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No. 6.

CLASSIFICATION OF THE HORNTAILS AND SAWFLIES, OR THE SUB-ORDER PHYTOPHAGA.

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(Paper No. 1.)

For many years past, those most interesting of Hymenopterous insects—the Horntails and the Sawflies—have received the closest study by some of the ablest Hymenopterists of the world. Cresson and Norton, in America; Newman, Westwood, Kirby, and Cameron, in England; Klug, Hartig, and Konow, in Germany; Lepelletier and André, in France; and Thompson, in Sweden, have all contributed much to our knowledge of these insects, and made decided improvements in their classification.

Mr. Peter Cameron, in his excellent Monograph of the British Phytophagous Hymenoptera, Vol. I., published in 1882, has given a thorough review of the progress made in the systematic arrangement of these insects; besides, on the completion of the work, some years later, gives a full bibliography on the subject; so that it is unnecessary here to repeat or enter particularly into this part of the subject, since this work is so easily accessible to the student.

I shall here, therefore, very briefly refer to Cameron's work on the group, and that of a later writer, Mr. F. W. Konow.

Mr. Cameron, in his work, made some decided improvements in the classification of these insects, and gave excellent tables for the separation of families and genera.

He recognized only four families: I. *Tenthredinidæ*, II. *Cephidæ*, III. *Siricidæ*, and IV. *Oryssidæ*, and some of these he again subdivides into subfamilies, tribes and subtribes.

The latest systematist to work in the group, a most prolific writer, and a profound and energetic student of these wasps, is Mr. F. W. Konow, of Teschendorf, who in the *Deutsche Entomologische Zeitschrift*, for 1890, proposed almost an entire new arrangement, besides giving a very unique and original method for showing the relationship of the different groups or tribes recognized by him.

In this paper, he considered the vast number of species, now known in the world, to belong to a single large family which he called the *Tenthredinidae*, and then separates it into three subfamilies as follows: i. Lydetæ, ii. Siricetæ, and iii. Tenthredinetæ. The Lydetæ he divides into four tribes: (1) *Lydini*, (2) *Cephini*, (3) *Pinicolini*, and (4) *Blasticotomini*; the Siricetæ into three tribes: (5) *Xiphydriini*, (6) *Siricini*, and (7) *Oryssini*; while the Tenthredinetæ he divides into four tribes: (8) *Cimbicini*, (9) *Argini*, (10) *Lophyrini*, and (11) *Tenthredinini*.

Many of these he again subdivides into subtribes, which agree in the main with some of the subfamilies of other authors.

Since this publication appeared, he has, in several very valuable contributions, still further elaborated his system, and in many clear and admirable tables has greatly enlarged our knowledge of genera and species.

The present status of Konow's systematic work in the group is probably well expressed in Dr. Von Dalla Torre's "Catalogue of the Tenthredinidæ," representing Vol. I. of his *Catalogus Hymenopterorum*, published in 1894, and which, in the main, appears to be arranged in accordance with the views published by Konow, up to date of publication.

In this Catalogue, 18 subfamilies are recognized, arranged in the following sequence: (1) *Dolerinæ*, Thomson, 1871; (2) *Tenthredinidæ*, Newman, 1834; (3) *Selandriidæ*, Thomson, 1871; (4) *Blennacampinæ*, Konow, 1890; (5) *Hoplocampinæ*, Konow, 1890; (6) *Nematinaæ*, Thomson, 1871; (7) *Lophyrinaæ*, Thomson, 1871; (8) *Pterygophorinaæ*, Cameron, 1878; (9) *Lobocerinaæ*, Kirby, 1882; (10) *Hylotominaæ*, Newman, 1834; (11) *Cimbicinaæ*, Leach, 1817; (12) *Oryssinaæ*, Newman, 1834; (13) *Siricinaæ*, Newman, 1834; (14) *Xiphydriinaæ*, Thomson, 1871; (15) *Blasticotominaæ*, Thomson, 1871; (16) *Xyelinaæ*, Newman, 1834; (17) *Cephinaæ*, Westwood, 1840; and (18) *Pamphiliinaæ*, Dalla Torre, 1894.

I have gone somewhat particularly into the present arrangement of these insects, and probably further than was really necessary as an introduction to the present series of papers on their classification: 1st, Because my own views are so at variance with other systematists; 2nd, Because I have recognized no less than 15 distinct families; and, 3rd, Because I have separated, quite widely, groups and genera that were previously placed together or in juxtaposition.

This separation will become more apparent in the articles that are to follow the present introductory paper, which will include synoptic tables for the recognition of the genera of the world.

Another thing, and a very important one, which has greatly influenced me, in making so many families, is, that not only do the imagoes themselves seem to possess good morphological characters that justify this separation, but that these are, in many instances, seemingly correlated by excellent morphological characters possessed by the larvæ, which would seem to indicate many natural groups.

My present views, respecting the arrangement of the series and families recognized, are incorporated in the following tables :

- II. SUB-ORDER PHYTOPHAGA.—Abdomen broadly sessile; larvæ with legs.
 Anterior tibiæ with one apical spur. Series I.—Xylophaga.
 Anterior tibiæ with two apical spurs. Series II.—Phyllophaga.

Series I.—XYLOPHAGA.

This series represents four distinct families, which may be separated by the following characters :

- Metathorax fissured in the middle at apex. 2.
 Metathorax not fissured.
 Vertex tuberculate ; antennæ inserted below the clypeus and eyes ; front wings with two submarginal cells ; abdomen cylindrical or depressed ; ovipositor not exerted. Family I., Oryssidæ.
 2. Middle lobe of mesonotum attaining the scutellum and separated from it by a transverse line ; abdomen cylindrical or depressed.
 Prothorax large, subquadrate ; costal cell of front wings not divided by a transverse nervure ; tip of abdomen ending in a triangular or lanceolate process. Family II., Siricidæ.
 Prothorax conical ; costal cell of front wings divided by a transverse nervure ; abdomen at tip normal. Family III., Xiphydriidæ.
 Middle lobe of mesonotum not attaining the scutellum ; abdomen more or less compressed. Family IV., Cephidæ.

Series II.—PHYLLOPHAGA.

This series I have separated into eleven distinct families, distinguished as follows :

- Prothorax emarginate behind ; middle lobe of mesonotum much longer than broad, not separated from the scutellum by a deep fovea ; costal vein usually strongly thickened or clavate towards apex ; costal cell without an intercostal vein. 2.
 Prothorax subtruncate behind ; middle lobe of mesonotum not much longer than broad, and separated from the scutellum by a deep

fovea; costal nervure towards apex neither thickened nor clavate, the cubitus originating from the basal nervure; costal cell with an intercostal vein; scape of antennæ long or rather long.

Head transverse, the temples not very broad; third joint of antennæ very long, three or four times longer than the long scape; ovipositor more or less exerted... Family V., Xyelidæ.

Head quadrate, the temples very broad, third joint of antennæ rarely much longer than the scape; abdomen much depressed, the ovipositor hidden..... Family VI., Lydidæ.

2. Basal nervure in front wings usually uniting with the subcostal vein far from the origin of the cubitus; basal plates of first abdominal segment usually closely united, rarely showing a slight median emargination at apex; if deeply emarginate, the sides of the abdomen acutely margined, while the antennæ are clavate.....7.

Basal nervure in front wings usually uniting with the base of the cubitus or with the subcostal very near its base; basal plates of first abdominal segment most frequently not united, medially slit or with a wedge-shaped or broadly triangular emargination, sides of abdomen rounded, never acutely margined.

Front wings with two marginal cells.....6.

Front wings with one marginal cell.....3.

3. Front wings without a lanceolate cell.....5.

Front wings with a lanceolate cell.

Antennæ 9- to 25-jointed.....4.

Antennæ 3-jointed.

Hind wings with an anal cell; tibiæ usually with lateral spurs; antennæ in ♀ with the third joint very long, subclavate or filiform, densely hairy, in ♂ most frequently forked..... Family VII., Hylotomidæ.

4. Hind wings with an anal cell; ♀ antennæ usually serrate or subserrate, ♂ antennæ ramose or biramose.. Family VIII., Lophyridæ.

Hind wings without an anal cell; ♀ antennæ most frequently subclavate or filiform, ♂ antennæ usually ramose or filiform..... Family IX., Perreyiidæ.

5. Hind wings without an anal cell; antennæ 6- to 25-jointed, in ♀ clavate or subclavate, more rarely filiform, in ♂ ramose, or simple, filiform, multiarticulate..... Family X., Pterygophoridæ.

6. Body rather short, oviform, the abdomen not long; scape small, scarcely longer than thick, not or only a little larger than the pedicel (except in the Blasticotominae, which has, however, only 4-jointed antennae); antennae 4- to 15-jointed; head, seen from above, not quadrate, the occiput more deeply concave, the temples not so broad, more rounded behind, while there is no distinct furrow or depression between the antennae and eyes, or so slight as to be scarcely noticeable. Family XI., Selandriidae.

Body elongate, the abdomen usually long, narrow and subcylindrical; scape rather large, usually thrice as long as thick or about four times larger than the pedicel; antennae 9-jointed; head, seen from above, quadrate, the temples very broad and with a furrow, channel or depression on each side of the antennae, between them and the eyes, which extends upwards and posteriorly on the vertex. Family XIV., Tenthredinidae (pars)
(= Subfamily Strongylogasterinae).

7. Front wings with two marginal cells. 8.

Front wings with one marginal cell; second submarginal cell receiving two recurrent nervures; lanceolate cell contracted near the middle and closed at base, or petiolate; antennae 9-jointed. Family XII., Nematidae.

8. Abdomen acutely margined at sides; antennae clavate, 5- to 8-jointed. . . 9.

Abdomen not margined at sides; antennae not clavate, 8- to 9-jointed; front wings with three or four marginal cells.

Front wings with four submarginal cells, the second usually receiving both recurrent nervures, or the second recurrent is interstitial with the second transverse cubitus, very rarely joining the base of the third submarginal cell; abdomen short, oviform. Family XIII., Dineuridae.

Front wings with four submarginal cells, the second and third each receiving a recurrent nervure; if with three submarginal cells, either the first or the second transverse cubitus is wanting; abdomen elongate, subcylindrical. . Family XIV., Tenthredinidae.

9. Dorsal plates of first abdominal segment usually deeply emarginate medially, leaving a membrane exposed. . . Family XV., Cimbicidae.

NEW BEES FROM NEW MEXICO.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

Podalirius phenax, n. sp.—♂. Length about 9 mm.; appearance of *P. maculifrons* (Cress.), with the same white pubescence (mixed with black on hind part of mesothorax and front part of scutellum), the same clear wings (but the second submarginal cell is less narrowed above), and the same legs, except that the tarsi are wholly dark. The black antennæ are considerably longer, when the head is thrown back they reach to postscutellum; scape with a broad white stripe; first joint of flagellum a little shorter than third. Eyes a beautiful dark lavender or gray-blue, instead of green. Clypeus (except the narrow black anterior edge) a transverse supraclypeal band, lateral face-marks (triangular, with the upper side deeply excavated), labrum (except the usual pair of spots), and a large patch on mandibles, pure white, shining, like porcelain. Abdominal bands more or less interrupted in the middle; fifth segment without a band; apex with two spines.

Hab.—College Farm, Mesilla Park, N. M., April 13, 1898, at flowers of plum. Allied to *P. albatrus* and *P. maculifrons*.

Andrena subaustralis, n. sp.—♀. Length about 10 mm.; black, the abdomen with a hardly noticeable greenish lustre. Pubescence rather abundant, but not hiding the surface, dull white, on upper parts of head and thorax pale dull ochreous. Head broad, facial quadrangle broader than long; face hairy; clypeus strongly and closely punctured, with no median smooth line; frons strongly striated; antennæ black, brown at tips; mandibles rufescent at ends, with a strong inner tooth; process of labrum broad, truncate at end. Mesothorax minutely tessellate, with rather shallow and sparse punctures; enclosure of metathorax triangular, poorly defined, minutely granular, feebly wrinkled at the base. Legs dark, quite densely pubescent, the pubescence on tarsi more or less tinged with fulvous. Tegulæ black; wings yellowish-hyaline, apical margin broadly smoky, but not conspicuously darkened; nervures and stigma honey colour. Abdomen oval, convex, tessellate and very minutely punctured; first and second segments with some white hair at sides; third to fifth segments with very thin bands of long white hairs, that on the third very broadly interrupted; anal fimbria bright orange-fulvous.

♂.—Similar, but smaller and narrower; flagellum wholly dark;

pubescence of thoracic dorsum with quite a fulvous tint ; abdomen thinly pubescent, but hardly banded, hair at apex yellowish or nearly white.

Hab.—Paraje, N. M., April 11th, 1898, at flowers of plum ; 3 ♂, 1 ♀. Differs from *A. Belfragei* by the pubescence being not so bright, clypeus without impressed line, wings not very dark at apex, abdomen not so punctate. Also rather resembles *A. polemonii*, Rob.

Andrena prunifloris, n. sp.—♀. Slightly over 10 mm. long, black, with grayish-white to white pubescence ; hind tibiae, and all the tarsi, bright ferruginous. Head broad, facial quadrangle broader than long ; face hairy, but not so as to hide the surface ; clypeus minutely rugose and strongly punctured, with a small shining space in the median line not far from the anterior margin ; frons striate, with punctures between the ridges ; vertex minutely tessellate, and punctured ; antennæ dark, flagellum only faintly brown towards the end, first flagellar joint fully as long as the two following together ; process of labrum broad and low, feebly emarginate ; mandibles wholly dark. Thorax with rather abundant pubescence, not hiding the surface, grayish-white or very pale mouse colour on mesothorax, otherwise white ; mesothorax microscopically tessellate, with strong, rather close punctures ; metathorax dull, enclosure triangular, ill-defined, with irregular feeble raised lines. Tegulæ piceous ; wings smoky subhyaline, nervures and stigma dark brown, third submarginal cell narrowed about one-half to marginal. Abdomen somewhat depressed, shining, very distinctly punctured ; hind margins of third and fourth segments with entire dense snow-white bands, second segment with a similar band broadly interrupted in middle, first with only patches of white pubescence at the sides ; anal fimbria sooty.

Hab.—Paraje, N. M., April 11, at flowers of plum. Allied to *A. viola*, Rob.

Hesperapis, n. g.—A small bee with the general aspect of a Philere mine. Body rather densely clothed with very short mosslike pubescence ; longer hairs intermixed ; abdomen with entire hair-bands. Wings rather short ; stigma subobsolete ; marginal cell large, obtusely pointed, the apex not diverging from the costa ; two submarginal cells, the second about two-thirds the length of the first, narrowing rather more than one-half to marginal ; both recurrent nervures joining the second submarginal cell at about the end of the first and beginning of the last fifth. Hind legs with large black bristles. Ocelli large, very prominent,

in a broad triangle. Tongue short, pointed, daggerlike, its margin entire. Labial palpi 4-jointed, first joint long, but not excessively so, nearly as long as 3 and 4 together, these being about equal; 2 somewhat shorter than 1. Maxillary palpi 6-jointed, first three joints moderately stout, the other three very slender; 2 conspicuously longest, all the others about equally long. No ventral scopa in ♀.

Hesperapis elegantula. n. sp.—♀. Length, $6\frac{1}{2}$ mm.; head and thorax black, abdomen dark ferruginous. Head oblong, facial quadrangle considerably longer than broad; face and cheeks with short snow-white pubescence, vertex with ochreous pubescence; clypeus with minute, rather sparse punctures; mandibles slender, reddish except at the extreme base, armed with a small tooth on the inner side; labrum clear ferruginous; antennæ short, especially the flagellum; scape and the rather large funicle black, flagellum brown; eyes dark, with a perceptible sage-green tint; pubescence of mesothorax and scutellum short and mosslike, with long hairs intermixed, ochraceous throughout, almost hiding the densely punctured surface; pubescence of postscutellum, metathorax and pleura white; basal triangle of metathorax minutely roughened, free from pubescence; tegulæ testaceous, pubescent; wings not reaching as far as tip of abdomen, hyaline, slightly milky or opalescent, stigma honey colour, nervures brown, subcostal nervure black; legs black, the knees and the hind tibiæ behind, reddish; pubescence of legs dull white, middle tarsi with a brown brush within; small joints of anterior tarsi with long dark lateral pencils of hair; outer side of hind tibia, and of basal joint of hind tarsus, with minute snow-white dense pubescence, and numerous long black bristles; abdomen somewhat depressed, of ordinary form, with five entire broad white hair-bands on the apices of the segments; the exposed ferruginous surface between the bands very minutely and closely punctured; fifth segment and apex with black bristles; pygidium shining, impunctate, with a small groove near its end; venter ferruginous, with no conspicuous pubescence.

Hab.—Mesilla Park, New Mexico, on campus of the Agricultural College, April 22, 1898, at flowers of *Dithyrea wislizenii* probably, possibly at *Senecio*. Collected by Mr. C. M. Barber.

This remarkable little bee seems to be most nearly allied to *Ammobates* (*Phileremus*), but it differs entirely in the mouth-parts, and might probably form a new tribe. From its structure and appearance it is probably parasitic in the nests of some other bee.

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

XXIX. THE ŒDEMERIDÆ AND CEPHALOIDÆ OF ONTARIO AND QUEBEC.

The family Œdemeridæ is of small extent, only five species, representing four genera, being recorded from the region under discussion. None of our species are very small and two of them at least often reach a size sufficient to render them readily noticeable. With the exception of *Nacerdes melanura*, which frequents houses, wharves, lumber piles and shipping, they are to be found on bushes and trees or else under boards in wooded districts.

Technically they may be defined as beetles having the hind tarsi four-jointed, the remainder five-jointed; the anterior coxal cavities open behind; the head not strongly and suddenly constricted at base; and the middle coxæ very prominent. The claws are either simple, dilated at base or with a basal tooth.

In appearance the genera differ considerably; however, those in our fauna belong to the three types of habitus of which figures are given, *Nacerdes* resembling *Asclera* in general form. It is hoped, therefore, that the collector may have no difficulty in identifying his Canadian captures. The generic table following is constructed on the lines laid down in the Classification and in Dr. Horn's recently published memoir:

- A. Eyes deeply emarginate, embracing the base of the antennæ, which are nearly as long as the body. Appearance much like a slender *Elaphidion* *Calopus*.
- AA. Eyes entire or nearly so.
- b. Form robust, colour black with faint violet tinge. Tarsi with several joints spongy-pubescent beneath. *Ditylus*.
- bb. Form slender, colour in part reddish or yellow.
- c. Anterior tibiæ with one spur. Colour above yellowish, elytra tipped with black. Antennæ of male twelve-jointed *Nacerdes*.
- cc. Anterior tibiæ with two spurs, antennæ eleven-jointed in both sexes. Colour blackish, prothorax wholly or in part reddish. *Asclera*.

Of course, it must be understood that the colour-characters given above are intended to apply only to the Canadian species.

CALOPUS, Fab.

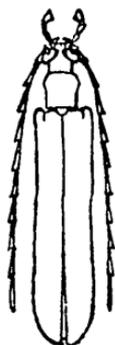


FIG. 13.

C. angustus, Lec., would probably be taken by most beginners for a Longhorn on account of its slender form and brownish colour, which cause it to resemble, in general, certain species of *Elaphidion*. The antennæ are almost as long as the entire body. Surface of body brownish, pubescence scant, whitish. Head, including the eyes, about as broad as the prothorax, which is broadest at about one-third from apex, the sides arcuate in front, nearly parallel posteriorly; the thoracic disk is uneven with a broad ill-defined median impression, punctuation distinct. Elytra at base much broader than the prothorax, nearly parallel, slightly broader behind, each with three ill-defined costæ. Length, .50-.72 inch. Occurs also in the western United States, particularly in mountainous regions. Such specimens as I have met with were found under stones or boards. The form of this insect is shown in fig. 13.

DIRYLUS, Fisch.

D. cœruleus, Rand., is stout, black with a violaceous tint most evident on the prothorax. Head punctured and rugose, prothorax finely and rather closely irregularly punctured, broadest in front of middle, sides oblique, hardly sinuate to base, which has a raised margin or collar. Median line distinct but not well defined. Elytra finely granulate or shagreened* with short, scarcely visible pubescence; each with four well-defined and nearly equidistant costæ. These costæ are but slightly elevated, their distinctness being due to the striæ bounding them on each side. Length, .48-.75 inch. (Fig. 14.)



FIG. 14.

Two other species are found in the Western or Pacific provinces: *D. gracilis*, Lec., which has a longer thorax (distinctly longer than wide), with less dense punctuation and not noticeably clothed with pubescence, and *D. quadricollis*, Lec., with a subquadrate thorax which is densely punctured, pubescent and opaque. In size these do not differ greatly from *D. cœruleus*, and so far as I have observed them their habits are the same.

NACERDES, Schmidt.

N. melanura, Linn., is an introduced form abundant in the Atlantic

*Dr. Horn has erroneously described them as "densely punctate."

cities and occasionally swarming on shipboard. It is readily recognized by the slender form, hardly broader behind, colour above yellowish, the elytra with blackish tips. Beneath it is blackish, the legs in part yellow. It reaches a length of about half an inch.

ASCLERA, Schmidt.

The two species of this genus are blackish insects of slender form, though not so elongate as *Calopus*, the prothorax more or less red, the elytra distinctly costate. They separate thus :



FIG. 15.

Prothorax red, with three foveæ (one near middle of base, the others anterior to this and placed one on each side of the median line). Elytral costæ sharply elevated. .20-.26 inch. *ruficollis*, Say.

Prothorax with a large central blackish spot, the disk depressed more deeply on each side of the middle line. Elytral costæ distinct but less sharp than in the preceding species. .26-.32 inch. (Fig. 15.) *puncticollis*, Say.

Allied to the *Cedemeridæ* is the small family *Cephaloidæ* represented in North America by the genus *Cephaloon*, which resembles in form a Longhorn of the *Lepturoid* series. The characters separating the two families are to be readily perceived in the form of head and claws. In *Cephaloon* the head is constricted behind and the claws are pectinate, besides bearing a long appendage. While only one species (*C. lepturides*, Newm.) has been actually reported from the eastern provinces, we copy Dr. Leconte's table of all the American species, since one (*C. tenuicorne*) has been taken on the Stickeen River in British Columbia, and the other may yet be met with in Canadian territory, since it is known from the White Mountains and Lake Superior. Dr. Leconte's table, amplified by the addition of some other characters, runs thus :

- A. Appendages of claws broad, rounded at tip.
 - b. Outer joints of antennæ gradually broader, not elongated. Colour extremely variable and inconstant, may be entirely testaceous ; the usual colour is piceous, legs (in part), head (with or without a frontal dark spot of varying size), and prothorax (often with a discal spot and more or less of the sides dark), testaceous. .36-.48 inch. *lepturides*, Newm.
 - bb. Four outer antennal joints slightly broader, the joints longer, especially the intermediate ones. Colour variable, testaceous,

head behind the antennæ, sides of elytra, under surface and sometimes also the legs (in part), and a median thoracic spot, piceous. .44-.48 inch *tenuicorne*, Lec.

AA. Appendages of claws curved, acute, slender. Very elongate, testaceous or piceous, antennæ slender, filiform, scarcely thickened externally, joints 9-11 longer. .44-.50 inch *ungulare*, Lec.

The few papers treating of the above families in systematic form are:

1854. Leconte, J. L. Synopsis of the *Ædemeridæ* of the United States. Proc. Acad. Nat. Sci., Phila., VII.
1866. Leconte, J. L. New species of Coleoptera. Smithsonian Misc. Coll. [Table of *Copidita*, p. 164; of *Oxaxis*, p. 165.]
1874. Leconte, J. L., and Austin, E. P. Catalogue of the Coleoptera of Mt. Washington, N. H., with descriptions of new species. Proc. Bost. Soc. Nat. Hist., XVI. [Table of *Cephaloon* on p. 276.]
1896. Horn, Geo. H. The *Ædemeridæ* of North America. Proc. Cal. Acad. Sci., 2nd Ser., VI.

NOTES ON PHILANTHUS.

BY S. N. DUNNING, HARTFORD, CONN.

I have been so fortunate as to have, while making the following notes, the collection of *Philanthus* belonging to the Academy of Natural Sciences before me.

Philanthus Sanborni, Cress. (*Philanthus Trumani*, Dun. Ent. News, VIII., 70, ♂, not ♀.)

This species does not always have the W-shaped mark on face described by Cresson.

Philanthus punctatus, var. *Cockerelli*, Dun. Ent. News, VII., 69 (1896).

The characters given by Cockerell, Ent. News, IX., 26 (1898), separate this from typical *punctatus*.

Philanthus scelestus, Cr.

On *Geranium* (probably *Richardsoni*). Evergreen, Colo., July 17. Also Santa Fé, New Mex., in August. (Ckll., 4252.)

Philanthus sublimis, Cr.

Vancouver Island, July 10-18, by Mr. C. Livingston.

Philanthus cleomæ, n. sp.

♀.—Length, 10-11 mm. Black, partly shining, with pale yellow markings. Clypeus, mandibles (except tip), two spots on genæ near base of mandibles (sometimes connected with line behind eyes), sides of face

to emargination of eyes, large subquadrate extension between antennæ, line behind eyes, two spots on vertex (sometimes connected), collar (sometimes a line or mark at sides or below), two spots on fore part of scutellum, spatulæ, postscutellum, two narrow lines and two large patches on metathorax (sometimes connected), tegulæ, tubercles, two small and one large spot behind and below (sometimes running underneath the thorax and connecting), interrupted band on first segment, usually emarginate, but sometimes interrupted band on second, emarginate bands on 3-5, all but apex of sixth, and almost all of legs (including coxæ), yellow; tarsi with a pale rufous tendency; antennæ brownish; a very few hairs on head and venter; distance between eyes about their greatest length; first joint flagellum distinctly longer than second; vertex and mesothorax with sparse fair-sized punctures, scutellum and postscutellum hardly punctured, enclosure of metathorax finely wrinkled, metathorax roughened rather than punctured, abdomen with large close punctures, becoming smaller towards apex, sixth segment but faintly punctured, venter sparsely so; wings hyaline, slightly clouded in outer half, nervures light rust coloured; collar declivitous.

Six females, four belonging to the Academy of Natural Sciences, and two in my own collection.

Hab.—Montana; S. Bernardino Co., Cal.; Las Cruces, New Mex.; (Ckll., 4786, on *Bigelovia*) and Denver, Colo. (D. 1105c and D. 1271a, on *Cleome serrulata*.)

Philanthus henricus, Ckll. and Dun., n. sp.

♀.—Length, 14 mm. Black with yellow and rufous markings. Mandibles (except piceous tip), clypeus, sides of face to emargination of eyes, a short emarginate extension between antennæ, a narrow line behind each eye, collar, tegulæ, small spot on tubercles, a larger spot behind, postscutellum, scape (partly), interrupted band on first segment, a narrowly interrupted band on second, emarginate bands on third and fourth, all of fifth and the last (except rufous apex), venter (except fore part more rufous), a spot on trochanters and last four coxæ, rest of legs (except rufous femora and rufous inclined tarsi), yellow. Yellow on face paler; a faint irregular rufous mark centrally on second segment; third joint antennæ as long as fourth and fifth combined; eyes as distant as their length; a fairly thick and long ochraceous pubescence on head, more sparse on thorax and still more so on venter; vertex, mesothorax, scutellum, postscutellum, disk of metathorax, abdomen and femora

shining; basal segment constricted as in *punctatus*. Punctures on vertex distinct, fair sized, scattered; on mesothorax and scutellum rather finer, scattered; of about the same size on metathorax, but closely crowded (fovea with fine transverse wrinkles not Λ shaped or coarse as in *flavifrons*); on abdominal seg. 1-2, large and pit-like as in *punctatus*, still large but sparse on seg. 3, on remaining seg. fine and so few as to be hardly apparent. Wings hyaline, a little dusky at centre and more so at apex; nervures pale rust-coloured.

One female in collection; T. D. A. Cockerell.

Hab.—New Mex. (N. F. Gila, July 16).

In marking like *flavifrons*, Cr., and in build like *punctatus*, Say.

Philanthus multimaculatus, Cameron (*Philanthus annæ*, Dunning. Ent. News, 1897, p. 68, ♂, not ♀). Four males and three females before me; the former are about 8-10 mm. long, the latter 11-12 mm. Las Cruces, N. Mex., on *Salix*, May 2, 1 ♂ (Ckll.); Mesilla, N. M., June 24, on *Aster spinosus*, 1 ♀ (ident. Ckll.); Calif. (taken by Prof. Griffith, Los Angeles), 2 ♀; Colo. (Baker, No. 1591), 1 ♀; Denver, Colo., July 20, 2 ♂, on *Cleome serrulata* (D. 1105a, D. 1271b).

Philanthus serrulata, n. sp.

♀.—Length, 9 mm. Black with yellow markings. A few ochraceous hairs on head and venter; distance between eyes on vertex equal to length of joints, 3-5 of antennæ; 3d. jt. antennæ longer than 4-5 combined; cavities at extremities of scutellum and postscutellum, like *multimaculatus*, Cam., and others; wings fulvo-hyaline, not clouded, nervures and stigma pale rust-coloured; punctures on vertex close and fine, on mesothorax fine but irregularly scattered (postscutellum and scutellum not punctured), on metathorax close and fine, including enclosure (which is not well defined), on seg. 1-2 not quite so fine, but close, sparse on seg. 3 and still more so on seg. 4-5, on venter like seg. 1-2; face to ocelli (except base of antennæ), spot on scape and joints 3-5 on one side, spots on vertex and behind eyes, collar, two spots or lines centrally on mesothorax and two smaller spots at sides in front of tegulæ, scutellum, postscutellum, tegulæ, tubercles, spot behind, broad bands on seg. 1-2, narrow irregular bands seg. 3-6, knees, tibia, yellow; apical 4 joints of antennæ and most of tarsi rust-coloured or rufous; collar declivitous.

From *multimaculatus* it differs at once in fine punctures, clear wings and markings; from *arizonæ* in distance of eyes apart on vertex, cavities

at sides of scutellum and postscutellum, and in coarser and more irregular punctures of abdomen. One ♂ spcm., Denver, Colo., July 20, 1898, on *Cleome serrulata* (L. 1105b).

Philanthus arizonæ, n. sp.

♂.—Length, 7 mm. Jet black with pale yellow markings. A fairly thick growth of fine white pubescence on face and cheeks, more downlike on thorax, hardly apparent on abdomen; eyes close, about the distance apart on vertex of the length of joints 3-4 of antennæ; collar declivitous; wings clear, not clouded, nervures outwardly fuscous, stigma and towards base pale rust-coloured; no cavity at sides of scutellum and postscutellum; joints 3-5 of antennæ on one side, face to ocelli (except base of antennæ), two spots on vertex and two behind eyes, collar, two spots on fore mesothorax centrally, most of scutellum, postscutellum, tegulæ, tubercles, spot behind, knees, tibia, yellow; lower face, tegulæ and tubercles very pale, almost white; tarsi rust-coloured mostly; punctures on vertex fine, sparse, on mesothorax fine, closer (scutellum and postscutellum not punctured), metathorax (including poorly defined enclosure) fine, close, on abdomen fine and close, about evenly distributed, on venter scattered, fine.

One ♂ spcm. taken by Dr. Griffith, at Phœnix, Arizona, Nov., '97, and numbered D. 1331 in my collection.

"Collar declivitous," as used above, describes *P. punctatus*; not declivitous would describe *P. ventilabris*.

THE EPIPLEMIDÆ THE LOWEST BOMBYCIDS.

BY HARRISON G. DYAR, PH. D., WASHINGTON, D. C.

The Epiplemidæ are a family of moths fairly well represented in India. (See Hampson's Moths of India, III., 121.) Only one larva is known, that of *Epiplema latifasciata*, Moore, and unfortunately the figure is insufficient to show more than that the feet are normal (five abdominal pairs) and the setæ probably single. The family occurs also sparingly in America. Hulst lists three genera as a subfamily of Geometridæ, the Strophidiinæ (Trans. Am. Ent. Soc., XXIII., 309); but I would certainly prefer Hampson's treatment, both as to the name and rank of the group.

By good fortune some larvæ of one of our species were bred at the Department of Agriculture at Washington in 1882, and inflated larvæ prepared by Koebele. They have remained undescribed to the present time. The species is *Callidapteryx dryopterata*, Grt., which falls near

the Indian genus *Orudiza*, Walk. The larvæ are remarkable. They possess the five normal pairs of abdominal feet, with rather few crotchets on the inner three-fourths of the planta, double hooked, of two not very regular lengths. The setæ are distinct but short, with large tubercles, single except that vi. consists of two setæ, arising from separate tubercles on abdominal segment 3 and posteriorly, but from the same tubercle on segments 1 and 2. Tubercles iv. and v. are separate on the posterior segments, strictly in line, iv. not at all higher. On abdominal segments 1 to 3 they are united together. There is a distinct leg plate with scattered setæ. On the thorax i. a + i. b, ii. a + ii. b, iii. separate, iv. + v., vi. double. The prothoracic shield is broken up, the lateral piece the most distinct and bearing three setæ. The head has single setæ, fairly distinct. Those on the epicranium are normal above; i., ii. and iii. forming a right angle; iv. below; v., vi. and vii. behind the eyes; vii. situated between the two lower ocelli; viii. above the level of the eyes, midway between them and the clypeus; ix. half way

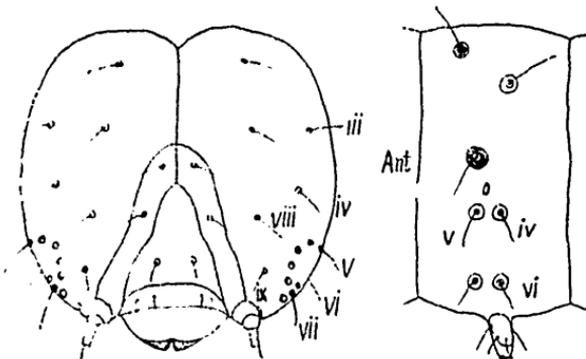


FIG. 16.

between viii. and the base of the antenna. (See Journ. N. Y. Ent. Soc., IV., 93, for numbering of head setæ.) I adjoin a figure showing the head and abdominal setæ of *Callidapteryx* in diagrammatic form. (Fig. 16.)

The interpretation of these structures is at first puzzling. There is a strange mixture of Bombycid and Tineid characters. Tubercle iv. is in its generalized position, yet on the forward segments it unites with v. as in the Tineids. But the fact that this union is not present throughout shows that it is a recent acquirement, for when such a character is congenital it is present on all the segments without equivocation. Another Tineid character is the union of the upper thoracic tubercles in pairs, especially of ii. b with ii. a. Again, on the head seta viii. is high up as in Tineids.

The Bombycid characters are the leg plates, the half row of crotchets on the feet, the doubling of tubercle vi. and breaking up of the cervical

shield. The usually decisive character of the position of tubercle iv. is here as indifferent as it could possibly be made. I explain the larva as follows: It is at the bottom of the Bombycids, and tubercle iv. has not yet taken up its definite position. The other Tineid anomalies are explained by a comparison with the Drepanidæ, with which this larva bears affinity in the setæ, although there is no hypertrophy of the anal plate. In *Drepana arcuata* the thoracic tubercles ii. a and ii. b are united, the epicranial seta viii. is high up, above the level of the eyes, and abdominal tubercle vi. is doubled, all as in *Callidapteryx*. *Drepana* is then also a low form, but here abdominal tubercle iv. is in the characteristic Bombycid position.

The Epiplemidæ, then, stand at the bottom of the Bombyces, throwing off on one side the Drepanidæ, on the other (judging from the moths) the Geometridæ. Near them the Notodontian stem has arisen, giving rise to the other Bombycid families. (See Proc. Boston Soc. Nat. Hist., XXVII., 146, for a geneological tree. The Epiplemidæ may be added at the point where the stem of the Drepanidæ joins that of the Geometridæ.)

Callidapteryx dryopterata, Grote.

The larvæ were found abundantly at the end of July on *Viburnum nudum*. Moths emerged August 16th, and eggs and young larvæ were found immediately after. Pupæ by September 6th between leaves. Evidently two-brooded. No description accompanies these notes in the books of the Department of Agriculture, and I do not think an adequate one can be made from the blown larvæ. They may have been green or whitish with broken brown lines, tubercles i. and iii. large and dark, the rest pale. Head spotted, 1.4 mm. wide. There is no record of whether the larvæ were exposed or concealed feeders. Stage I. is preserved mounted on a slide labelled 3/4/92, No. 2826, but so badly shrunken that I cannot see the arrangement of setæ. Feet slender, the crotchets nearly bordering the planta, anal plate prominent but not produced; setæ large.

THE TORONTO BRANCH of the Entomological Society of Ontario held its second annual meeting on the 1st of April last. The following officers were elected for the ensuing year: President, Mr. R. J. Crew; Vice-President, Mr. C. T. Hills; Secretary-Treasurer, Mr. Arthur Gibson; Librarian-Curator, Mr. H. D. Chipman; Members of Council, Messrs. H. C. Tyers and E. M. Fenwick. The Department of Education for Ontario has granted to the Society the free use of a room in which to hold its meetings and place its library and collections.

DESCRIPTIONS OF NEW GENERA AND SPECIES OF THE
GEOMETRINA OF NORTH AMERICA.

BY GEO. D. HULST, BROOKLYN, N. Y.

(Continued from page 121.)

LEPTOMERIS NIGRODISCALIS, n. sp.

Expands 24 mm. Palpi and front black; vertex ochre-white; antennæ whitish below, blackish or smoky above; thorax and abdomen white, slightly ochre stained. Fore wings white, with four somewhat indistinct, broad, even, wavy, ochre lines, the first well out from base, the second just outside of discal spot, the third in outer space, the fourth marginal; hind wings with corresponding broad lines; discal points prominent, rather large, jet black; four fine marginal black points below apex on fore wings; beneath more diffuse, more fuscous, less ochreous, the lines less determinate; discal spots not so marked, black points as above on margin of fore wings, and some appearing below apex along margin on hind wings.

Maine.

EOIS PERSIMILIS, n. sp.

Expands 23-26 mm. An insect strongly resembling in superficial appearance *Eois 5-linearis*, Pack. It is smaller than that species, with the hind wings rounded, and not angled as in *5-linearis*. The lines of the wing are brownish ochreous, and straight or slightly bent, not at all wavy and angulate as in *5-linearis*. The ground colour is a clearer white, and has a sprinkling of brownish or blackish scales. The cross lines are rather broadish, even in width, and quite distinct. Beneath as above, with the lines the same, though not so definite as above. Discal spot obsolete above, quite distinct, black, below.

Canada, from Quebec and Ontario; sent by Mr. Hanham, of Winnipeg. The species seems to be midway in some respects between *E. inductata*, Guen., and *E. 5-linearis*, Pack. Mr. Hanham writes me *inductata* is taken at Winnipeg in abundance on the open prairies, while this species he has taken only in dark woods.

EOIS HANHAMI, n. sp.

Expands 23-26 mm. Palpi black, front black, vertex white; thorax and abdomen white or slightly smoky stained; fore wings, ground colour white or slightly fuscous stained, with a sprinkling of blackish points sometimes numerous enough to give a fuscous shading; lines three,

rather faint, blackish, rounded, parallel with each other, equally separated, finely and evenly dentate so far as evidenced; hind wings with three corresponding lines; beneath, more fuscous than above, the inner lines fainter or entirely obsolete; fore wings, apex and outer margin rounded, hind wings without angle.

Closely allied to *E. 5-linearia* and *persimilis*, but with much more rounded wings, and the outer lines different in direction.

Winnipeg, Manitoba; from Mr. Hanham.

SYNCHLORA LOUISA, n. sp.

Expands 18-22 mm. Palpi dull red; front whitish or red below, red above; summit pure white; thorax light green, deep purple-red stained above in ♂, green in ♀; abdomen of ♂ white, deeply stained with purple-red above, end white, with a large snow white spot dorsally on basal segment, and another posteriorly on third segment, (abdomen of ♀ wanting); antennæ pure white, in ♂ pink tinted. All wings clear bright light green, edged with purple-red along costa, and on outer margins, this running out on fringe at end of veins more or less deeply; the colour is more heavy in the ♂, and broadens somewhat on fore wings on outer margin below apex, and at posterior angle; fringes white, more or less purple stained in ♂; discal spots present on all wings, fine, reddish. Beneath smooth, even, silky white, with a greenish tinge; marginal lines fine, purple.

Cocoanut Grove, S. Florida. A very pretty insect. One type in National Museum, No. 3918.

SYNCHLORA VIRIDIPURPUREA, n. sp.

Expands 25-27 mm. Palpi reddish at end, end member very long; front reddish below, dark green above; summit pure white; antennæ white at base, becoming light ochre outwardly; thorax deep clear green; abdomen deep green, the posterior segments light green anteriorly, end reddish, with reddish spots dorsally on posterior segments. All wings deep green, even, somewhat striated with whitish; fore wings with apex sharp, subfalcate; discal point small, reddish-brown; marginal line purplish; an indication of an outer line is given in red spots on the veins towards costa, which become a large purple blotch filling the wing at inner angle, extending one-third towards base, and nearly half way to costa. The hind wings have a diffuse purplish discal spot, purplish marginal line, and a large rounded purple blotch along anal margin and within anal angle; beneath, whitish-green, the purplish blotches faintly showing; body white below, with some reddish on abdomen.

Charlotte Harbor, Indian River and Lake Worth, Florida ; of the size and form of *S. hollandaria*, Hulst, especially distinct, however, in lacking the white spots on wings. I have seen ♀ ♀ only, and the genus may not be properly determined.

SYNCHLORA TEXANA, n. sp.

Expands 25 mm. Palpi and front reddish ; antennæ light ochre ; thorax clear green ; abdomen light green, with pure white spots, rather large, on each segment dorsally. Fore wings, costa rounded, apex pointed, posterior angle distinct, the wings clear green, quite evenly striated with white ; inner line scarcely evident, outer line not very distinct, strongly wavy, about parallel with outer margin, discal spots prominent, distinct, reddish-brown ; marginal line clear distinct reddish-brown also, fringes white, reddish-brown at end of veins. Hind wings of same colour as fore wings, posterior angle prominent, outer margin somewhat wavy ; discal spot distinct, reddish-brown ; marginal line distinct, reddish-brown, fringe white, red at end of veins. Beneath whitish-green, even ; discal points and marginal line reddish-brown, not so sharp as above ; costa of fore wings above and below, as also fore tibiæ on inner side, tinged with reddish.

Austin, Texas. I have the male only.

APIODES CATACHLOA, n. sp.

Expands 24 mm. Palpi and front reddish ; palpi of ♂ short and stout ; antennæ light ochre, pure white on top of stem ; summit pure white ; collar red ; wings bright green, somewhat washed with white, and intermixed with white scales, broad, rounded, a small red spot costally at base, the rest of costa narrowly white ; two not very distinct cross lines continued across both wings, the inner less wavy, the outer more distinct, two-thirds out, parallel with outer margin and wavy ; discal spots distinct, blackish-brown ; margins red ; fringes white. Beneath light whitish-green, the fore wings anteriorly slightly greener than the rest ; fore wings with costa rather broadly ochre nearly to apex ; discal spots distinct, blackish ; margin faintly reddish ; thorax dark green above ; abdomen above green at base, becoming white at end, with a greenish tint dorsally ; on third, fourth, fifth and sixth segments dorsally, red enclosing pure white subtriangular spot ; beneath pure white, except that femora and tibiæ of fore legs are red in front.

Charlotte Harbor, Florida. Mrs. Slosson.

Aploides obliqua, n. sp.

Expands 26 mm. Palpi and front ochre, stained with reddish; summit white; antennæ ochre, white above; collar green; thorax, front and tegulæ deep green, dorsally and posteriorly dull ochre; abdomen ochre-white, with reddish on segments above; fore wings deep even green, whitish-ochre along costa, with two broad white lines; the inner, one-third out from base and reaching inner margin an equal distance from base; the outer line two-thirds out, parallel with outer margin, thus very closely approaching basal line at inner margin, while widely separated at costa; a red marginal line, fringe pinkish, discal spots wanting; hind wings deep green, lighter at base; lines broad, white, the basal not distinct, the outer only slightly rounded; marginal line red, fringe pinkish. Beneath as above, but lighter green, and lines less distinct.

Colorado; from Mr. Bruce.

Deilinia pulveraria, n. sp.

Expands 35-38 mm. Palpi black; front dark brown; thorax dark brown, mixed with blackish; abdomen dark fuscous; fore wings dark fuscous, overlaid with black scales, with many of violet-brown, giving a general dark, almost blackish-brown colour; this darkest at base as shading of basal line, as a broad band over central portion and on outer and submarginal portions; between middle and outer lines is a band of reddish-brown, and on submarginal field a line of whitish lunules or scallops; a marginal line of black dashes present; discal spot a whitish annulus; hind wings fuscous in dark cross striations, heaviest and so darkest outwardly; discal spots distinct, black. Beneath fore wings fuscous, with cross striations, cell more darkened, with an outward black band, distinct towards apex, obsolete before inner margin; hind wings fuscous, with coarser blackish striations darkening the outer portion of the wing, the wing outwardly having a brownish tint.

Rosslund, British Columbia; from Mr. Danby. Taken by him from April 18th to May 9th. The general appearance of the insect is much like *D. litaria*, Hulst.

Deilinia behrensaria, var. *cervinicolor*, n. var.

I wish to give this varietal name to the marked cervinous form of *D. behrensaria*, Hulst. The type form is reddish-ochre or ochre, while the variety is very distinct in appearance, being of the colour stated above, this replacing the colour of the type on all wings.

MACARIA PICTIPENNATA, n. sp.

Expands 23-27 mm. Palpi fuscous gray; thorax and front light, clear gray; abdomen gray, fuscous stained; fore wings clear gray, overlaid with blackish in fine dots and striations; inner line faint across the wing, with a black spot at costa, nearly straight; median shade faint, also black at costa; outer line white, only slightly sinuous, edged on both sides with blackish, this becoming heavy black spots at costa and vein 4; a submarginal shade and black or broken black margin; hind wing fuscous gray, darker outwardly, striated, without lines; discal spots evident on all wings, but not strong; beneath light gray with fuscous tinge, and an ochre shading, nearly white on inner half of hind wings, the outer third on all wings darker.

Prescott and Senator, Ariz.; from Dr. Kunzé. Taken July 1st, and Sept. 1st to Sept. 9th, 1896. The insect is bright in appearance, resembling *Sciagraphia muscaria*, Guen., but brighter, and with outer line not angled near costa, differing as well as in the antennal structure of the male.

NACOPHORA QUERNARIA, var. ATRESCENS, n. var.

I have received this very marked form from Mr. Moffat, of London, Ontario. The general colour is black with a narrow whitish basal line, and a narrow whitish outer line, which broadens near inner margin. The hind wings have an outer broad whitish band; each of these is the edging of the normal black lines of *quernaria*, these lines being evident in the variety. Beneath as above, the colours a little sharper and less squamose.

London, Ontario, Canada; from Mr. Moffat.

SCIAGRAPHIA SPODOPTERATA, n. sp.

Expands 35-38 mm. Palpi, front, thorax and abdomen light fuscous to nearly white, the abdomen being darkest and sometimes interlined with black. Fore wings fuscous-white to white, the surface more or less marked with points and cross striations of fuscous; lines three, subparallel, black, equally distant, the basal and outer heavy, distinct; the middle, which is through the discal point, lighter and more variable; these lines are straight or slightly sinuous, continuing to the costa without the angle or sharp bend so generally found near costa in species nearly allied, in this respect resembling *trifasciata*, Pack. Outer margin somewhat lighter; marginal line black. Hind wings gray-fuscous stained, or with considerable fuscous striations, with a basal and extra discal black line—these

varying in intensity—the basal often, and both sometimes, obsolete. Beneath more diffusely obsolete, the lines above showing in depth of colour, but not black nor distinct.

Colo., Cala. The specimens are all females. The species is nearest to *atrofasciata*, Pack., but is much larger in size and lighter in colour.

SCIAGRAPHIA FLAVIVENATA, n. sp.

Expands 34 mm. Palpi ochreous at end and above, brownish below; front fuscous ochreous; antennæ ochreous, blackish above; thorax brownish, with a dorsal gray line, and ends of patagium bright orange-ochreous; abdomen with white dorsal lunule at base, the rest yellow with scattered dark scales. Fore wings blackish, ochreous, with distinct cross striations of yellow and whitish, the yellow striations more prevalent along the costa, the white on the rest of the wings, these being enough to give a banded appearance at base, intradiscally, and outwardly, the latter being more clear and somewhat uneven; veins clear deep yellow. Hind wings dirty grayish, somewhat mottled, the markings being more distinct in colour along inner margin, and at dorsal angle. Beneath dull fuscous mottled gray, a whitish line from apex to inner margin on fore wings, and a blackish extra-discal line on hind wings; all discal spots distinct.

Taken near Quebec, Canada, and sent to me by Mr. Hanham. A very beautiful insect with peculiar markings. Since writing the description I have seen another specimen from New Hampshire.

DIASTICTIS PARTICOLOR, n. sp.

Expands 28 mm. Palpi stout, ascending, rather long, end member very short, these with front dark purple, mixed with whitish; summit violet; collar purple-yellow; antennæ filiform, purplish; thorax yellow; abdomen yellow at base, becoming purplish and whitish at end, with the purple pronounced dorsally; wings yellow, somewhat stained and striated with purple or violet, the fore wings less so and brightest yellow anteriorly; cross lines scarcely suggested; discal spots prominent, pure white, surrounded with a purple clouding; outer field violet, edged within with dark purple, beginning at vein 7, running narrowly and evenly to between veins 5 and 6, then at a right angle, becoming much broader, reaching half way to cell; the inner margin then curving around to inner angle; hind wings, corresponding violet spot reaching along outer margin, limited within by a dark purple, rather broad edging, nearly straight from anterior to posterior angle; all fringes purplish. Beneath lighter, ochre

to ochre-yellow, the spots showing through in a purple shading; discal spots as above, indistinct. Legs white, fore legs and tibiae of middle legs purplish in front.

Lake Worth, Fla.; Mrs. Slosson. A very pretty insect.

DIASTICTIS MARICOPA, n. sp.

Expands 26 mm. Palpi and front dull clay colour; thorax dull whitish; abdomen dull whitish, with intermixed darker scales; fore wings dull clay colour, with three black cross lines, each much more heavily marked at costa; the basal is rounded somewhat wavy; the other two fine, rounded, and broken, the outer being emphasized into a distinct and prominent black spot at vein 4; a marginal line of black points; hind wings rather more grayish, with black atoms, these suggesting two cross lines near the middle. Beneath nearly as above in colour, the lines faintly showing on all wings.

Arizona.

DIASTICTIS FLORIDENSIS, n. sp.

Expands 22 mm. Palpi fuscous orange-ochre, front orange-ochre; thorax fuscous ochre, with blackish scales intermixed, the end of the abdomen becoming more orange-ochre; fore wings fuscous, with an ochre tinge, squamose with fuscous points, a faint rounded outer line of darker fuscous, and a faint small spot in outer space on vein 4; hind wings bright orange-ochre, ochre along inner margin, with scattered fuscous striations, showing into a faint median line and an outer line of fuscous spots; discal spots on all wings blackish; beneath, all wings bright orange-ochre, the lines and spots showing as above and somewhat more clearly.

South Florida, from Mr. Rautenberg. I have the ♀ only, and the generic reference is provisional and doubtful.

DIASTICTIS OLIVALIS n. sp.

Expands 25 mm. Palpi heavy, drooping, fuscous ochre; front fuscous ochre; thorax olivaceous fuscous ochre; abdomen fuscous ochre. Fore wings smooth, even olivaceous fuscous, dark fuscous narrowly along costa and forming outwardly a marginal line; discal spots and lines obsolete and unsuggested. Hind wings light fuscous, with fuscous striations, making them approach the colour of the fore wings, but with scarcely an olivaceous tinge. Beneath fuscous with a violet tinge, costa and veins slightly ochreous; hind wings squamose ochre fuscous.

Without locality, in U. S. National Collection, type No. 3957.

[TO BE CONTINUED.]

OBITUARY.

DR. JOSEPH ALBERT LINTNER.

By the death of Dr. J. A. Lintner, which occurred at Florence, Italy, on May 6th, economic entomology has lost one of its oldest, ablest, and most distinguished devotees. He was of German parentage, and was born at Schoharie, N. Y., February 8th, 1822. He graduated from the Schoharie academy at the age of fifteen, and for the next thirty years was actively engaged in mercantile pursuits in New York City, Schoharie, and Utica. The study of natural history became a fascination for him early in life, and in 1853 he turned his attention especially to insects, and rendered valuable aid to Dr. Fitch, who was then making an entomological survey of the State of New York.

Dr. Lintner's first paper upon insects was published in 1862, and six years later he became zoological assistant in the New York State Museum of Natural History. He continued in the service of the State until his death, working as assistant in the Museum for twelve years, and in 1880 receiving the appointment of State Entomologist. This thirty years of continuous active service in an official capacity, in a useful and limited scientific field, and in a single State, is certainly a remarkable record, and one which speaks volumes of praise for Dr. Lintner.

He richly deserved the honour of the degree of Ph. D. conferred upon him in 1884 by the University of the State of New York. He was also honoured with the presidency of several scientific associations, and his name is enrolled among the members of many entomological and other scientific societies, both in America and in Europe. The publications of Dr. Lintner merit the highest praise, and deservedly entitle him to the foremost rank among the economic entomologists of the world. He published more than a thousand miscellaneous articles upon injurious insects, besides his four important "Entomological Contributions" and his twelve reports as State Entomologist; probably the thirteenth report, for 1897, is in the printer's hands.

These reports are justly entitled to the highest rank among the scientific publications of the great Empire State. They represent the highest ideal or model of what such reports should be, both from a scientific and a practical standpoint. For typographical neatness and scientific accuracy, for the simple, yet elegant and dignified, way in which dry scientific facts are made interesting and adapted to the understanding

of the agriculturist, Dr. Lintner's reports have not been excelled in the world's entomological literature. Such indexes as his reports contain are rare in any literature. One is still more impressed with the scientific and literary attainments of Dr. Lintner, when one understands that, practically, he never had any of the modern facilities, such as are found at many of our experiment station, for studying the habits of insects; his office was his literary sanctum, laboratory, museum, library and insectary combined.

Dr. Lintner was a man of quiet and dignified manners, always courteous and pleasant to meet in social intercourse. He was ever ready to impart from his vast fund of knowledge; and, being an impressive speaker, he always commanded the attention of scientific bodies which he was called upon to address. His frequent addresses before horticultural and agricultural societies in his own and in other States, and farmers' meetings of all kinds, were always full of information. He had recently been granted a well-earned six months' leave of absence, and was spending it in sunny Italy when the death summons came. In Dr. Lintner the agriculturists of New York found one of their best and most helpful friends, and entomologists the world over a true and sympathetic co-worker. His name well deserves a place in that list of names enshrined in the hearts of every American economic entomologist—Harris, Fitch, Walsh, LeBaron, Riley—and Lintner. M. V. SLINGERLAND.

PROFESSOR DAVID SIMONS KELLICOTT.

Professor David Simons Kellicott was born at Hastings Centre, Oswego County, N. Y., January 28, 1842, and died at his home in Columbus, Ohio, April 13, 1898. In his boyhood his frail constitution and delicate health required him to spend much of his time out of doors, and it is to this, no doubt, that, in part at least, his love for nature may be traced. He graduated from Syracuse University with the degree of B. Sc., while the institution was yet known as Genesee College; teaching one year in Southern Ohio, prior to his graduation. After graduating, he taught one year in Kingston Normal School, Pennsylvania, after which he was connected for seventeen years with the State University at Buffalo, N. Y., being Dean of the College of Pharmacy and also Professor of Botany and Microscopy. He came to the Ohio State University in 1888, where for ten years he has occupied the chair of Zoology and Entomology. At the time of his death he was General Secretary of the American Association for the Advancement of Science, President of the American Microscopical Society, and Treasurer of the Ohio Academy of

Science. He had served as President of the Buffalo, N. Y., Academy of Science and the Ohio Academy of Science.

Animal Parasites of Fishes, and the Rotifera, from time to time claimed a considerable portion of Professor Kellicott's attention, but his entomological work won for him the admiration of the entomologists of America. Patient, conscientious and utterly devoid of selfishness, he was one of the most kind and lovable men the writer has ever met. Faithful and just with his colleagues and the idol of his pupils, seeking patiently and industriously after the truth, he won esteem while living, and in his death he has left numberless friends to mourn his loss. If there was ever a man who deserved the reward, "Well done, thou good and faithful servant," that man was David S. Kellicott; and the fruits of his labours will stand as an enduring monument to his faithfulness among his fellow-men. He began to contribute to the CANADIAN ENTOMOLOGIST in 1878, his last article appearing in 1896.

F. M. WEBSTER.

BOOK NOTICES.

A TEXT-BOOK OF ENTOMOLOGY, INCLUDING THE ANATOMY, PHYSIOLOGY, EMBRYOLOGY, AND METAMORPHOSES OF INSECTS, FOR USE IN AGRICULTURAL AND TECHNICAL SCHOOLS AND COLLEGES, AS WELL AS BY THE WORKING ENTOMOLOGIST.—By Alpheus S. Packard, M. D., Ph. D. New York: The Macmillan Company, 66 Fifth Avenue; 1898. Price, \$4.50.

The book is primarily divided into three parts: Part I. being devoted to Morphology and Physiology, Part II. to Embryology, and Part III. to Metamorphoses. Under these divisions Dr. Packard treats his subject as follows: Position of Insects in the animal kingdom; Relation of Insects to other Arthropoda; Insecta (Hexapoda); The Head and its Appendages; The Thorax and its Appendages; The Abdomen and its Appendages; The Armature of Insects; The Colours of Insects; Muscular System; Nervous System; Sensory Organs; Digestive Canal and its Appendages; Glandular and Excretory Appendages of the Digestive Canal; Defensive or Repugnatorial Scent-Glands; Alluring or Scent-Glands; Organs of Circulation; Blood Tissue; Respiratory System; Organs of Reproduction; Development of the Egg, Larva, Pupa, and Imago; Hypermetamorphism; Summary of the Facts and Suggestions as to the Causes of Metamorphism.

The volume contains 729 pages, including a carefully prepared index, 654 figures and numerous valuable bibliographical lists. We certainly have nothing in the way of entomological literature in this country that will cover the field of development of insects as will this last work of Dr. Packard. Not only the teacher and student, but the educated men and women of the world at large who may desire to know more of the anatomy, physiology and metamorphoses of insects, will find in this work the very aid that is most desired. With this work and some other like Comstock's Manual, any student of ordinary ability can begin at the very foundation of entomology and work his way upward fully as easily as has heretofore been possible in zoology. The advent of this work certainly marks the trend of entomological studies in America. In future, except in some particular groups, we are to have less species-making and more studies of the development and transformations of those already well known in the adult stage, as well as of their inter-relations with each other and with other organisms about them. We shall not study dried corpses alone, but life in connection therewith, and the possession of pinned specimens of the adults in our cabinets will only increase our desire to know more of the problems of their existence.

F. M. W.

ARANEÆ HUNGARIÆ.—By C. Chyzer and L. Kulczynski.

The last part of Vol. II. of this important work has just been published (Jan., 1898), and completes the account of the Hungarian spiders. This part is of two hundred pages, and five plates, and contains the families Zodarioidæ, Agalenoïdæ, Drassoidæ, Zoropseoidæ, Dysderoidæ, Filistatoidæ, Calommatoidæ, Theraphosoidæ, and an appendix with additions to previous parts of the work. Nearly 800 species are treated; and in this part forty spiders are described as new, thus showing how much there is yet to be done in a well-known part of Europe. In a systematic way the authors have closely followed Thorell. Tables are given for the separation of genera and species, which are useful to the American student in indicating lines of systematic work in this country. For clear definition of species the work is, I believe, the best that has ever been written.

N. B.

The twenty-eighth annual report of the Entomological Society of Ontario for 1897 has recently been issued by the Department of Agriculture. It consists of 104 pages, and is illustrated by 56 wood cuts and 2 plates. One of the latter gives an inside view of the Society's library and cabinets, with the well-known figure of Mr. J. Alston Moffat, the librarian and curator. The picture is reproduced from a photograph kindly taken by Mr. R. W. Rennie, of London.