

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/
Couverture de couleur
- Covers damaged/
Couverture endommagée
- Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- Cover title missing/
Le titre de couverture manque
- Coloured maps/
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- Bound with other material/
Relié avec d'autres documents
- Tight binding may cause shadows or distortion
along interior margin/
La reliure serrée peut causer de l'ombre ou de la
distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear
within the text. Whenever possible, these have
been omitted from filming/
Il se peut que certaines pages blanches ajoutées
lors d'une restauration apparaissent dans le texte,
mais, lorsque cela était possible, ces pages n'ont
pas été filmées.
- Additional comments:/
Commentaires supplémentaires:

- Coloured pages/
Pages de couleur
- Pages damaged/
Pages endommagées
- Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- Pages detached/
Pages détachées
- Showthrough/
Transparence
- Quality of print varies/
Qualité inégale de l'impression
- Continuous pagination/
Pagination continue
- Includes index(es)/
Comprend un (des) index
- Title on header taken from: /
Le titre de l'en-tête provient:
- Title page of issue/
Page de titre de la livraison
- Caption of issue/
Titre de départ de la livraison
- Masthead/
Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

The Canadian Entomologist.

VOL. XXV.

LONDON, MARCH, 1893.

No. 3.

CANADIAN HYMENOPTERA.—No. 3.

BY W. HAGUE HARRINGTON, OTTAWA.

In my last paper (see page 32) I unfortunately repeated the error made by Provancher in giving Vancouver as the habitat of *Ecthrus Provancheri*. I overlooked its correction (CAN. ENT., Vol. XVII, page 160) by Mr. Brodie, who obtained the insect from Muskoka.

Having recently restudied and rearranged my Ottawa collections of Phyllophaga and Xylophaga, so as to prepare for publication in the *Ottawa Naturalist* a complete list of the local species, I have made some notes which may be of more general interest. There are also several species, apparently new, which I prefer to describe here, as I think that all new species should be described (or at least redescribed) in some publication devoted entirely to Entomology, and accessible to all students. The publication of species in miscellaneous proceedings and transactions prevents many entomologists from having access to them, necessitates an outlay of money and time which in many cases cannot be spared by students, and gives rise to much unnecessary synonymy, etc.

One point of interest in the Tenthredinidæ is the excess of the females, both as regards species and individuals. Of the 152 species which have been taken in this neighborhood the females of 139 species are represented, and the males of 82 only. Both sexes are recognized in 69 species, leaving 70 represented by the female only, and 13 by the male only. This disparity of the sexes is more marked in some sections of the subfamily, notably in the unwieldy and difficult genus *Nematus*, where of 34 species there occur females of 32, and males of only 10., *i. e.*, only the male of every third species has been found.

The scarcity of males among sawflies is even more marked, when the occurrence of individuals is considered; for in 1,262 specimens there are 885 females and 377 males. Of many species the females and males differ so much in coloration that they have been described as distinct insects, and the relationship of some have undoubtedly not yet been recognized, but there are other species of which, while the sexes are

known and readily distinguished, it is very difficult to obtain the males either by collecting in the field or by breeding. Of such may be instanced *Nematus Erichsonii*, Hart. (= *N. cinctus*, Newm., according to Kirby), of which I have only obtained one male, although the females can be taken in any desired number.

Acordulecera saginata, Prov., is apparently the male of *A. dorsalis*, Say., a species which is found upon oak and hickory, the larvæ skeletonizing the leaves.

NEMATUS RUFOCINCTUS, n. sp. Female—Length, 8 mm. Black, with pale legs and rufous band on abdomen. Head rather small; the ocelli in shallow basins defined anteriorly by a distinct sinuate ridge above the antennæ; edge of clypeus, labrum and palpi whitish; antennæ slender, with subequal joints. Thorax polished; tegulæ, angles of prothorax and legs in great part, white; the anterior and median femora touched with brown; posterior legs with apical two-thirds of femora, apical half of tibiæ and the tarsi, black; wings large, hyaline; nervures and stigma black; third submarginal cell quadrate, small, hardly larger than first; the recurrent nervures received about one-fourth respectively from the base and tip of the second submarginal cell. Abdomen robust, with dorsal ridge; basal plates, sides of first segment, spots on fifth, and the terminal segments black, remainder rufous.

One female taken near Hull on 26th June, 1887, upon alder, and in general appearance resembling a small *N. Erichsonii*, Hart.

NEMATUS THORACICUS, n. sp. Female—Length, 6 mm. Head, metathorax and base of abdomen black, remainder rufo-testaceous. Head as wide as thorax, ridges surrounding ocelli ill-defined, but prominent between antennæ; palpi and mandibles pale, the latter with red tips; antennæ long and slender, joints subequal. Thorax rufous, except sutures below wings and the scutellar region, including the scutellum, black; legs rufous, the posterior with tips of tibiæ and the tarsi almost black; wings hyaline, nervures and stigma brownish, third submarginal cell one and one-half times as long as wide; recurrent nervures received respectively about one-fifth from base and one-sixth from apex of second submarginal cell. Abdomen short and stout, slightly ridged dorsally; basal plates and spot on first and second segments black, remainder rufous.

One female taken near the city on May 11th. This species is near *N. bivittatus*, Nort., but the head is much less rugose, and the mesothorax is not lineate with black, etc.

NEMATUS LINEATUS, n sp. Female—Length, 7 mm. Rufo-testaceous. Head nearly white below the antennæ, and honey-yellow above, palpi dusky; antennæ as long as head and thorax, rather stout, black; a black spot between ocelli. Thorax orange-yellow; tegulæ and angles of prothorax white; a line on median lobe of mesothorax, a spot above insertion of posterior wings, the apex of scutellum and adjoining sutures, black; legs yellow, coxæ and trochanters paler, tips of posterior tibiæ and tarsi dusky; wings hyaline, nervures brownish, stigma pale, third submarginal cell nearly twice as long as first, recurrent nervures received about one-fourth the distance from base and tip of second submarginal cell. Abdomen broad, compressed toward apex, paler than thorax, basal plates and narrow broken dorsal line black, ovipositor prominent.

One female collected near city on May 5th.

Fenusa varipes, St. Farg. (*melanopoda*, Cam.), previously recorded by Mr. Fletcher as introduced from Europe, was observed on Aug. 26th, upon native alders in a swamp not far from the Experimental Farm, and a number of the leaves showed the characteristic blotches caused by the larvæ. The species can, therefore, be considered as naturalized.

Emphytus multicolor, Nort., (= *Strongylogaster multicolor*, Nort., = *Emphytus hullensis*, Prov.) This is one of the species in which variability in wing-venation has led to a redescription. I have the types, ♀ ♂, of *E. hullensis*, and they agree exactly with the description of *S. multicolor*. Of six specimens which I have since collected, four have four submarginals, as in *S. multicolor*, one three submarginals, as in *E. hullensis*, and the remaining one has three cells in one wing and four in the other. As the insect seems to more nearly resemble an *Emphytus* than a *Strongylogaster* or *Taxonus*, I have referred it to the former genus.

Harpiphorus tarsatus, Say. From a series of specimens taken upon *Cornus* it seems evident that *H. varianus*, Nort., and *H. versicolor*, Nort., are only varieties of this species. My specimens vary much in colour, but even the blackest show more or less trace of rufous. The insect is very active and difficult to net, as it darts to and fro among the bushes. On one occasion I heard a rustling of insect wings on a branch near the ground and found it to be caused by two males in pursuit of a female, and I netted the three at one stroke.

Monostegia maculata, Nort. I have already (*Insect Life*, Vol. II., p. 227) discussed the variation in the wing-venation of our common Strawberry Sawfly, and a further examination of the species seems to indicate

that it should be placed in the genus *Monostegia*. It is certainly very unlike the other species of *Harpiphorus*. Under the name *M. ignota*, Nort., I propose to retain a few immaculate specimens which also slightly differ in other respects.

MACROPHYA ALBILABRIS, n. sp. Male—Length, 8 mm. Black; anterior legs and base of posterior pale. Head rugosely punctured, almost opaque, no depressions or sutures above antennæ; clypeus deeply emarginate, labrum truncate; both, with spot on mandibles, white; antennæ stout. Thorax coarsely punctured, the scutellum rugose; edge of tegulæ and fine line on border of prothorax white; anterior and median legs pale, including portion of coxæ, the femora and tibiæ with dusky abbreviated lines above; tips of posterior coxæ, the trochanters, basal third of femora with line below to apex, white; remainder of femora, the tibiæ and tarsi, black. Edges of basal plates white dorsally.

One male taken near the city, but not dated. This insect is closely allied to *M. flavicoxa*, Nort., and may prove but a variety of that species, though none of my examples of *flavicoxa* show any variation of this kind. The chief differences are in the colour of the posterior legs, the white touches on basal plates, and the more deeply emarginate clypeus.

Pachyprotasis omega, Nort.—The insect described by Provancher (CAN. ENT., Vol. XVII., p. 50.) as *Synairema americana*, seems, from his description, to be identical with this species, except that he gives the length as .46 inch, whereas my largest specimen of *omega* is only about .35 inch. Norton in his description of the species gives the length as .26 inch.

Pachyprotasis delta, Prov. Since my notes on this species (CAN. ENT., Vol. XVIII., p. 32) I sent to Mr. Kirby a small lot of Tenthredinidæ regarding which he writes: "The principal remark I have to make on this lot of insects is, that the insect sent as *Tenthredo* (?) *delta*, Prov., is a true *Pachyprotasis*, near *P. discolor*, Klug., an European species."

Pachyprotasis varipicta, Har. On June 7th, I captured two males which evidently belong to the species which I described as a *Harpiphorus* (CAN. ENT., Vol. XXI., p. 96), and these show that the species belongs to *Pachyprotasis*, and has, like *P. delta*, very unstable wing venation. One specimen has, like the female described, two cross nervures in the lanceolate cell of one wing. The other has in the right anterior wing five sub-marginals, the third cell being subdivided almost in continuation of the second recurrent. These males differ from the female only in having the

apical two-thirds of posterior femora blackish, and the basal segment of abdomen darker at the base. The outer cells of the posterior wings are closed, as in *P. delta*.

Strongylogaster soriculatus, Prov. *S. soriculatipes*, Prov., appears to have been the name under which this species was first published, but the Abbé has used *soriculatus* in republishing, and the old name does not appear in his index.

Tenthredo grandis, Nort. This species is somewhat variable in the extent of its white markings, and I have one specimen which answers exactly to the *T. nigricollis*, Kirby, described from Newfoundland.

Tenthredo basillaris, Prov. This species is placed in Cresson's catalogue as a synonym of *T. signata*, Nort. My specimens, five females, of which one was determined by Provancher, are remarkably uniform in their markings, and do not agree with the description of *T. signata*, so that I am disposed to retain the species as distinct.

Tenthredopsis Evansii, Har. I have a female of this species from the Rocky Mts. near Calgary, and have examined another from Colorado (Gillette.) This insect is very near, perhaps identical with, *Tenthredo viridescens*, Fourcr. (*scalaris*, Klug.) an European species.

TENTHREDOPSIS (?) ANNULICORNIS, n. sp. Female.—Length, 10 mm. Head black, rugosely punctured; mandibles, clypeus and triangular spot above rufous, the clypeus strongly notched; antennæ slender, two basal joints and base of third rufous, apex of third, the fourth and terminal three black, joints five and six pure white. Thorax with the pleura coarsely punctured; rufous above with spot on each lateral lobe of mesothorax and the scutellar sutures black; legs rufous, tips of coxæ, the trochanters and posterior tarsi white, tip of posterior femora and of tibiæ black; wings hyaline, nervures blackish, base of stigma white; lanceolate cell with straight, short, cross nervures, as in *Tenthredo*, etc.; posterior wings without middle cells. Abdomen rufous.

Male.—Length, 9 mm. Antennæ a little stouter, testaceous, rufous toward base. Abdomen with apex blackish.

The female was taken near the city on June 6th, 1891, and the male on May 28th last. The antennæ of the male differ in colour, and in being slightly stouter, from those of the female, but in all other respects it seems to be identical. The strongly notched clypeus, and the absence of middle cells in the posterior wings, would seem to refer the female to *Perineura*, but the outer cells of posterior wings of the male are not

closed. These insects, except for the antennæ, look very much like small specimens of *Harpiphorus varians*.

PAMPHILIUS RUFICEPS, n. sp. Female—Length, 15 mm. Black, with rufo-testaceous head and legs. Head very large; coarsely punctured, rufous, with a small black spot enclosing the ocelli; mandibles very large; antennæ slender, about 35-jointed, black, with three basal joints rufous, third joint more than twice as long as the fourth. Thorax coarsely punctured, the pleura quite rugosely; tegulæ, anterior angles, lateral lobes and apex of median lobe of mesothorax and scutellum, rufous; beneath black, with dull rufous spots on pleura; legs rufous, coxæ paler, tarsi dusky, the posterior almost black, anterior tibiæ with side spur. Abdomen broad, with narrow lateral margin of bright lemon-yellow.

One female, found walking on a doorstep in the city, May 31st, 1891. This species is near *P. (Lyda) bruniceps*, Cress.

PAMPHILIUS CINCTUS, n. sp. Female—Length, 11 mm. Black, with red band on abdomen. Head polished behind the ocelli, rugulose anteriorly; face flat with a ridge between antennæ, not reaching anterior margin of clypeus; clypeus broad, squarely truncate, not margined, and coarsely punctured; cheeks below the eyes, mandibles, clypeus, triangular spot at inner summit of each eye, similar spots behind on margin of occiput, and two minute dots below ocelli, white; antennæ black, long, slender, 25-jointed, third joint hardly longer than fourth. Thorax polished; tegulæ, short lines in front and beneath, a double triangular spot on middle lobe of mesothorax, scutellum and postscutellum, white; legs pale yellow, including tips of coxæ, anterior tibiæ without side spur; wings hyaline with brown nervures, third submarginal cell large. Abdomen with first segment, except a black spot on each side, and three following, rufous; apical segments black.

One female, taken near the city on June 28th. It resembles in appearance *P. rufofasciata*, Nort., but differs in shape of antennæ and clypeus and in markings.

Pamphilius fascipennis, Cress. This fine species, originally described from the White Mts., N.H., has been taken by Mr. Evans at Sudbury.

Xyela minor, Nort. In June, 1886, I captured by sweeping on the margins of a wood composed of pines, spruces, etc., a male and a female of this very interesting species, which Mr. Kirby thinks should constitute a distinct genus from the European species of *Xyela*. I failed to obtain the insect again until May 11th, 1891, when, in beating spruce trees, I

secured eight females. I endeavored to ascertain if the insects were ovipositing in the twigs, but they are so small and inconspicuous that it was impossible to find them without beating them from the trees. Subsequent beatings in the same locality, and careful search again last May failed to turn up any more. It seems probable, however, that the insect breeds in the young shoots of the spruce (as none could be found on adjoining trees or shrubs of other species), and some of our collectors, knowing when and where to search, may succeed in discovering if such be the case. It may also live in other conifers, as Provancher records taking the female on the buds of white pine, on which I have also taken one specimen.

Xiphydria canadensis, Prov. ? In an article on *X. albicornis* ("A new foe to the maple." Rep. Ent. Soc., Ont., 1883, p. 40), I stated that some of the males had the antennæ black, as in *X. Provancheri*, Cress., and that this species and *X. canadensis* were probably only varieties of *X. albicornis*, with which may be also included probably *X. maculata*, Say. In re-studying my specimens I find a female which seems to be distinct, but which, however, does not agree with descriptions of any of the species quoted above as regards markings, although it agrees with *X. canadensis* in having the "head rugose except upon the vertex," and not wishing to create an unnecessary new name I have placed it under that. It has the following characteristics which are not given in the other descriptions:—Antennæ black, 16-jointed only, the second joint much shorter than in *albicornis*, not more than half as long as the third; no white markings above the antennæ on the front, but an almost square patch below and a small spot on each side of clypeus, adjoining a larger spot under the eye. There is also a small spot on the posterior margin of the head behind each eye, and two short lines above ocelli which are differently situated from those of *albicornis*. In that species the lines start about on a level with ocelli and stop before attaining the occipital margin, while in the specimen under consideration they start from the occipital margin and stop at some distance above ocelli. The coxæ are also uniformly rufous instead of black, or blackish, and the markings of thorax are different. The usual white spots occur on segments one to seven of abdomen, with the exception of the sixth.

Xiphydria rufiventris, Cress. This addition to the Canadian fauna has been made by Mr. Fletcher, who has a fine female example taken last year.

Tremex columba, Linn. In July, 1891, Mr. John Stewart, of this city, informed me that he had a stick of firewood containing a great many larvæ of beetles. Some days later I called on him to examine it and found that the insects had commenced to emerge, and that they were the common Horntail. The log was gnarled rock-maple, about 10 inches in diameter, partly decayed, but still very hard, as was proved in sawing out a section, which I took home. I secured a number of larvæ and pupæ, and from the section retained numerous flies emerged, of which only one was a male. On leaving for Japan (July 22nd) I locked the block up in an old cabinet, and on my return found that several more females had appeared, and of course died during my absence. The fact of most interest concerning these is that one had endeavored to deposit in the block, and had died with the ovipositor deeply inserted.

NEW CHERNETIDÆ FROM THE UNITED STATES.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Since my last article on this group (CAN. ENT., Aug., 1891), I have obtained quite a number of forms; some of the new ones are described in this article. Two genera, new to the U. S., are recorded, both of which occur in South America. *Chelifera alius*, described by Leidy in Proc. Phil. Acad. Sci., 1877, agrees, as far as description goes, with *Chelanops oblongus*, Say, and with no other form known to me, therefore I consider it a synonym of *C. oblongus*.

CHELANOPS PALLIPES, n. sp.

Length, 3 mm. Colour: cephalothorax, dark brown; palpi, red-brown; dorsal scutæ, yellow-brown; legs, yellow-brown. General appearance of *C. acuminatus*, but the hand is not black as in that species. Structure also similar to *C. acuminatus*, differs in being furnished with clavate hairs; the trochanter does not project as much behind; the femur is more slender; the tibia is not nearly as much gibbose on the inner side; the hand less broad and shorter; the fingers much more slender, about as long as the hand.

California. A few specimens.

CHELANOPS LATUS, n. sp.

Length, 3.2 mm. Cephalothorax and palpi red-brown, the fingers black, scutæ red-brown, legs brownish-yellow. Structure similar to *C.*

acuminatus; hairs simple, the trochanter is less gibbose behind, the femur a little more slender; the tibia enlarges quite suddenly on the internal margin, but is then more parallel with the external margin than in either *C. acuminatus* or *C. pallipes*; the hand is more slender than in *C. acuminatus*, and the sides are quite nearly parallel; the fingers stout and much shorter than the hand.

East Florida. Under bark of pine trees. Common.

CHELANOPS GROSSUS, n. sp.

Length, ♀, 4.7 mm.; ♂, 3.3 mm. Similar to *C. oblongus*, Say, but very much larger. Palpi uniform dark red-brown; anterior part of cephalothorax similar but paler, beyond the suture yellowish; dorsal scutæ, yellow-brown; legs, pale. Body very long and narrow; cephalothorax shining, smooth; palpi with long simple hairs. Palpi similar to *C. oblongus*; hand longer and the sides more parallel; the tibia not so much swollen on the inner side and thus more slender.

Colorado. [Dr. C. F. Baker.] Apparently common.

OLPIUM OBSCURUM, n. sp.

Length, 2 mm. Colour in life blackish, in alcohol the cephalothorax and abdomen greenish with sides blackish, legs pale with a greenish tinge, palpi brownish-yellow with a tinge of green, hands darkest. Cephalothorax narrower in front than behind, anterior eyes about their diameter from anterior margin, posterior eyes just behind anterior ones and looking more dorsal; stylet simple; abdomen widest at about seventh segment, quite long; palpi shorter than abdomen; trochanters somewhat conical, sides convex; femur not quite as long as cephalothorax is broad at posterior margin, barely pedicellate; sides almost parallel, internal margin a little convex near base, then a little concave, external margin almost straight; tibia short, pedicellate, a little shorter than femur and broader than that joint, both sides convex; hand about as long as tibia, barely pedicellate, sides but little convex; fingers a little shorter than hand and curved.

East Florida. One specimen, swept from grass.

RONCUS, Koch.

Allied to *Chthonius*, differs in having but one eye on each side of cephalothorax. Not previously known from U. S.

RONCUS PACIFICUS, n. sp.

Length, 1.6 mm. Colour, pale whitish; mandibles and claws of palpi reddish; femora of palpi sometimes reddish; dorsal scutæ of abdomen yellowish-brown; legs with a pinkish tinge; young specimens lighter than adult ones. Mandibles large, as in *Clithonius*; cephalothorax somewhat narrower behind than in front, sides slightly curved, one large eye each side near anterior margin; palpi not as long as body; hand with fingers almost as long as cephalothorax plus mandibles; femur about as long as cephalothorax, sides about parallel; tibia almost conical, almost as wide at tip as the hand at base; hand not pedicellate, longer than tibia, sides but little convex; fingers longer than hand, about straight; legs short, hind pairs not much enlarged. Body and appendages with simple hairs.

Washington State. [Kincaid.] A few specimens.

IDEORONCUS, Balzan.

Allied to *Obisium*, but has only one eye each side of cephalothorax and the claw of mandible has a prominent stylet. Species previously known from South America.

IDEORONCUS OBSCURUS, n. sp.

Length, 3.2 mm. Colour, pale whitish; anterior part of cephalothorax with a reddish tinge, mandibles pinkish, palpi red, dorsal scutæ pale yellowish; body soft. The mandibles have a long stylet, which is divided into two parts; the cephalothorax is a little narrower in front than behind; the eyes, hardly perceptible above, are two, one each side, about its diameter from anterior margin; the cephalothorax just in front of eyes is more suddenly narrowed than elsewhere. Palpi shorter than body; trochanters almost twice as long as wide, the internal margin about straight, external margin quite suddenly but not greatly swollen; femur not quite as long as cephalothorax and broader than trochanters, pedicellate, internal margin at first convex then concave, external margin convex, slightly narrower near tip than near base; tibia shorter, pedicellate, external margin evenly convex, internal one convex, more so near base than near tip; hand as long as tibia, short pedicellate, much broader than other joints, neither margin much convex; fingers shorter than hand, slightly curved, stout. Body and appendages with simple hairs. Abdomen long, sides nearly parallel, not much broader than cephalothorax. The outlines of trochanters can be distinctly seen on the femora.

of all legs. The tarsi are divided into two parts by a transverse suture ; posterior pairs of legs but little larger than the anterior pairs.

Washington State. [Kincaid.] Two specimens.

CHTHONIUS SPINOSUS, n. sp.

Length, 1.7 mm. Colour, hard parts pale tinged with reddish-brown, venter of abdomen white ; abdomen with a few silvery white spots. Anterior part of cephalothorax a little wider than posterior, the anterior portion bent downward and divided in the middle by a deep furrow, the mandibles bent downward ; the cephalothorax, basal joints of mandibles, and segments of abdomen provided with scattered conical tubercles which bear a spine at tip. Cephalothorax and palpi finely granulated, basal joint of palpus [trochanter] short, not visible from above ; femur about length of cephalothorax, sides nearly straight, tip a little larger than base, patella short, almost conical ; hand once and a-half as long as patella, sides nearly straight but little swollen, the inner side the most so ; fingers straight, longer than hand. Eyes a little more than their diameters apart. Abdomen twice as long as cephalothorax. Anterior legs long and slender ; posterior pairs larger but hardly longer ; trochanters distinct on posterior pairs.

Citrus Co., Florida. [C. M. Weed.] Quite common.

DESCRIPTIONS OF NEW BRACONIDS BRED BY PROF. A. D. HOPKINS.

BY WILLIAM H. ASHMEAD, WASHINGTON, D. C.

In the following pages I describe the new Braconids bred by Prof. A. D. Hopkins, of the West Virginia Agricultural Experiment Station, as recorded by him in *Insect Life*, Vol. IV., pages 256 to 259.

The types are in the National Museum.

Subfamily BRACONIDÆ.

BRACON, Fabr.

(1) *B. lixi*, sp. n. *Bracon lixi*, Ashm., MS., *Ins. Life*, IV., p. 257.

♀—Length, 3.5 mm. ; ovipositor, 1 mm. Brownish-yellow ; stemmaticum, metathorax above, first abdominal segment and an oblong median spot on second segment at base, black ; sometimes the middle lobe of meso-scutum is black anteriorly ; antennæ 35-jointed, brown. Head and thorax smooth, shining, the head transverse. Wings hyaline ; tegulæ yellow ; costa, stigma and nervures dark brown ; recurrent nervure

received in the apical angle of the first submarginal cell; second abscissa of radius twice as long as first; second submarginal cell twice as wide at base as at apex. Legs pale brownish-yellow, the apex of posterior tibiæ above and the basal 3 or 4 joints of tarsi more or less dusky. Abdomen oblong-oval, the first segment above and the black median spot on the second, rugulose; rest of the surface granulated or shagreened; the first segment is the longest; the second and third about equal, the suture between being distinct, crenated; the following subequal, the fourth being one-third shorter than the third.

Hab.—Morgantown, W. Va.

Bred from *Lixus scrobicollis*, living in *Ambrosia trifida*.

(2) *B. rufomarginatus*, sp. n.

♀—Length, 2 mm.; ovipositor, 0.5 mm. Polished black; orbits, a line extending from base of eye and along the clypeus, yellow; palpi black; legs black, beneath pale brownish; lateral margins of the abdomen and the venter reddish-yellow; antennæ 24-jointed, black; wings fuliginous; the second abscissa of radius one-half longer than the first; the second submarginal cell not narrowed at apex.

Hab.—Morgantown, W. Va.

Comes nearest to *B. phycidis* Riley, but with darker wings and different coloured legs.

Subfamily EXOTHECINÆ.

RHYSIPOLIS, Forster.

(3) ? *R. bifformis*, sp. n. *Rhysipolis bifformis*, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 3.5 mm.; ovipositor a little longer than the abdomen. Head and thorax black, pubescent; abdomen ferruginous; anterior coxæ, all trochanters, except slightly on the upper surface, annulus at base of all tibiæ and all tarsi, honey-yellow or pale ferruginous; middle and anterior coxæ and all femora black; mesopleura reddish or piceous. Head quadrate, above smooth, polished, with a delicate occipital margin; face finely punctate with a sparse, rather long, whitish pubescence; mandibles black; palpi piceous. Thorax finely shagreened, the parapsidal furrows obsolete posteriorly but sharply defined anteriorly, the middle lobe just in front of scutellum depressed, rugulose with a slight median keel; meso-pleura smooth and pale or piceous at the middle, with a slight longitudinal sulcus; scutellum smooth, with a crenate furrow across the base; meta-thorax rugose, with a delicate median carina down the centre

slightly forked at apex. Wings subfuliginous, the stigma and venation brown; submedian cell longer than the median, the recurrent nervure not interstitial but joining the first submarginal cell at the lower apical angle; first abscissa of radius about half the length of the second. Abdomen ferruginous or reddish-yellow, the first and second segments rugose or shagreened, the following smooth, polished. In one specimen the basal part of the third segment, as well as the first two, is also shagreened.

In the ♂ the apical margins of the third and following abdominal segments are piceous; the antennæ are much longer than the body, brown-black, 36-jointed; the legs similar to the female, but with the femora more piceous, not black; otherwise as in female.

Hab.—Morgantown, W. Va.

Bred Sept. 14, 1891, from a Buprestid, or Longicorn, larva living under bark of dead Spruce *Abies nigra*.

I am doubtful about the position of this insect, as it might just as well be placed in the genus *Doryctes* as in *Rhysipolis*, having a close resemblance to *Doryctes radiatus* Cr., *D. macilentus* Prov., *D. fartus* Prov., and other species in this genus.

Subfamily RHYSSALINÆ.

RHYSSALUS, Haliday.

(4) *R. pityophthori*, sp. n. *Rhyssalus pityophthori*, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 1.2 mm.; ovipositor shorter than the abdomen. Black, shining; head transverse, smooth, impunctured; mandibles and palpi pale ferruginous; antennæ very little longer than the body, (?) 17-jointed. Thorax alutaceous, the parapsidal furrows distinct, the middle lobe with a median impressed line anteriorly. Wings hyaline, strongly iridescent, the stigma and nervures brown, the first abscissa of radius two-thirds the length of the second, the marginal cell long, extending to tip of wing. Legs, including coxæ, pale or honey-yellow. Abdomen oblong-oval, ferruginous, the ovipositor black.

Hab.—Morgantown, W. Va.

Bred July 29, 1891, from Yellow Pine twigs infested with *Pityophthorus*, sp.

Subfamily SPATHIINÆ.

SPATHIUS, Nees.

The following table will aid in determining the species in this genus known to me as occurring in our fauna :—

TABLE OF SPECIES.

Wings fuscous or blackish, with 3 white transverse bands (*i. e.*, one white band with the base and apex of wing white)..... 3

Wings fuscous, with one white band..... 2

Wings hyaline or subhyaline, without bands.

Testaceous; pleura, metathorax and petiole blackish or fuscous.

Petiole very long and slender, two-thirds the length of the thorax; legs entirely pale yellow; antennæ 24-jointed. (♂, length, 2.5 to 3 mm.)..... *S. longipetiolatus*, sp. n.

Testaceous; abdomen from apex of second segment black.

Petiole not more than half the length of thorax; legs pale yellow; antennæ 24-jointed. (♂, length, 2.1 mm.)..... *S. californicus*, sp. n.

Black; face, collar, mesopectus, legs, petiole and basal half of second abdominal segment, testaceous.

Petiole a little longer than half the length of thorax; hind femora subfuscous. Antennæ 23-jointed. (♂, length, 2 mm.)..... *S. claripennis*, sp. n.

2. Black; head, apex of petiole, base of second segment, fuscous or piceous; all femora much swollen; trochanters, annulus at base of tibiæ and the tarsi, white; ovipositor twice the length of abdomen. Antennæ 34-jointed. (♀, length, 4 to 4.5 mm.)... *S. unifasciatus*, sp. n.

3. Species for the most part testaceous or brownish-yellow..... 4
Species black or dark fuscous.

Collar, petiole and base of second segment, pale brownish-yellow; trochanters, base of tibiæ and the tarsi, yellowish-white; sometimes the mesopectus and head more or less rufo-testaceous; basal half of second abdominal segment always finely sculptured or shagreened; ovipositor $1\frac{1}{2}$ to 2 times as long as the abdomen.

♀, antennæ 32 to 35-jointed; ♂, antennæ 25-jointed. (Length, from 2 to 4.5 mm.)..... *S. simillimus*, sp. n.

Ovipositor not longer than the abdomen.

Head polished, with traces of faint transverse striæ before the ocelli but none behind; second abdominal segment faintly granulated at base.

♀, antennæ 29-30; ♂, 26-jointed. (Length, 2 to 2.5 mm.) *S. tomici*, sp. n.

Ovipositor half the length of abdomen.

Head transversely rugulose; second abdominal segment perfectly smooth, polished.

♀, antennæ broken. (Length, 3 mm.)

. *S. brachyurus*, sp. n.

4. Rust brown, disk of thorax and scutellum black.

Ovipositor nearly twice the length of the whole insect.

Head polished, although faintly transversely aciculated; abdomen elongate, black, shining, the petiole finely rugose, not longitudinally striated; the second segment with some faint aciculations only at base.

♀, antennæ 20-jointed, reaching only to the base of the metathorax. (Length 3.5 to 4 mm.)

. *S. Laflammei*, Prov.

Ovipositor not quite as long as the whole insect.

Head opaque, finely rugose, the rugæ posteriorly transverse; abdomen oblong-oval, the apical one-third of the second segment and following segments black polished; petiole coarsely longitudinally striated; basal half of second segment shagreened.

♀, antennæ multiarticulate (broken at tips). (Length, 5.5 mm.) *S. floridanus*, sp. n.

Brownish-yellow or testaceous, sometimes varied with fuscous.

Ovipositor shorter than the body, usually shorter than the abdomen.

Head finely rugose and transversely aciculated; second abdominal segment basally feebly shagreened; ovipositor longer than the abdomen. (Length, 4.5 to 5 mm.) *S. trifascietus*, Riley.

Ovipositor shorter than abdomen.

Head polished without or with very faint transverse aciculations; base of second segment and the petiole yellow,

rest of abdomen black, the basal half of the second segment very finely shagreened. Antennæ 23-jointed, a little longer than the body. (♀, length, 2.8 mm.)..

.....*S. Canadensis*, Ashm.

Head shining, transversely striated; basal two-thirds of second segment finely shagreened, the rest of abdomen smooth, polished. Antennæ 30-jointed, longer than the body. (♀, length, 3.5 mm.).....*S. pallidus*, sp. n.

Head opaque, minutely transversely rugulose; the second segment has the basal one-third finely shagreened, then followed by a smooth polished space and again shagreened, and polished again at apex. Antennæ longer than the body, more than 33-jointed (the tips broken off). (♀, length, 4 mm.).....*S. brunneus*, Ashm.

Head smooth polished, with scarcely a trace of any transverse aciculations; second segment polished, impunctured. Antennæ 25-jointed. (♀, length, 3 mm.).....

.....*S. sequoia*, Ashm.

- (5) *S. claripennis*, sp. n. *Spathius clavipennis*, Ashm., MS. (err. impr.), Ins. Life, IV., p. 257.

♂.—Length, 2 mm. Black; prothorax, mesopectus, petiole and basal half of second abdominal segment, testaceous or yellow; legs pale, the posterior femora and their tibiæ toward apex slightly dusky. Wings hyaline, the stigma and nervures brown. Antennæ 23-jointed, fuscous, the basal three or four joints pale yellowish. The head is polished, with some faint transverse aciculations on the vertex. Thorax subopaque, finely granulated or shagreened; the petiole longitudinally striate.

Hab.—Morgantown, W. Va.

Bred April 20, 1892, from *Polygraphus rufipennis* living under the bark of dead *Abies nigra*.

- (6) *S. unifasciatus*, sp. n. *Spathius unifasciatus*, Ashm., MS., Ins. Life, IV., p. 258.

♀.—Length, 4 to 4.5 mm. Black; collar anteriorly dull ferruginous; apex of petiole and base of second segment reddish piceous; legs fuscous, anterior and middle coxæ and trochanters, posterior trochanters and annulus at base of all tibiæ, white; tarsi more or less pallid beneath. Antennæ 34-jointed, fuscous, the basal 3 or 4 joints pallid. The head is polished, the vertex faintly transversely aciculated, the frons and

face rougher; thorax closely granulated, opaque, the middle lobe posteriorly, pleura and metathorax, finely rugulose, the latter indistinctly areolated. Wings fuliginous, with a white band across the middle from the base of the stigma, the apex of the wing showing scarcely any white. All the femora are very much swollen, while the abdomen, except the petiole, is smooth, polished; petiole longitudinally striate, somewhat rugose basally.

Hab.—Morgantown, W. Va.

Bred April 29, 1892, from *Scolytus 4-spinosus* living under the bark of *Carya alba*.

(7) *S. simillimus*, sp. n.

♂, ♀.—Length, 2 to 4.5 mm. Black; collar, mesopectus and petiole pale ferruginous or brownish-yellow. Head above transversely aciculated; thorax opaque, closely granulated; the middle mesothoracic lobe posteriorly and the metathorax finely rugose, the latter faintly areolated; petiole striate. Wings fuscous, white at base and tips, and with a transverse white band from the base of stigma. Antennæ in ♀ 32 to 35-jointed, in ♂ 25-jointed, fuscous, pale toward base. Legs fuscous; the coxæ and trochanters, annulus at base of tibiæ and the tarsi, white. Abdomen, except petiole and base of second segment, black, the basal half of the second segment shagreened; ovipositor as long or very little shorter than the body.

Hab.—Morgantown, W. Va.

Bred May 18 and 25, 1892, from *Agrilus bilineatus* living in White Oak stump.

(8) *S. brachyurus*, sp. n. *Spathius brevicaudus*, Ashm., MS. (Olim. preoc.), Ins. Life, IV., p. 258.

♀.—Length, 3 mm.; ovipositor half the length of abdomen. Much like *S. simillimus*, but with the lower part of head, the prothorax, metathorax and petiole brownish, the ovipositor very much shorter, in *simillimus* being about as long as the whole insect, while in *brachyurus* it is only half the length of the abdomen. The head is transversely rugulose; the legs and antennæ brown, the tibiæ not annulated with white, the femora not especially thickened; while the second abdominal segment is perfectly smooth and polished.

Hab.—Morgantown, W. Va.

Bred Nov. 10, 1890, and March 15, 1891, from *Dryocoetes autographus* living under bark of dead *Abies excelsa*.

(9) *S. pallidus*, sp. n.

♀.—Length, 3.5 mm.; ovipositor a little longer than the abdomen. Pale ferruginous or honey-yellow; coxæ, trochanters, base of tibiæ and tarsi, whitish. Head shining, transversely striated; antennæ 30-jointed, longer than the body; petiole as long as the body of abdomen, striated; second abdominal segment nearly twice the length of the third, the basal two-thirds finely shagreened or coriaceous, the following segments polished, impunctured. Wings fuscous, whitish at base and tips, and with a white band across from base of stigma. The parapsidal furrows are distinct, converging and meeting at base of scutellum, the middle lobe thus formed being smooth and not rugose at base just in front of the scutellum, as in the other species.

Hab.—Morgantown, W. Va.

Bred from *Tomicus cacographus* living in Yellow Pine.

Subfamily HECABOLINÆ.

Lysitermus, Förster.

(10) *L. scolyticida*, sp. n. *Lysitermus scolyticida*, Ashm., MS., Ins. Life, IV., p. 258.

♀.—Length, 2.1 mm. Black, shining, impunctured; mesoscutum with two distinct furrows; metathorax finely rugose; wings hyaline, nervures brown; legs honey-yellow, the posterior tibiæ and tarsi sub-fuscous. Antennæ 17-jointed, black, the three basal joints yellow. Abdomen oblong-ovate, composed of but three visible segments, the first segment and the second at the extreme base striated, otherwise smooth and polished; ovipositor as long as the abdomen.

Hab.—Morgantown, W. Va.

Bred April 30, 1891, from *Scolytus 4-spinosus* living under Hickory bark.

CÆNOPHANES, Förster.

In describing the species in this genus reared by Prof. Hopkins, I have taken advantage of the opportunity to publish a table of the species known to me in our fauna, believing the characters given in the table sufficient for the recognition of all the species.

TABLE OF SPECIES.

Testaceous or brownish-yellow species..... 2
Black or blackish-fuscous species.

Ovipositor longer than the whole insect.

Collar and legs yellow; abdomen piceous; first segment and basal two-thirds of second longitudinally striated, the second with a transverse impressed line at the middle.

Metathorax with two areas at base; antennæ in ♀ 24-jointed..... *C. longicaudus*, sp. n.

Metathorax rugose, but without areas at base; antennæ in ♀ 18-jointed.... *C. flavicollis*, sp. n.

Ovipositor not quite as long as the body.

Head piceous, polished; collar, mesosternum, legs and basal half of abdomen, yellow; antennæ 24-jointed; metathorax with two smooth areas at base..... *C. consimilis*, sp. n.

Ovipositor scarcely as long as the abdomen.

Head minutely punctulate, subopaque; legs, base of second abdominal segment and the three terminal segments, yellowish; first segment, basal two-thirds of second and base of third and fourth, striated; the second segment with two transverse impressed lines; antennæ 28-jointed *C. languriae*, sp. n.

Head transversely aciculated, shining; legs brown, trochanters and tarsi yellow; abdomen piceous black, the first and second segments striated, the following smooth; antennæ in ♀ 19, in ♂ 18-jointed..... *C. atrata*, Ashm.

Ovipositor half the length of abdomen.

Head polished, impunctured; legs yellowish-white; abdomen piceous or yellowish at base of second segment, also sometimes at apex of first; first segment, basal two-thirds of second and base of third, striated; rest of abdomen smooth, shining, the second segment with a transverse impressed line at the middle; antennæ in ♀ 23-jointed. *C. anthaxiæ*, sp. n.

Head transversely aciculated; legs brownish-yellow, the hind coxæ black; abdomen finely rugose, the first segment and the following segments (except apical portion of the 3, 4 and 5, two-thirds of the 6 and the 7, which are polished), striated; second segment with two longitudinal furrows; antennæ 25-jointed..... *C. borealis*, Ashm.

Legs pale brown, trochanters and tarsi whitish; abdomen elongate ovate, black, polished, the first two segments and

the third at extreme base striated, the second segment without a transverse furrow ; ♂, antennæ 22-jointed.
 *C. pityophthori*, sp. n.

Ovipositor one-third the length of abdomen.

Head smooth, polished ; collar, mesosternum, second abdominal segment and the apex of abdomen, more or less, yellow ; first segment, basal two-thirds of second, and base of third and fourth, striated ; the second with two transverse impressed lines ; antennæ 25-jointed.
 *C. floridanus*, sp. n.

2. Ovipositor longer than the abdomen.

Head black or piceous black, polished, impunctured ; scutellum with two large foveæ at base ; metathorax with two large areas at base, posteriorly rugose or reticulated ; antennæ in ♀ 31-jointed. *C. atriceps*, sp. n.

Ovipositor two-thirds the length of abdomen.

Metathorax with two areas at base.

Head transversely aciculated.

First abdominal segment and } basal two-thirds of
 second striated ; rest of abdomen smooth, polished, the second segment with a transverse impressed line ; antennæ in ♂ and ♀ 25-jointed.
 *C. hylotropidis*, sp. n.

First abdominal segment, basal two-thirds of second, and the bases of the third and fourth, striated, the second with two transverse impressed lines ; antennæ in ♂ 30-, in ♀ 25-jointed.
 *C. aciculatus*, sp. n.

Ovipositor less than half the length of the abdomen.

Metathorax with a petiolate, diamond (∇) shaped area. -

Head transversely aciculated ; first abdominal segment, the second, except at apex, and base of third and fourth, striated, the second with a transverse impressed line at basal one-third and a transverse depression a little beyond ; antennæ in ♀ 36-jointed. *C. prodoxi*, Riley.

Metathorax rugose, reticulated, with two areas at base.

Head smooth, polished ; first abdominal segment,

basal two-thirds of second, striated, the second with a transverse furrow at the middle.

. *C. melleus*, Riley.

Ovipositor one-third the length of abdomen.

Metathorax rugose, but not areolated; first abdominal segment and basal half of second, striated; rest of abdomen smooth, polished; antennæ in ♀ 18-, in ♂ 19-jointed.

. *C. Koebelei*, Riley.

Metathorax with a petiolate, diamond-shaped area at the middle and with two areas at base; first, second and base of third abdominal segments striated, the rest smooth, polished; antennæ in ♀ 24-jointed, in ♂ 27 or 28-jointed.

. *C. Chittendenii*, sp. n.

(10) *C. languriæ*, sp. n. *Caenophanes languriæ*, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor scarcely as long as the abdomen. Head and thorax black, the parapsidal furrows, collar and mesopleura ferruginous, with sometimes the face and orbits ferruginous, the second abdominal segment with 2 transverse impressed lines; abdomen in ♂ pale ferruginous, in ♀ darker, with the base of second abdominal segment and the three last segments yellowish. Head minutely punctulate; antennæ in both sexes 28-jointed; wings sub-hyaline, the first and second branches of the radius equal in length; first abdominal segment, basal two-thirds of second, and base of the third, and in the ♂ the sutures at base of 3, 4 and 5, striated.

Hab.—Morgantown, W. Va.

Bred Dec. 24, 1891, and Feb. 24, 1892, from *Languria* larvæ living in pith of *Ambrosia trifida* and *artemisiæfolia*.

(11) *C. anthaxiæ*, sp. n. *Caenophanes anthaxiæ*, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor half the length of abdomen. Head and thorax in ♂ black, in ♀ fuscous; the head polished, impunctured; thorax closely microscopically punctate, the middle lobe posteriorly rugose; abdomen ferruginous, the first segment, basal two-thirds of the second, and the suture between segments 3 and 4, striate; legs pale yellow; wings hyaline, the first abscissa of radius two-thirds the length of the second. Abdomen sometimes fuscous, with a pale blotch at the middle.

Hab.—Morgantown, W. Va.

Bred May 4 and June 24, 1892, from *Anthaxia viridicornis* infesting Willow; and May 26, from an *Agrilus* larva living under the bark of Dogwood, *Cornus florida*.

(12) *C. pityophthori*, sp. n. *Caenophanes pityophthori*, Ashm. M. S., Ins. Life, IV., p. 258.

♂.—Length, 2 mm. Black; second abdominal segment at base and sometimes the petiole at apex ferruginous; head shining, faintly transversely aciculated on vertex; thorax opaque, minutely granulated; metathorax areolated, the pleura rugose; antennæ 22-jointed, black, the 3 basal joints yellow; abdomen elongate ovate, black, polished, the first two segments and the third at extreme base or the suture striated. Legs pale yellowish. Wings hyaline, the first abscissa of radius less than two-thirds the length of the second.

Hab.—Morgantown, W. Va.

Bred Feb. 24, 1892, from *Pityophthorus* sp. living under the bark of a small dying Spruce, *Abies nigra*.

(13) *C. hylotrupidis*, sp. n. *Caenophanes hylotrupidis*, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor two-thirds the length of abdomen. Pale ferruginous; metathoracic sutures fuscous. Head above transversely aciculated; thorax finely granulated, the middle lobe posteriorly strongly rugose; metathorax, except the two basal areas, rugose, and with a λ -shaped carina at the middle; first abdominal segment and basal two-thirds of the second striate, rest of abdomen smooth, polished, the second segment with a transverse impressed line at the middle. Antennæ in both sexes 25-jointed. Wings hyaline, the stigma and nervures pale brown, the first and second branches of the radius about equal in length.

Hab.—Morgantown, W. Va.

Bred April 4, 1891, from *Hylotrupes ligneus* living in *Juniperus virginiana*.

Subfamily HELCONINÆ.

HELCON, Nees.

(14) *H. occidentalis*, Cr. *Helcon tetrapodii*, Ashm., MS. (olim), Ins. Life, IV., p. 259.

Bred July 14, 1891, from *Tetrapodium cinnamopterum* living in sapwood of Spruce log *Abies nigra*.

Subfamily ALYSINÆ.

ADELUPA, Förster.

(15) *A. tibialis*, sp. n.

♂.—Length, 1.5 mm. Polished black; lower half of head, two basal joints of antennæ, legs, including coxæ, except the posterior tibiæ which are fuscous, and first and second abdominal segments, honey-yellow. Head transverse, wider than the thorax, the ocelli close together. Palpi white. Antennæ 24-jointed, black, much longer than the body. Thorax smooth, without distinct parapsidal furrows, or only indistinctly impressed anteriorly. Mesopleura piceous; metathorax almost smooth, the surface wrinkled posteriorly. Wings large, hyaline, the tegulæ white, the costa and the elongate stigma black; rest of venation brown; the first branch of the radius very short, the second very long, about twice the length of the first transverse cubital nervure; the second submarginal cell very long, twice as broad at base as at apex; recurrent nervure almost interstitial received in the angle of the second submarginal cell; submedian cell a little longer than the median. Abdomen oblong-oval, smooth, shining, the first segment finely rugose.

Hab.—Morgantown, W. Va.

Subfamily DACNUSENÆ.

COELINIUS, Nees.

(16) *C. Hopkinsii*, sp. n.

♀.—Length, 4 mm. Black, shining; prothorax, legs, including coxæ, and the second abdominal segment, brownish-yellow; mandibles rufous; palpi white. Head oblong, smooth and polished; face punctate with a median carina, pubescent. Antennæ 33-jointed, black, as long as the body; the two basal joints, and the flagellum beneath for more than half its length, brownish-yellow. Thorax smooth, shining, trilobed; mesopleura separated from the mesosternum by a large longitudinal furrow and with a triangular fovea posteriorly; the surface, except anteriorly where it is sparsely punctate, is smooth and shining; metathorax rugose. Wings hyaline, the venation brown-black, the costa towards base and the tegulæ yellowish. Abdomen twice as long as the thorax, compressed beyond the second segment; except the second segment, black, smooth and shining; the first segment is one-third longer than the second, rugulose, smoother at apex.

Hab.—Morgantown, W. Va.

SYNOPSIS OF THE ASILID GENUS *DIOTRIA*.

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

The following table includes all the species of *Dioctria* known to me as occurring in North America:—

- | | |
|---|--------------------------|
| 1. Wings on the basal half yellow, on the apical half blackish..... | 2 |
| Wings not marked like this, nearly uniformly blackish.. | 3 |
| 2. Legs wholly black; length, 4 mm..... | <i>parvulus</i> , n. sp. |
| Legs partly reddish-yellow; length, 7 mm..... | <i>Sackenii</i> , Will. |
| 3. Abdomen wholly black..... | 4 |
| Abdomen and legs partly reddish..... | 6 |
| 4. Legs wholly black..... | 5 |
| Legs having base of tibiæ broadly reddish-yellow; mystax black | |
| | <i>nitida</i> , Will. |
| 5. Mystax black..... | <i>albius</i> , Walk. |
| Mystax red..... | <i>resplendens</i> , Lw. |
| 6. Antennal style nearly half as long as the third joint, coxæ red | |
| | <i>pusio</i> , O. S. |
| Antennal style one-sixth as long as the third joint, coxæ black | |
| | <i>rubidus</i> , n. sp. |

DIOTRIA PARVULUS, n. sp. ♂.

Wholly black, shining. Pile of head light yellow, that on sides of face very sparse, extending to base of antennæ. First two joints of antennæ subequal in length, the third joint as long as the first two taken together; style one-sixth as long as the third joint, thick and blunt. Pile of thorax rather abundant, that on abdomen very sparse and short, bright yellow. Base of wings to beginning of fifth posterior cell yellowish-white, beyond this blackish; all posterior and the anal cell open. Length, 4 mm. Los Angeles County, Cal. Two specimens.

DIOTRIA RUBIDUS, n. sp. ♂.

Head black, the pile light yellow; face with a large fovea above the centre, below which is a large gibbosity bearing the rather dense mystax; face covered with a very short, brassy yellow pubescence, and with a few pile on each side above. Antennæ black, first joint one and a-fourth times as long as the second, the third joint slightly longer than the first two taken together, the style one-sixth as long as the third joint, very robust, its tip blunt. Thorax and scutellum shining black, quite thickly light yellow pilose. Abdomen shining reddish-brown, except the first segment which is black, but sometimes the second segment and a large portion of the third and fourth segments are also black; pile very sparse and short, light yellow. Legs yellowish, the coxæ, trochanters, apical three-fourths of hind tibiæ, and sometimes also of the other tibiæ, and all the tarsi, black. Wings blackish, all posterior and the anal cell open. Halteres yellow. Length, 7 mm. Los Angeles County, Cal. Three specimens.

NOTES FROM THE CORNELL INSECTARY.

I.—SOME RESULTS OF A TRAP LANTERN EXPERIMENT.

BY M. V. SLINGERLAND, CORNELL UNIVERSITY, ITHACA, N. Y.

May 1, 1889, the Entomological Department of the Cornell Agricultural Experiment Station set six trap lanterns, at considerable distances apart, on the University farm for the purpose of determining their value as an insecticide. Each trap consisted simply of a common lantern set in a pan of water whose surface had a thin film of kerosene upon it to facilitate the destruction of the insects caught. The lanterns were kept burning every night until Oct. 15, 1889, or until no more insects were attracted. The captured insects were taken from the pans every morning and placed in alcohol, those from each lantern being kept separate. So many outside influences, as other lights, the smallness of the area covered, etc., entered into the case, that practically no results were obtained from the different locations of the lanterns in the number of specimens caught by each lantern in any of the species thus far studied. Therefore, in the tables which follow, the total catch for each day from all the lanterns is placed under that date.

An immense amount of material was taken, representing nearly every order of insects; the moths, however, included a majority of the specimens. But comparatively little of the material has yet been studied. Several species of Cut Worm Moths, the Apple-tree Tent Caterpillar Moth, and all the species of the May Beetles taken in the lanterns have been determined by the writer. As all of these are of economic importance, the following tables showing the number of specimens of each species taken each day will be of economic interest as showing the period of flight, when most numerous, the relative commonness of the different species, and many other questions of importance, as we shall see.

TABLE I.—*Clisiocampa americana* taken at Trap Lanterns in 1889:—

	DATE.	MALES.	FEMALES.
June	17.....	1	
"	18.....	2	
"	20.....	4	
"	21.....	3	
"	22.....	6	
"	25.....	11	4
"	26.....	35	
"	27.....	85	8
"	28.....	46	5
"	29.....	100	33
"	30.....	61	25

TABLE I.—(Continued).

DATE.		MALES.	FEMALES.
July	1.....	62	6
"	2.....	30	
"	3.....	29	4
"	4.....	26	
"	5.....	7	1
"	6.....	1	1
"	7.....	1	
"	8.....	1	1
"	9.....	1	
"	18.....	1	
Total.....		513	88

TABLE II.—*Agrotids* taken at Trap Lanterns in 1889:—

DATE.	<i>F. subgothica.</i>		<i>F. jaculifera.</i>	
	♂	♀	♂	♀
July 4.....				1
" 12.....	1			
" 17.....				1
" 21.....	2			
" 23.....	1			
" 26.....	1			
" 27.....	2			
" 28.....	1			
" 29.....	6			
" 30.....	2	2		
" 31.....	12	2		
Aug. 1.....	7	2		
" 2.....	19			2
" 3.....	9	1	1	
" 4.....	17	3	1	
" 5.....	39	4	3	
" 6.....	5			
" 7.....	3			
" 8.....	5		1	
" 9.....	32	1		
" 10.....	7	1	4	
" 11.....	9	2		
" 12.....	5			
" 14.....	30	3	1	2
" 15.....	59	1	2	
" 16.....	42		1	
" 17.....	76	10		2
" 18.....	124	3	1	
" 19.....	161	9	5	
" 20.....	198	6		
" 21.....	160	19	1	1
" 22.....	108	6		
" 23.....	63	2		
" 24.....	122	10		

TABLE II.—(Continued).

DATE.	<i>F. subgothica.</i>		<i>F. jaculifera.</i>	
	♂	♀	♂	♀
Aug. 25.....	209	8		
" 26.....	110	7		
" 27.....	90	2		
" 28.....	93	3		
" 29.....	97	4		
" 30.....	53	2		
" 31.....	108	6		
Sept. 1.....	60	8		
" 2.....	65	2	I	
" 3.....	50			
" 4.....	87	4		
" 5.....	23			
" 6.....	37	2		
" 7.....	8			
" 8.....	16	3		
" 9.....	1			
" 11.....	1	2		
" 14.....	1			
" 16.....	2	I		
" 17.....	1			
" 18.....		I		
Total.....	2240	142	22	9

One male of *Carneades redimicula* was taken on the 16th and a female on the 29th of July, and a female of *Carneades insignata* was caught July 11.

TABLE III.—*Lachnosterna* taken at Trap Lanterns in 1889 and 1892:—

DATE.	<i>fusca.</i>				<i>dubia.</i>				<i>ilicis.</i>			
	1889.		1892.		1889.		1892.		1889.		1892.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
May 6.....	I											
" 7.....	I											
" 8.....	I	I				I						
" 10.....					I							
" 11.....	I	I			2	I						
" 12.....					I	I						
" 13.....		I										
" 14.....	I	I			2							
" 16.....	I				6							
" 17.....	2	I			I							
" 18.....	8	I				2						
" 19.....	22				5	I						
" 20.....	4				4							
" 21.....	31				4	I						

TABLE III.—(Continued).

DATE.	<i>fusca.</i>				<i>dubia.</i>				<i>ilicis.</i>			
	1889.		1892.		1889.		1892.		1889.		1892.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
May 22.....	1	2			1							
" 25.....	16	2			4	3						
" 26.....			2		1							
" 28.....					1							
" 30.....			10	2	1			1				
" 31.....	1	2	8				2					
June 1.....	13	5			3				2			
" 2.....			3		2	1	1					
" 3.....	4	1	3		6	4						
" 4.....	13	1	1		2							
" 5.....	1	1				1						
" 6.....			1					1				
" 7.....			1			1		1				
" 8.....		1				1						
" 9.....	8	2			1				1			
" 10.....	11	3	2	1								
" 11.....	4	1	4									
" 13.....		1	12	1		1					1	
" 14.....	1	2	54	1	1			1				
" 15.....	6	1	13	1	1				1			
" 16.....	3		5						1			
" 17.....	3	2	11	1								3
" 18.....	6		1									
" 19.....			1	1								
" 20.....	3	2	32	2								1
" 21.....	1		35	2								
" 22.....	4	1	28	1		1	1					
" 25.....			2	1								
" 26.....	2								1			
" 27.....	8	1							1			
" 28.....	3		1	1					2			
" 29.....					1				1			
" 30.....	1								1			
July 1.....									5			
" 2.....	1								4			
" 3.....	1								1			
" 4.....									1			
" 5.....	1					1						
" 14.....												1
" 19.....									1			1
" 20.....									3			1
" 28.....												1
" 30.....									1			1
Total.....	297	37	230	15	50	16	9	3	27			10

In this table are also included the results of the specimens caught in one trap lantern which was kept running during 1892, from May 20 to Oct. 1. In 1889 there were also taken two specimens of *grandis*, June

20 and 27, both males; four *hirticula*, two males and two females, the former taken July 1 and 19, the latter June 14 and July 22; two males of *balia* taken June 1; two males of *hirsuta* taken May 20 and June 3; and one male of *quercus* was taken June 1. In 1892, one male of *grandis* was taken June 21; three males of *hirticula* on June 11, July 15 and 26; and two males of *hirsuta* were taken on June 2 and 3. Thus eight species were represented in the trap lantern material; at least twenty-three species should be found in our State.

From Table I. we learn that *Clisiocampa americana* flies from June 17 to July 18, occurring in the greatest numbers during a period of about ten days from June 26 to July 4: over 92 per cent. of the moths being taken at this time.

Table II. shows that *Feltia subgothica* is excessively abundant in this locality, nearly 2,400 specimens having been taken. I believe that more specimens of this moth were taken than of any other species of insect. Although the species flies from July 12 to Sept. 18, there is nothing to indicate more than one brood. Other experiments at the Insectary show that the insect hibernates in the larval state, and it is said that the change to a pupa takes place about July 1. As will be seen in the table, the adults appear in the greatest numbers from Aug. 14 to Sept. 6, over 97 per cent. of the moths being taken during these three weeks.

A glance at Table III. will show that *fusca* is by far the most numerous species in our vicinity; out of 694 specimens of *Lachnosterna* taken in the two years, 83 per cent. of them are *fusca*. *Dubia* and *ilicis* are comparatively common, while *hirticula*, *hirsuta*, *grandis*, *balia* and *quercus* are rare. In 1889 *fusca* flew from May 19 to June 10 and reached its climax on June 1, when 39 per cent. of them were taken. In 1892, however, *fusca* did not begin to fly until May 26 and stopped June 28, and it was the most numerous from June 13 to 28, or about two weeks later than in 1889. *Hirsuta*, *balia* and *quercus* seem to appear at about the same time as *fusca*, that is, during May and June. But *ilicis*, *grandis* and *hirticula* do not appear until the latter part of June and during July. No *Lachnosterna* were taken after July 30, although the lanterns were run until Oct. 15, thus indicating that the emergence of the beetles in the fall is very uncommon, if it happens at all. This is confirmatory evidence of the conclusion which Prof. Forbes, of Illinois, and Prof. Perkins, of Vermont, have reached in their recent

studies of these insects. In the case of the three species which fly later in the season, it is possible that they either pass the winter as pupæ or do not pupate until spring.

The most striking thing to be learned, however, from each of these tables is the great disparity in numbers between the males and females caught. The males greatly outnumber the females in every instance. Only about 17 per cent. of the *Clisiocampa americana* in Table I. were females. But a little over 6 per cent. of the *Feltia subgothica* in Table II. were females, while nearly 41 per cent. of *jaculifera* were of this sex. Less than 12 per cent. of the *Lachnosterna fusca* in Table III. taken in 1889, and but little over 6 per cent. of those taken in 1892, were females; with *dubia* the proportion of females is greater, being about 32 per cent.; no females of *ilicis* were taken in either year.

This great preponderance of the males over the females has also been noticed in every other species of the trap lantern material which has been studied of whatever order. It indicates that the males are much more active than the females, and is of the greatest importance when considering the insecticidal value of the trap lantern. For undoubtedly many of the males have copulated before being caught, and enough others remain uncaptured to fertilize the remaining females. Therefore the perpetuation of the species is provided for, and the insecticidal value of the lantern is rendered too small to be practicable.

BOOK NOTICE.

THE BUTTERFLIES OF NORTH AMERICA. Third Series, Part XIII.

Another part of Mr. Edwards's magnificent work has just appeared, and for beauty of illustration and interest of the letter-press, it perhaps surpasses all previously issued parts. The first plate shows the type of *Chionobas Chryxus*, var. *Calais*, Scudder, and the accompanying letter-press gives some interesting data collected by Mr. T. E. Bean concerning a similar form found at Banff, in the Rocky Mountains. The second plate shows in full all stages of the rare Canadian species, *C. Jutta*. This is accompanied by 14 pages of letter-press, in which nearly everything that is known concerning this species in America is related in a most entertaining manner. To the Rev. T. W. Fyles, F. L. S., of South Quebec, belongs the honour of being the only person so far who has reared *Jutta* from the egg to imago and described the different stages.

What the writer deems the most interesting feature in the life of this species is referred to, but Mr. Edwards's view of the matter seems to be different from his. Speaking of larvæ which hibernate after the first or second moult of a brood, part of which reach full growth the first autumn, he says:—"If any of these small larvæ run their full course, it seems certain that their butterflies should show themselves at least a month later than the 15th of June, and I do not understand why there is not a second flight." The writer has had the opportunity four times of breeding the species from the egg through the first winter, and all of the specimens hatched from eggs laid at Ottawa, Quebec, Banff and Nepigon, went into hibernation after the first or second moult; one larva, however, of five sent by Mr. Edwards, fed straight on and reached full growth before winter set in. Those which revived the following spring fed slowly and did not attain full growth until the autumn, as related of this species and of *Chionobas Macounii* in Annual Report Ent. Soc., Ont., 1888, p. 7.

The third plate, also, figures two rare species of the same genus, which may be included in the Canadian fauna, *Crambis*, from Labrador, and a mountain species, named *Brucei* by Mr. Edwards, which has been taken by Mr. Bean, at Banff. The preparatory stages of the latter are beautifully illustrated in great detail, and it is seen that the larva resembles very closely that of *C. Semidea*. There are some critical notes concerning the synonymy of some allied species, which will be read with interest by students of this difficult genus.

We feel sure that all entomologists will hail with pleasure the appearance of this superb contribution to the knowledge of our Diurnal Lepidoptera, and we trust that the talented and genial author may be spared for many years to carry on this great work which has cost him so much.

J. FLETCHER.

[We were delighted to hear that Mr. Edwards has received a grant of \$500 from the Bache Fund of the National Academy of Sciences to assist him in the completion of his publication on the Butterflies of North America.—ED. CAN. ENT.]

NOTES.

LUMINOUS WORMS.

Driving from Hudson to Como on the 23rd of September, 1892, about 8 p.m., the night being warm and damp, I was much surprised to see on the hard road something luminous, emitting quite as strong a light as the glow-worm in England. We stopped quickly, but before I could get back the few yards it had disappeared. Some half mile further we passed another, which also, before I could get to it, disappeared. Can any of your readers say what these were? Their sudden disappearance and our failing to find them, though we struck a match in both cases, would lead me to think they were some sort of earth worm, as these draw themselves quickly into their holes when disturbed. How else is their sudden disappearance to be accounted for?

LACHLAN GIBB.

The cells of *Megachile*, which I send, were found in rather a peculiar place last September, being attached to the trimmings of a dress which was inside a wooden chest placed on a gallery in Montreal.

LACHLAN GIBB.

CORRESPONDENCE.

LARVOPHAGOUS CATERPILLARS.

Sir: On reading in the issue of the CANADIAN ENTOMOLOGIST for January of Larvophagous caterpillars of *P. philenor*, I was reminded of an observation which I made last summer. I had at that time several larvæ of *Danias archippus* in a wire cage, and supplied them frequently with milkweed leaves, which they devoured voraciously. On one occasion, owing to a delay in getting leaves, their supply became exhausted, and in a short time—not more than an hour or two, I should think—one of them attacked another which was about to change to a chrysalis, and began eating it. Some of the others joined, and by the time the leaves were obtained fully half of the unfortunate caterpillar had disappeared. They ate it very slowly, not being hungry enough to relish it, I suppose. My brother tells me that he has seen a larva of *P. asterias* greedily eating the chrysalis of one of its kind which was hung on a fence.

WILLIAM L. W. FIELD, Guildford, Conn.

Mailed February 28th.