsocera; larvæ in decayed stems of Althea (H. Heeger).

? Novum genus; bred in California from a spider's egg-mass.

Fam. EPHYDRIDÆ:

Halmopota; larvæ in salt-pits (Bouché).

Ephydra; larvæ in salt-pits (v. Heyden), in salt-pits of Kissingen (Diruf). *E. californica;* larvæ live in great numbers in water of alkaline lakes in the south-western U. S. (Packard, Williston). *E. hians;* larvæ in immense numbers in water of Lake Tezcuco, in Mexico, and are used by the Mexican Indians as food. It may also be mentioned that the larvæ of E. californica are used by the Pah-Utes as food (Williston).

Teichomyza fusca; larvæ live in urine (Rob. Desv.)

Fam. DROSOPHILIDÆ:

Aulacigaster; larvæ of only species found in wounds on elm trees (L. Dufour).

Gitona; larvæ of only species live in flower-heads of Sonchus arvensis (Loew), probably also in flower-heads of Onopordon (Sch.)

Drosophila; larvæ usually in sour-fermented matter, fermented liquids, vinegar, decayed fungi, ulcerated wounds of trees, decayed fruits (Sch.) *D. ampelophila;* larvae in pomace of cider mills, in pickled and preserved fruits (Lintner), bred from maggots found hollowing out grapes (Forbes). *D. quinaria;* bred from a mass of cochineal insects (Riley & Howard). Some species (Scaptomyza Hardy) are leaf-miners (Sch.) One or more species mine turnip leaves in Europe and U. S. (Curtis, Garman).

? Stegana; breeding in hen dung (Riley & Howard, Ins. Life, II., 254). It is perhaps doubtful whether this fly belonged to the Drosophilidae.

Fam. OCHTHIPHILIDÆ:

Leucopis; larvae parasitic (?) on plant lice and scale insects, (?) in spiders' nests (Sch.) *L. bellula;* reared from cochineal insect (Riley & Howard). *Leucopis* sp.; parasitic (?) on Rhizococcus sp. on grasses in Nova Scotia (Fletcher).

Lestophonus iceryae; parasitic (?) on Icerya (Riley).

Fam. MILICHIDÆ:

Cacoxenus indagator; larvae live in nests of Osmia emarginata, consuming the food prepared for the Osmia larvae and causing them to die (Giraud). Probably found in other bees' nests (Sch.)

Fam. AGROMYZIDÆ:

Agromyza; larvae are leaf-miners or live in pith of plants (Sch.) *A. tritici;* bred from larvae crawling in large numbers from unthreshed wheat in a barn (Fitch).

Ceratomyza; larvae of one species mine leaves of Sonchus oleraceus (Sch.)

Fam. PHYTOMYZIDÆ:

Phytomyza; larvae are leaf-miners (Sch.), some species pupating in the parenchyma of the leaf (Chromatomyia Hardy). *P. chrysanthemi;* larvæ mine leaves of Chrysanthemum, Tanacetum, Eupatorium, Gazania, Helianthus, Cineraria (Lintner). *P. lateralis;* larvae live in heads of Anthemis, Pyrethrum, and in stems of Centaurea, Verbena and Urtica (Kaltenbach), *mining* in Sonchus (Gourean). *P. flava;* larvae in subcutaneous mines in leaves of Scolopendrium vulgare, a fern (Doubleday). *P. flaviceps;* larvae mine leaves of woodbine (Hal.) *P. obscurella;* larvae mine leaves of holly (Hal.), in honey suckle (Glover). *P. nigricornis;* larvae mine in underside of leaves of turnip, peas, forming long galleries in parenchyma beneath lower cuticle, pupating at end of gallery (Curtis), also mine leaves of monkshood, Aconitum (Kaltenbach).

Fam. BORBORIDÆ:

Borborus; larvae in dung and decayed fungi (Haliday).

Sphaerocera; larvae live in horse dung (Sch.)

Limosina; larvae of a species in Confervae, in diseased potatoes, and in fungi (Sch.)

NOTE.—If any genera whose larval habits are known have been omitted, or if any peculiarity in habit of a genus here mentioned is not included, the author will be glad to know of the references or observations. The list is not supposed to be complete.

LARVÆ OF PAPILIO PHILENOR BECOMING LARVOPHAGOUS.

BY RICHARD E. KUNZE, M. D., NEW YORK.

> " I perish by my art ; dig mine own grave ;
> I spin the thread of life ; my death I weave."

Truly wonderful is the adaptability of some individuals when placed under circumstances tending to diminish the reproduction of their race. Desirous of raising larvæ of *Papilio philenor*, I planted two years ago five vines of Dutchman's Pipe (*Aristolochia sipho*) in my back yard, which in the summer of the present year (1892) covered a wall and fence 16x7 feet with luxuriant foliage.

July 2nd a friend brought me, from Staten Island, N. Y., from 125 to 150 larvæ of *Philenor*. The majority had passed their first, and a few their second moult. All were transferred to the leaves of the Dutchman's Pipe vine in my garden plot. By the ninth of July nearly all the leaves of my Pipe vines were devoured, before less than half of the leaves were full grown. I then removed fifty of the largest to a five-gallon flower pot, covering the bottom with a layer of loam, and filling up this breeding cage with as many leaves of *Aristolochia sipho* as it would hold. The pot and loam were first well sprinkled with water to furnish moisture for stems of *Aristolochia* vines, and the top covered with thick manilla paper to prevent evaporation, inasmuch as the porosity of the cage answered every such purpose. Two days later the leaves of breeding cage were all devoured, and those on my vines in the garden nearly so. I divided what remained of the latter, and gave an equal share to larvæ in the cage. Exactly forty-eight hours afterward the Pipe vines of the garden were entirely defoliated, and the larvæ contained in the flower pot nearly all transforming into chrysalids.

Two days previously I requested my friend, Mr. Ehrenberg, who furnished the larvæ, to procure me a supply of *Aristolochia* leaves from Staten Island, where he officiated as landscape architect at a well-known villa, else most of our larvæ would perish. In the meantime the owner of the villa noticed the foliage of his *Aristolochia* trellis disappearing rapidly, caused by the remaining larvæ which my friend had failed to take off for me. His,(the owner's) instructions to the resident gardener to keep these larvæ well picked off had not been observed, he thought, while the landscape architect tried to raise a few more chrysalids on the trellis facing the villa, and suggested to the gardener to defer operations a few days longer. The owner, not knowing of our intentions, became vexed and gave an Italian labourer a bagfull of sulphur, with orders to dust the *Aristolochia* with it effectually. How well the instruction was carried out may be inferred when it is known that those plagued worms, all the remaining foliage and much of the grass beneath the vines, were totally destroyed!

At the same time, while in expectation of an abundant supply of larval food, I had collected from the bare vines, wall and fences of the yard, from the passage ways of the house, and wherever they wandered in search of food, some sixty hungry larvæ. These were put into a lady's large bonnet box, and some fifteen different food plants which grew on the premises were placed therein to serve that wriggling mass of large black larvæ with long concolorous tubercles their immediate wants. But touch it they would not. On the evening of the ninth of July my friend returned from Staten Island without any food plant, and informed me of our misfortune. I knew of only two more private places in this city, and another in Astoria, Long Island, where *Aristolochia sipho* is cultivated. Not being acquainted with the owners, I could not obtain a supply.

The children of neighbours brought me numbers of my *Philenor* larvæ which had crawled into their yards and gardens. I decided to keep only the largest of these famishing larvæ, thinking to obtain a few more chrysalids while waiting for a possible supply of food plant, which, however, did not come. All others I gave liberty to go where they pleased. Many returned to the bare stem of my *Aristolochia*, where they nibbled at the epidermis of the vines until most had perished.

Necessity compelled the larvæ I had in that bonnet box to become *Entomophagous*, so to speak. Not a leaf of a plant, shrub or tree, wild or cultivated, would they eat. On the 11th of July I observed several of the caged larvæ had spun a thread of silk across their bodies and were suspended by their anal hooks from the sides of the cage. A number of other hungry larvæ were attacking and devouring their own kind which were helplessly "hung up" and could not escape from the onslaught of these carnivorous larvæ. On the next day I discovered a few chrysalids suspended from the box, which during transformation had escaped attack, while others were being devoured. But before they hardened sufficiently to permit of removal these chrysalids, too, were attacked and converted into food! It was a disgusting and repellant sight to witness. From day to day this larval cannibalism continued to enable a number of individuals to transform into the second stage. When the chrysalis was not at once removed it would soon disappear, excepting only the outer case. Sometimes 3 or 4 larvæ would attack a suspended larva at the same time, and whenever a dismembered portion of the victim fell to the bottom of the cage other larvæ would seize and devour it. A dozen larvæ and as many chrysalids were eaten up in four days, and not even the skin of a larva would remain. Thermometer ranged from 80° to 92° in the shade, but no sign of decomposition was noticeable in cage. It was dog eat dog, and not even bones left to tell the tale!

July the 16th only nine larvæ were left, and two chrysalids transformed the previous day were in an unsightly condition—literally disemboweled. All of these larvæ were very lively, but whenever ready to transform would never be more than two-thirds the size of those naturally fed. One more unfortunate hung by its anal feet to become the next victim in order. July the 19th three larvæ were alive, of which one was "spinning the thread of life". I again placed 8 or 10 kinds of food plants in the cage, which in twenty-four hours were untouched. One chrysalid was left intact. I now placed the remaining two larvæ on my *Aristolochia* vines, inasmuch as a new growth of leaves was in sight. These immediately fed upon the tender food offered. A number of others, barely alive, were nibbling away at the bare vines lower down on the plants, and had not yet discovered the new foliage.

Altogether these were a most carnivorous lot of larvæ, from which I obtained only five chrysalids out of a possible twenty-five larvæ retained in that cage. From one of these emerged, in September, a ♂ imago of the normal colour, but smaller in size.

I am not aware that larvophagous caterpillars have been reported as occurring among Rhopalocera. In the *American Naturalist*, Vol. XX., page 556, it is stated that a Lycænid larva of *Feniseca tarquinius* feeds upon an Aphid which is found only on the branches of alder *(Alnus serrulata)* affecting swampy localities. One of my liberated *Philenor* larvæ fed upon a cultivated plant of *Azalea indica*, which was a potted plant fifteen inches in height. I discovered the chrysalid in September, and this was the only exception as far as I could discover where these had not fed either upon *Aristolochia sipho* or their own kind.

SYNOPSIS OF THE ASILID GENUS ANISOPOGON.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table includes those species of *Anisopogon* at present known to occur in this country north of Mexico :—

1.—Scutellum (except sometimes its extreme base) black 2
Scutellum and face yellow, abdomen yellow, marked with five black fasciæ, wings pale yellow . . . . *vespoides*, Bigot

2.—Abdominal segments one to four wholly black 3
Abdominal segments three to six (except sometimes their lateral margins) reddish 5

3.—Wings pure hyaline, the cross veins and furcations alone sometimes clouded with brown ; tibiæ reddish 4
Wings more or less brown, the apex never blackish . . . . *ludius*, n. sp.
Wings having the apical half blackish . . . . { *phœnicurus*, Loew. / *gibbus*, Loew. }

4.—Pollen of abdomen extending on the bases of the segments . . . . *senilis*, Bigot.
Pollen confined to the apices of the segments . . . . *lautus*, Loew.

5.—Wings nearly uniform, smoky-gray ; head, first two joints of antennæ, thorax and legs obscure brown . . . . *rubidus*, n. sp.
Wings smoky-brown, darkest on apical half ; head, antennæ and thorax black . . . . *patruelis*, n. sp.

Anisopogon ludius, n. sp. ♂.—Black, the tibiæ and tarsi dark reddish-brown. Face gently convex, white pilose, bristles of lower part black ; first joint of antennæ slightly longer than the second, the third joint tapering to the tip, three times as long as the second, the style slender, seven-eighths as long as the third antennal joint ; pile of occiput, thorax, pleura, coxæ and venter white ; upper side of each front tarsal joint with a dense covering of appressed white hairs ; upper side of middle femora toward its apex with a dense covering of short appressed black hairs, which, however, leave a large elliptical naked space between the apex and the middle ; middle tibiae white pilose in front, and above the middle ornamented with a large patch of appressed black hairs and bristles, which form an inner and an outer fringe ; inner side of hind tibiae near the tip, and also of the hind metatarsi, densely bright yellow pubescent : wings smoky brown, lightest at the apex and along the hind margin ; all posterior and the anal cell open.

♀ as in the male, except that the front tarsi, middle femora and tibiae are not ornamented as in the male, and the wings are much lighter, the brown forming a border to some of the veins. Length, 12-16 mm. Los Angeles and San Bernardino Counties, California, and British Columbia. Two males and three females, in May. The British Columbia specimen was received from Mr. W. A. Danby.

This species is closely related to *A. senilis* Bigot, but in the latter species the wings are wholly hyaline, and the appressed white hairs on the front tarsi of the male are confined to the first joint. I have specimens of the latter species from Colorado and Florida (Morrison). In both species, the colour of the bristles on the head, body and legs is too variable to be of any value in separating the species.

Anisopogon rubidus, n. sp. ♀.—Obscure brown, the following parts black :—The third antennal joint, basal half of style, proboscis, palpi, scutellum except its base, first segment of abdomen, basal half of second, lateral margins of the others, seventh segment and genitalia largely, apex of venter and upper side of each femur, that on the first and second segments of abdomen with a strong bluish tinge, brown of abdomen more reddish than on the other parts ; thorax irregularly marked with grayish black. Head gray pollinose, the pile yellowish-white ; face evenly convex, the pile extending nearly to base of antennae ; first joint of antennae slightly longer than the second ; third joint slightly longer than the first two taken together, tapering gradually to the apex, the style two-thirds as long as the third joint. Thorax gray and golden pollinose, the pile short, sparse, mixed black and white ; pleura gray pollinose, its pile and that of the coxae white, the fan-like pile in front of halteres also white. Pile of abdomen sparse, microscopic, light-coloured, that on lateral margins and on venter longer, whitish. Pile of legs sparse, whitish, that on tarsi and tips of tibiae largely black. Wings smoky gray, all posterior cells and the anal cell open.

♂ same as the ♀, except that the middle femora have each a cluster of black pile at its apex in front and two similar fringe-like clusters, one on the upper, the other on the lower surface at its last third, and above the middle of each middle tibia are two long dense fringes of black pile on its inner and outer sides, connected with each other in front ; front metatarsi destitute of appressed white pile. Length, 14 to 17 mm. Los Angeles County, Cal. Four females and one male.

Anisopogon patruelis, n. sp. ♂ ♀.—Same as the above description of *rubidus*, with these exceptions :—Head, antennae, thorax, scutellum and femora, except the apex, black ; apical third of the first abdominal segment and the apical three-fourths of the second segment reddish in the female, but black in the male. Style one and a fourth times as long as the third antennal joint. Wings smoky brown, lighter on the base as far as the furcation of the second and third veins ; a lighter transverse shade passes through the middle of the discal cell. Front metatarsi of the male densely covered with appressed white hairs above. Length, 13 to 16 mm. Texas. A single male and female received from the late H. K. Morrison.

THE LARVA AND CHRYSALIS OF CHRYSOPHANUS DIONE.

Some time ago Mr. Henry G. Willard, of Grinnell, Iowa, very kindly sent me some of the full grown larvæ of this species. I made a few notes at the time which may be of use, owing to the fact that nothing has been published in regard to the early stages of this butterfly. The food plant at the home of the insect is *Rumex longifolius*, but they readily ate our common species of dock found here The full grown larva were oniciform in shape, grass green in colour, and 20 mm. in length. Most of them had a narrow, claret-coloured dorsal stripe, and the entire body, under a glass, was seen to be clothed with minute black hairs. The larva is of the same general appearance as that of *Chrysophanus hypophleas*, but larger. The chrysalis is the same shape as most others in the Lycænidæ, and looks very much like Scudder's figure of the chrysalis of *E. thoe*. In colour the chrysalis is a light hay colour, and the dorsal abdominal segments are heavily marked with blackish blotches. The dorsal thoracic segments are peppered with black spots. The wing covers are lightest in colour of any part, but are also peppered with the fine black points. The head, eyes and shoulder-joints are covered with black blotches. One chrysalis, which I think was entirely green and without the black markings, disclosed a *C. thoe*, but I did not notice any difference in the larva I had, so I conclude the larvæ of the two species look very much alike. Mr. Willard could perhaps give us something interesting about the times of appearance and habits of this butterfly, as it is common in his locality.

HENRY SKINNER, M.D., Philadelphia.

NOTES ON ZARÆA AMERICANA.—CRESS.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

The young larva of *Zaræa Americana* appears in the beginning of July on *Menyanthes trifoliata*. It lies curled on the underside of the leaf. Its head is black, and its body lead-colour above and greenish-white beneath. It develops into the most beautiful larva of any of the Tenthredinidae that I am acquainted with.

Description of the full-grown larva.—Length one and a-quarter inches. Head black. Body above lead colour—excepting the anal segment, which is greenish white. The underside and the legs are greenish-white. The forelegs are tipped with black. Along the back are eleven pairs of raised and conspicuous bright yellow spots. Between the pairs, and on either side of them, are conspicuous jet-black spots, which, taken with the yellow ones, form rows across the back. There are other rows of *smaller* black and *pale-yellow* spots—two after each row of the larger ones. The side lines are white. Above these lines, on the margin of the lead-colour, is a row of black dots. Beneath them, just above the legs, is a series of raised yellow spots—each spot being surmounted by one or two black dots.

The larvae were plentiful in one spot, but could hardly be said to be *gregarious*, as only one or two were to be found on a plant. Towards the end of July the larva spins around itself a closely woven, dark-brown cocoon. In the spinning it usually gathers several leaves of the plant about it. The larva remains unchanged in the cocoon till spring, when it assumes the pupal state. The fly makes its appearance in the middle of May.

Description of the perfect insect.—In length the fly measures about nine-twentieths of an inch; and in expanse of wings about eighteen-twentieths. The antennae are dark brown, six-jointed and clavated. The wings are faintly clouded with brown. The head and thorax are dark brown and hairy. The abdomen, which is oval in outline, is of a rich velvety-brown above, with a slightly bronzy-green lustre. The colour fades into light reddish-brown on the sides and on the two last segments. The underside of the abdomen is pale brown. The tibiae and tarsi are white, and have a waxen appearance. The fly seems to be somewhat sluggish in its habits.

I am indebted to Mr. E. T. Cresson for the identification of the insect.

A NEW FORM OF PRIONIA, AND NOTES ON PLATYPTERYX ARCUATA AND P. GENICULA.

BY GEORGE H. HUDSON, STATE NORMAL SCHOOL, PLATTSBURGH, N. Y.

Prionia levis, n. var. or sp.

Primaries without the delicate frosted or silvery appearance, and without the numerous short, fine, strigate, brown lines of *bilineata*. The brown scales are present, but are uniformly and evenly distributed, save where they form the two brown lines which cross the wing, and a little darker shading near the outer edge and apex. These two transverse lines are about a third wider apart than in *bilineata*, the second narrowly edged externally with the clear, pale yellow ground-colour of the wing. There is no brown submarginal line, but a wavy, pale yellow line runs from inner margin to costa, midway between the second line and the outer margin. The vestiture appears to be more dense and smooth than in the allied form. Both primaries and secondaries seem to have a more decided ochreous tint.

Underside with markings more obscured.

Described from one male taken Aug. 13, 1887, and one female taken Aug. 3, 1890; both from the electric lights.

This may prove to be a seasonal form of *bilineata*. My dates of capture for the latter, since 1886, are as follows (the figure after the hyphen giving the number of specimens). May 8, 10-2, 15-3, 19; June 16, 22-2, 30.

Mr. H. G. Dyar, while here last summer, suggested that this new form might be the one which the late Mr. Hy. Edwards (CAN. ENT., XIX, 146) referred to *P. lacertinaria*, Linn. (=*lacertula*, Den. and Scheiff.). Both *P. bilineata* and *P. levis* are distinct from the European form, although very closely allied to it. Mr. Dyar also called my attention to the fact that this form seems to vary somewhat af‑ r the manner of *Platypteryx genicula* from *P. arcuata*, as pointed out by Dr. Packard in "Proceedings of the Boston Soc. Nat. Hist.", Vol. XXIV., page 491, 1890. We separated the two forms and then looked up the dates of capture, with results as follows:—

Platypteryx arcuata.—May 10-2, 11, 16-2, 19, 21-2, 24; June 1-2, 3, 9; July 27.

P. genicula.—July 7, 13, 27-3, 28-2, 31-2; Aug. 2-4, 3-2, 14.

FEMALE OF CROCOTA ROSA, FRENCH.

BY G. H. FRENCH, CARBONDALE, ILL.

In describing this species in Vol. XXII., page 133, of the CANADIAN ENTOMOLOGIST, I had before me two males, one from Texas and one from Ohio. I have now before me a fine fresh female from Champaign, Ill., the first of this sex I have seen, and I will give here some additional characters of the species. The forewings are fawn, a little darker than in the type, but the latter was evidently a little faded. The hindwings have a few dusky scales in the outer border near the anal angle. On the forewings the veins are a trifle darker than the spaces between the veins, but only from the wing being thicker here. Antennae a shade darker than the forewings; a semi-ring back of the eyes that is red tinted, as also the underside of the palpi; upper side of tibiae a little more red tinted. Abdomen above concolorous with the hindwings, an obscure row of dorsal dusky spots; whole of underside of body concolorous with upper side of forewings.

CORRESPONDENCE.

A CORRECTION.

Sir,—On page 225, CAN. ENT., 1892, I described a new Bombycid genus, *Melia*. Finding that this name is preoccupied, I have changed it to *Eumelia*, calling the insect proper *Eumelia Danbyi*, Neum.

B. NEUMOEGEN.

HONEY-BEE OR HOUSE-FLY.

Sir,—The November number of your journal contains upon its first and second pages some rather misleading comments on an article of mine in *Science*, of April 29. There was nothing in the article to justify the intimation that I had arranged any insects in a "linear series." The article was in the main a re-statement of Hyatt and Arms's view of the systematic position of the Diptera. To this I added several considerations tending to reinforce their conclusions. I referred to their placing "the Hymenoptera second and the Lepidoptera third," but this does not necessarily imply anything "linear." See their book "Insecta."

So far am I from holding the views imputed to me that I prefer not to regard any of the groups as representing "parallel branches," believing that "we should make an effort to avoid the expression of lineal rank in groups of animals."

I purposely based my conclusions upon anatomy alone, because, as I said, "to introduce the subject of instinct or of usefulness to man, is to confuse our ideas, for we cannot translate the data furnished by such a criterion into terms of the other standard." Judged from that position, it is very much out of the way to assert that "mere specialization is never a test of rank in itself." All that I tried to show was that, anatomically considered, the Diptera are the most highly specialized order.

I trust that it is not out of place to add that the author of one of our principal introductions to entomology, a man whose opinions have as great weight as anyone's in this country, informed his class in entomology last summer that he had come to the conclusion that the Diptera are the highest order. I was so informed by one of his students.

J. M. ALDRICH.

Brookings, South Dakota, Nov. 11, 1892.

NOTES.

MELANCHROIA CEPHISE, HÜBN

The genus *Melanchroia* has been associated in our lists with *Gnophaela* to form a family *Pericopidæ*. As a matter of fact it is a veritable geometer, with little more relation to *Gnophaela* than is expressed in the statement that both are Macro-Heterocera ! This has, indeed, been recognized in Europe, and Mr. Butler, when identifying my specimens as *M. cephise*, added the remark "belongs to the geometrites".

M. cephise is very common in Kingston, Jamaica, and on Aug. 5, last year, Mr. Bowrey kindly gave me a number of the larvae. These were of the usual form of geometrid larvae, and from them I drew up the following description :—

M. cephise: Larva about 22 mill. long, body smooth, with a few short hairs, which are hardly visible without a glass. Head yellow-brown, the mouth parts dark. Thoracic legs yellow-brown. Abdominal legs tinged yellow-brown. Body pale yellow, with a black ring on each segment, which extends downwards only as far as the infraspiracular line (except that on the 4th body segment, which is continuous below). These rings are broad on the 4th to 8th body segments, but rather narrow on the others. There is a longitudinal, narrow black subdorsal line, and a black infraspiracular line, which broadens into triangles (which are spotted with white) at the junctions with the black rings. The edges of all these black bands are whitish.

The very young larvae are marked in similar way to those which are mature. The pupa is brown and rather shiny. The moths began to emerge on Aug. 15th.

T. D. A. COCKERELL,
Institute of Jamaica, Kingston, Jamaica.

HALISIDOTA MACULARIA, WALK.

I find on further search that *H. macularia*, Walk. (see CAN. ENT. Vol. XXIV., p. 306), is made a synonym of *Alpenus maculosus*, Stoll., whose habitat is given as West Africa. The citation of it from North America can only be the result of an error. The occurrence of *Halisidota megapyrrha*, Walk. (= *Ammalo helops*, Cram.), is also doubtful, though not so much so, as its home is in Surinam.

HARRISON G. DYAR, Roxbury, Mass.

ASTATUS BICOLOR, SAY.

In the excellent synopsis of the difficult genus Astatus, by Dr. William J. Fox, published in the September number of this journal, I believe that gentleman to be in error as to his identification of *A. bicolor*, Say. This is an undersized species, not uncommon in Illinois, having the stigma and the contiguous portion of the submarginal vein of a yellowish rufous colour—"pale rufous", Say writes—and not black, as Dr. Fox states; the legs black, as usual. The species described by Dr. Fox as new, under the name *pygidialis*, appears from the description to agree closely with *bicolor*, scarcely differing except in the rufo-testaceous colour of the legs and on the clypeus and antennal scape, which parts are black in *bicolor*. It is possibly an extreme variety of the latter species. I would arrange the synonymy of this group as follows:—

ASTATUS RUFIVENTRIS, Cress.
  ♀ *rufiventris*, Cress. Trans. Amer. Ent. Soc. IV., p. 218.
  bicolor, Fox. CAN. ENT. XXIV., p. 232.
A. BICOLOR, Say.
  ♀ ♂ *bicolor*, Say. Lec. Ed., I., p. 166.
  terminata, Cress. Trans. Amer. Ent. Soc. IV., p. 218.
A. PYGIDIALIS, Fox.
  pygidialis, Fox. CAN. ENT. XXIV., p. 234. (? = var. of *bicolor*.

CHARLES A. HART, Champaign, Ill.

BOOK NOTICES.

HISTOIRE NATURELLE DES ARAIGNEES: Deuxième Edition, Par Eugène Simon: Librairie Encyclopédique de Roset, Paris, 1892.

The first portion of Vol. I of this most important work has just appeared (pp. 1–256). The work will be divided into four parts: 1. External Anatomy; 2. Classification; 3. Biology; 4. Geographical Distribution. Simon arranges the known spiders of the world in 41 families; three families under the suborder *Araneæ theraphosæ;* the remaining families under *Araneæ veræ;* the latter is divided into two sections—the *Cribellatæ*, with eight families, the *Ecribellatæ* with thirty families. This portion of Vol. I. contains the External Anatomy and the classification of the *Araneæ theraphosæ* and the *Cribellate* section of the *Araneæ veræ*. The text is illustrated with outline figures. There is no key to the families, but under each family there is a key to the genera, after which follow descriptions of the genera and various remarks. The descriptions of the genera and the keys are in Latin; the rest in French. Although the classification will, of course, change from time to time, this work will be for many years to come a most important work for arachnologists, and should be found in every college library throughout the world. —N. B.

A SYNONYMIC CATALOGUE OF LEPIDOPTERA HETEROCERA (MOTHS) by W. F. Kirby, F. L. S., F. E. S., etc., etc.: Vol. I., Sphinges and Bombyces. London: Gurney and Jackson, 1 Paternoster Row: 1892.

This forms a large volume of 950 pages, including the Sphinges and Bombyces of the world, and brought down to May 1, 1892. There are twenty-nine families recognized, of which the Sphingidæ form the twenty-first, preceded by the Notodontidæ and followed by the Bombycidæ. The Castniidæ head the list, including as the only North American species, the genus Megathymus, heretofore classed among the butterflies. The genus Lagoa, which Dr. Packard has recently proposed should form the type of a new family, is placed in the Liparidæ, between Parorgyia and Orgyia, a most peculiar location. A number of names, long since referred to the synonymy, reappear under their original generic titles in a very misleading manner, as, for example, *Arctia bimaculata* Saunders, placed between *A. f-pallida* Stets. and *A. Nais* Dru., in the genus Apantesis Walk. One would hardly look for *Crocata quinaria* here. On page 36 is a curious error, whereby the noctuid genus *Euedwardsia*, Grote, proposed for *Xanthotrix Neumoegeni*, Hy. Edw., is made to stand for *Edwardsia brillians*, Neum. As both generic names are thus pre-occupied, the Agaristid genus may be known as *Eupseudomorpha* But errors of this kind are hard to avoid in a work of the size of this one; and the arrangement of the moths of the world under a uniform system of classification makes possible a revision of our North American species to correspond with it. The correction of certain errors in the location of species, with which Mr. Kirby is necessarily autoptically unacquainted, can easily be made, and Mr. Neumoegen and myself have already started on this work.

HARRISON G. DYAR.

Mailed January 5th.