



REV. G. W. TAYLOR, F.R.S.C.

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THE REV. GEORGE W. TAYLOR, F. R. S. C., F. Z. S.

The subject of this memoir was born in Derby, England, in 1851, and came to Canada when he was twenty-five years of age. He settled in Vancouver Island and studied for the Ministry under the Rt. Rev. George Hills, D. D., Bishop of Columbia. He was made a deacon in 1884 and ordained to the priesthood in 1886. His first clerical charge was Cedar Hill. He had already given attention to the attractive and but little known fauna of the Pacific Coast, for in the preface to the Toronto Check List of Insects, which was published in 1883, Messrs. Brodie and White speak of him as a collector to whom their thanks were due, and at the annual meeting of the Entomological Society of Ontario, held at London, Ont., October 15, 1884, Mr. James Fletcher presented, on behalf of Mr. Taylor, a collection of Diurnal Lepidoptera to the society. On this occasion Mr. Fletcher said that although Mr. Taylor was but a new member "he had already done good work." In the report of this meeting the first contribution, by the Rev. G. W. Taylor, to the annals of the Society, appears. It is entitled "Notes on the Entomology of Vancouver Island." In the CANADIAN ENTOMOLOGIST for the same year (Vol. XVI) other papers written by him will be found.

In 1887, Mr. Taylor was appointed Honorary Provincial Entomologist of British Columbia. In the Annual Report of the Entomological Society for that year he published a very interesting account of a series of expeditions made by himself, Mr. Fletcher, Professor Macoun, Mr. Tolmie and others, to the summit of Mount Finlayson, in search of *Chionobas gigas* Butler.

After some years' active service during which he had built a church, he resigned his charge in Columbia Diocese, and moved to Ottawa. There he was favourably received by the Ecclesiastical authorities; and there he founded the church of St. Barnabas. But after some years, for the benefit of his health, he returned to British Columbia and became rector of the church at Wellington, near Nanaimo. He retained this charge until five years ago when he was appointed by the Federal Government Curator of the Biological Station at Departure Bay.

It was during the period of his second residence in Vancouver Island that Mr. Taylor became a constant contributor to the pages of the CANADIAN ENTOMOLOGIST. In the volumes of that magazine numbered from XXXVI to XLII inclusive no less than eighteen papers from his hand appear. His last contribution, entitled "On some New Species of *Mesoleuca*," is given in the number for March, 1910.

Of late years Mr. Taylor gave much attention to the Geometridæ, especially those belonging to the genera *Eupithecia* Curtis and *Mesoleuca* Hübner. Of these he described and named many new species. The whole of his collection of Geometridæ has been recently purchased by Dr. Wm. Barnes, of Decatur, who, without doubt, will make excellent use of it; but we cannot but regret that so much of the fruit of our late friend's research and ability should have passed from the Dominion.

In 1881 Mr. Taylor was made a Fellow of the Royal Society of Canada. He had been for many years a Fellow of the Zoological and Entomological Societies of England, and fifteen years ago he was elected a Corresponding Member of the Ottawa Field Naturalists' Club. All these societies have been benefitted by his labours.

In the Thirty-fourth Annual Report of our own society appears a highly-appreciative and eulogistic account of Mr. Taylor from the pen of the late Dr. Fletcher. From it we learn that many naturalists have given honour to Mr. Taylor by naming after him new species of various kinds, as, for example: *Melitæa taylori* W. H. Edwards, *Mediolaria taylori* Dall, *Leucandra taylori* Lambe.

Undoubtedly Mr. Taylor's chief scientific work was done in connection with Marine Zoology, and in recognition of this the Federal Government, in 1905, appointed him a member of the Dominion Fisheries Commission for British Columbia. In the report of that Commission, Mr. Taylor described as many as thirty kinds of edible shell-fish.

"There is in course of publication by the Dominion Government at the present time a very long and valuable report on the crabs, shrimps, and other crustacea of British Columbia."—(*Ottawa Evening Journal*, Aug. 24th, 1912.)

The following words, written by Dr. Fletcher in the lifetime of Mr. Taylor, and in the paper above referred to, convey much in few words, and were justly due to the deceased: "Mr. Taylor is an indefatigable collector and a generous correspondent, who considers no trouble too much to make observations or secure specimens when specially desired. In his parish work he is painstaking, gentle and self-denying—always ready to help. A clear and forcible preacher and an earnest liver, who shows in his works that religion is not an accessory of every-day life, but an integral part of it."

Mr. Taylor died of paralysis, on August the 2nd last, and was buried in the cemetery at Nanaimo. He leaves to mourn his loss a married daughter and two sons. The funeral service was read by a dear friend of the deceased, the Venerable Archdeacon Scriven.

It is to be hoped that measures will be taken to secure for the benefit of posterity the very valuable conchological and (remaining) entomological collections left by Mr. Taylor.

T. W. F.

ON THE DIPTERA OF BAJA CALIFORNIA, INCLUDING SOME SPECIES FROM ADJACENT REGIONS.—II.*

BY C. H. T. TOWNSEND, LIMA, PERU.

This paper embodies a report on a lot of flies sent me for determination some years ago by the California Academy of Sciences. They were secured on a later expedition than those mentioned in the first paper.† Unless otherwise stated, they were collected jointly by Dr. Gustav Eisen and Mr. Frank H. Vaslit, who, together, visited and collected in San José del Cabo in September, and Tepic in October and November, 1894. Species already listed in the first section appear here with their original numbers.

*The present paper has been in manuscript for nearly ten years, but with many others was never reached by the Publication Committee of the California Academy of Sciences, owing to lack of funds. It was returned to me many years ago, has since that time been overlooked, and is now offered on account of the fact that the results it contains appear to have lost none of their interest during the lapse of time.

†Section I appeared in Proc. Cal. Acad. Sci., Ser. 2, Vol. IV, pp. 593-620. October, 1912

BIBIONIDÆ.

2. *Dilophus stygius* Say.

Topic.—Twelve ♂s and forty-three ♀s, Nov. One pair *in coitu*, which verifies my conclusion that the two sexes associated together in my former determination (see No. 2 of Section I) are the same species. The females vary considerably in size, some being as small as the larger males. The small linear blackish stigma in the whitish wings of the ♂ is often nearly or quite obsolete.

It is worthy of note that, among the specimens sent me of the females of this species, there was inadvertently included a specimen of a black sawfly, which would easily pass for a ♀ *Dilophus stygius* if not looked at a second time. This sawfly is of the same uniform deep shining black as the ♀ *stygius*, is of the same size, and has the same black wings of corresponding shade. I can hardly resist the conclusion that the sawfly mimics the ♀ *stygius*, though for what reason cannot at present be said. The sawfly is a remarkable form, in that it possesses long-branched antennæ. Each antenna is split nearly to base into two branches, the stalk or pedicel being short and bare, and the branches hairy. The abdomen of the sawfly is more shining than that of the ♀ *stygius*, but this does not show save on close inspection, while its general form closely approaches that of the ♀ *stygius* abdomen. Of course, the head of the sawfly is totally different from that of the ♀ *stygius*, but this is not conspicuous on first sight, the effect being lost in the uniform colour resemblance and otherwise close similarity.

D. stygius is an abundant Mexican species. The length of the body in the ♀ does not average over 6 mm. in the present specimens. I believe that the ♀ *Dilophus* identified by Bellardi as *orbatus* Say (Saggio I, p. 19) was not that species, but *stygius* Say. My reasons for this opinion are as follows:

D. stygius was described by Say from Mexico. *D. orbatus* was described by Say from Pennsylvania, and Osten Sacken has identified as *orbatus* two sexes of a species collected in Florida by himself. It is very common for a Middle Atlantic Coast species to extend into Florida, but rarely does a northern species extend so far southwest as Southern Mexico. Bellardi's specimens were from Orizaba. I have myself taken in numbers in the outskirts of Orizaba what I believe to be *stygius*. The males from Florida, which Osten Sacken identifies as *orbatus*, and which I consider to be that species in all probability, are described as having the wings

yellowish, whereas all the Mexican males that I have seen have the wings distinctly whitish with no yellowish tinge. Bellardi gives the length of his specimen (♀) as 8 mm., which is much longer than ♀ *orbatus* as given by Say ($\frac{1}{8}$ inch = less than 5 mm.), and Wiedemann (2 lines = about 4 mm.). The median cross-vein of the wing is always present in both sexes; it is often situated in both sexes exactly at the furcation of the vein, at other times being just a little distance before the furcation.

62. *Plecia bellardii* Towns., n. nom.

Sym. *vittata* Bell. (nec. Wied.) preocc.

Tepic.—Eight ♂s and three ♀s, Nov. Aside from the genital characters the females may be known by the eyes not being contiguous but well separated, the front being fully as wide as the eyes. Bellardi says that the ♀s are larger than the ♂s, and have the wings longer and wider. In my specimens there is hardly any difference in size of body or wings, except that the abdomen of the ♀ may be slightly larger. Length of body about 7 mm., of wing about 9 mm.

I identify these specimens with Bellardi's (not Wiedemann's) *Plecia vittata*, which Schiner (Nov. Reise Dipt., p. 22), makes a synonym of *plagiata*. I believe that this synonymy is incorrect. If *vittata* Bell. is distinct, as I believe, it must be called by another name, as *vittata* is preoccupied by Wiedemann. I have therefore proposed the name *bellardii*.

There is no brownish tinge to the wings, which vary from a dense to a dilute black, with an iridescent greenish to violet reflection in oblique lights. Wiedemann describes the darker parts of the wings of *plagiata* as blackish brown, Schiner gives no reason whatever for placing *vittata* Bell. as a synonym of *plagiata*.

TABANIDÆ.

63. *Pangonia tepicana* Towns., n. nom.

Syn. *P. basilaris* Wd., Aus. Zweifl., II, 621 (preocc.).

Tepic.—One ♀, Oct. I believe this to be *P. basilaris* Wd., Aus. Zweifl., II, p. 621 (not *basilaris* Wd., Aus. Zweifl., I, pp. 554-5, and not *wiedemanni* Bell., Saggio Ditt. Mess., I, p. 48). Von Röder has pointed out (Dipt. gesam. Süd-Amerika von A. Stübel, p. 7) the differences in the wing coloration of *basilaris* (Wd., Aus. Zw., I, pp. 554-5) and *wiedemanni* Bellardi. In the latter the black of wings is confined to the extreme base, and extends only as far as the cross-veins at base of basal cells. In the former it extends to the cross-veins, closing the basal cells, and takes up the whole basal third of the wing. Röder's specimen of *basilaris* was from the Rio del Cinto (Ecuador), about 5,000 ft.

My specimen agrees perfectly with Wiedemann's description (Aus. Zw., II, 621). It differs markedly, as does also Wiedemann's description, from *P. wiedemanni*, as described by Bellardi. I therefore believe that Bellardi was in error in identifying his species with Wiedemann's. *P. tepicani* differs as follows from Bellardi's description of *wiedemanni*:

♀.—Length, 12½ mm.; proboscis, hardly 3½ mm. Front brownish-yellow pollinose, first two antennal joints light brownish yellow, third wholly reddish yellow, apex not fuscous. Apical annulus elongate, narrow and pointed, hardly half length of rest of third joint. Third joint is swollen at base, but flattened, and the annuli are strongly contiguous. Face brownish-yellow pollinose. Palpi not unusually elongate, last joint about as long as third antennal joint, flattened and curved, but pointed at tip. The palpi and the six lancet-like organs are clear reddish yellow. There are four faint lines apparent on thorax, distinguished from the fuscous-yellow pollinose surface by being more thickly pollinose. Abdomen brownish yellow, first segment black under scutellum, from which a black median vitta extends back to fifth segment (subobsolete for a short distance on third segment in my specimen). Third, and especially fourth and fifth segments tinged with brownish, due to age of specimen no doubt. First two segments with yellowish hair only; third with black hair on anterior two-thirds and yellow hair on posterior one-third; fourth and fifth (these segments are short) with black hair anteriorly, and yellow hair behind, giving the hind border of abdomen a good fringe of yellow hair. Femora blackish, rest of legs wholly orange-yellow, with front femora distally tinged with same colour. Wings tinged with fuscous-yellow, the extreme base blackish brown. All else as in Bellardi's description.

This species will be distinguished at once by the smaller size, shorter proboscis, black femora, and the median abdominal vitta and black hair of third to fifth abdominal segments.

15. *Tabanus punctifer* O. S.

Mesa Verde, L. Cal. One ♀, Oct., 1893 (Eisen).

ASILIDÆ.

21. *Proctacanthus arno* Towns.

San José del Cabo. Four ♀s and seven ♂s, Sept. One of the ♂s measures 33 mm.

22. *Eccritosisia amphinome* Walk.

Syn. *Proctacanthus zamon* Towns. (Section I, No. 22).

San José del Cabo. Twenty ♂s and eleven ♀s, Sept. Four of the

♀s and three of ♂s measure 29 to 31 mm. I observed this species at Hermosillo, Sonora, in Sept. 1894, on the sand of the dry bed of the Rio Sonora.

64. *Doryctus distendens* Wd., var. *varipennis* Walk.

San José del Cabo. One ♀, Sept.

Dr. Williston places Walker's species as synonymous with *distendens*, but it may be considered a good variety on the strength of the two brown cross-bands of the wings. This is the first exact record of the species from north of Guatemala.

The present specimen is a strongly aberrant one, with body almost wholly brownish red, front tibiæ and metatarsi not at all blackish; and the fourth posterior cell wide open, being as wide on margin of wing as the first posterior cell. The lateral thoracic vittæ are grayish pollinose, but the two middle vittæ are tawny grayish. The middle vittæ are not elongate cuneiform from a hind view (see O. S., Biol. C. A. Dipt., I, 182), but are distinctly equilateral, well separated and parallel. From a front view they do appear elongate cuneiform. Abdomen is almost wholly brownish red, with only flakes of blackish in places, especially on underside.

Since Jænnicke's figure represents *Doryctus distendens* with the fourth posterior cell completely closed, I infer that this is the normal venation of the genus. Whether the present form should be separated on account of this cell being wide open I cannot now decide. As it otherwise agrees so closely with *Doryctus* in the more important characters, I refer it here.

APIOCERIDÆ.

26. *Rhaphiomidas xanthos* Towns.

San José del Cabo. One ♂, apparently not maturely coloured, seems to be this species. Sept.

Length, nearly 25 mm. This is the only specimen of *Rhaphiomidas* in the lot, which seems strange since so many occurred in the previous sendings. The wings do not quite reach the tip of the abdomen. Segments 6, 7 and 8 of abdomen together about as long as 5, which is but a little shorter than 3. It seems that in the previous description a segment was missed, which is revealed in this less matured specimen.

SYRPHIDÆ.

65. *Chrysogaster bellula* Will.

Tepic.—One ♀, Nov.

Length, 4½ mm. Resembles *intida* in antennæ, which are much

longer than face, and with second and third joints nearly equal in length. The face is not more than three-fifths the length of antennæ. It agrees perfectly in the wings with Williston's description of *bellula*, and not at all with *intida*; therefore I place it here. The antennæ are brown, with first two joints tinged with yellowish. The disk of abdomen is pronouncedly opaque blackish, but with some cupreous and green. The face is quite rugose and the epistoma is hardly produced downwards. I am unable to restore the markings of the eyes, doubtless because the specimen was originally an alcoholic one, and therefore cannot say toward which species it inclines in the pattern of the eye-picture. (See Williston, Biol. C. A. Dipt., III, p. 7.)

66. *Volucella obesa* Fab.

Tepic.—Two specimens, ♂ ♀, Oct.

Length, 10 to 11 mm. Metallic green. The third antennal joint is only moderately short in the ♀, and hardly shorter in the ♂.

67. *Volucella dichroica* G.-Tos.

Tepic.—One ♀ I consider as this species. Oct.

The face is strongly conically projected below, ending in two teeth formed by a median longitudinal notch in the apex of the cone, and I should hardly call it obtuse. The scutellum is not reddish-coppery (*rosso-rame*), but of the same greenish-violaceous colour as the thorax and abdomen. The metatarsi and next two joints, especially in the hind legs, are pale brownish-yellowish, as are also bases of antennæ. Otherwise it agrees well with Giglio-Tos' description. The brownish spot at distal end of submarginal cell is subobsolete, and a similar cloud is apparent on last section of fourth vein at distal end of apical cell, and along last section of third vein. There are bristles on the edge of the scutellum, and the eyes are hairy, both of which characters are unmentioned by Giglio-Tos.

The specimen agrees well with the more important characters in Williston's description of *V. viridis*, from Chapada, Brazil, except that the ♀ front is not of equal width, but is very noticeably widened anteriorly. While the marginal cell is short petiolate, the legs are more luteous than in Giglio-Tos' specimen, yet their prevailing colour is black. In the colour of the scutellum it agrees better with *viridis*, and it possesses the ciliate-like pile of femora and tibiæ. These two species must be very closely allied.

48. *Eristalis tricolor* Jænn.

Tepic.—One ♀, Oct.

Length, $9\frac{1}{2}$ mm. Has much more black on the abdomen than Lower California specimens. The black triangle of second segment expands on each side along posterior margin, widening at posterior corners of segment into a spot. Third segment is black, with a yellow spot on each side, which reaches anterior border only. Narrow hind margin of second to fourth segments light yellow. Tibiæ quite yellowish, even hind pair.

San José del Cabo. One ♀ and three ♂s, Sept. These have more yellow on the abdomen than the above specimen. The ♀ has even the fourth segment yellowish (brownish yellow), with black spot in middle. Second and third segments same. The three ♂s are the same, except that the fourth segment is wholly black in two, and with only the anterior lateral angles yellow in the other.

TWO BEES NEW TO CANADA.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Chelynia ricardonis, n. sp. (? *rubi*, subsp.).

♀.—Length, 9 mm.; similar to *C. rubi* (Ckll.), but sides of head above, and sides and anterior part of mesothorax, with conspicuous white hair; tubercles densely fringed with dull white hair; abdominal markings bright lemon yellow (cream-coloured in *rubi*), the band on first segment broad and entirely curved at sides; that on second interrupted sublaterally, the lateral pieces of it pyriform; third segment with a rather short median stripe and small lateral spots; fourth with a median butterfly-shaped yellow mark; hind basitarsi long, subclavate, with reddish hair on inner side.

Hab.—Vernon, British Columbia, June 19, 1902 (Miss Ricardo). British Museum. This has the structure of *C. rubi* (*betheli* Ashm.), but differs in the colour of the markings and pubescence. It is probably a valid species, but it may prove to represent only a local race or subspecies of *C. rubi*. The latter occurs at Seattle and Olympia, in the State of Washington. Although the two species are not very far apart geographically, Vernon is an inland locality, with doubtless a very different fauna from that of the coast.

Anthidium porterae Ckll.

Calgary, one male (Miss Ricardo). British Museum. Also from Calgary, from some collector, is a male *A. tenuiflorae* Ckll., a form with the scape of the antennæ entirely black.

October, 1912

NEW GENERA AND SPECIES OF XYELIDÆ AND LYDIDÆ.*

BY ALEX D. MACGILLIVRAY, UNIVERSITY OF ILLINOIS, URBANA, ILL.

The most of the following descriptions have been in manuscript for many months. The names in this paper and some others to be published later are to be used in another place, and they are offered for publication at this time for that reason.

Paraxyela, n. gen.—Front wings with the free part of M arising distinctly before the point of separation of R and Sc₂, the free part of R₃ distinctly shorter than R + Sc₂, frequently less than one-half the length of R + Sc₂; the hind wings with the free part of R₃ present; clypeus triangular in outline, the median portion two or three times as long as the lateral portions; the antennæ with the third segment longer than all the following segments together; the claws cleft, the two parts of the cleft parallel. Type, *Xyela tricolor* Nort.

Macroxyela bicolor, n. sp.—Male: head with a flat depressed area in front of the median ocellus, never crossed by the median fovea; median fovea represented by a linear smooth spot only slightly if at all depressed below the surface of the front; the area of the head between the antennal sockets and the ocellar furrow blackish and coarsely punctured, the remainder of the head and the notum finely shagrinated; antennæ with the third segment five times as long as all the following segments together; the fourth and fifth segments subequal, each longer than any of the following segments; the body black with the clypeus, the labrum, the malar space, the supraclipeal area, the basal plates at sides above the abdomen, and the legs, rufous. Length, 8 mm.

Habitat.—Columbus, Ohio. Professor J. S. Hine, collector.

Differentiated from the males of all other species of the genus known to me by the greater abundance of rufous.

Macroxyela obsoleta, n. sp.—Female: head with a flat depressed area in front of the median ocellus, never crossed by the median fovea; median fovea a broad, flat, indistinct, depressed area, more distinct near the median ocellus; antennæ with the third segment many times longer than all the following segments together, with a black ring at base; the fourth, fifth and sixth segments subequal in length, the following segments shorter; the head below the ocelli sparsely, coarsely punctured; front wings with

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the radial cross-vein much nearer the point of separation of R_2 than the radio-medial cross-vein; the saw-guides strongly convex above on the basal half and straight or slightly convex below; the body rufous with a spot about the ocelli, a spot near the base of each wing, and the base of the abdomen more or less black. Length 8 mm.

Habitat.—Ithaca, N. Y. J. O. Martin, collector.

Similar in appearance to *infuscata* Norton, but readily separated by the sculpture of the head.

Macroxyela distincta, n. sp.—Female: head with a flat depressed area in front of the median ocellus, never crossed by the median fovea; median fovea a distinct, narrow, elongate, diamond-shaped depression, flat on the bottom; antennæ with the third segment many times longer than all the following segments together; the fourth, fifth and sixth segments subequal in length, the following segments shorter; the head below the ocelli roughened by elongate punctures; the radial cross-vein nearer the point of separation of R_2 than the radio-medial cross-vein; the saw-guides convex above on the basal half and straight below; the body rufous with two spots on the lateral lobes of the mesonotum, and the postscutellum black. Length 8 mm.

Habitat.—Ithaca, N. Y. J. O. Martin, collector.

The male is black with the clypeus, labrum, legs and venter, except at base, apex, and lateral margin of abdomen for the most part, yellowish-rufous.

Separated from *infuscata* Norton and *distincta* Mack by the form of the median fovea.

Protoxyela, n. gen.—Front wings with the free part of M arising distinctly before the point of separation of R and Sc_2 , the free part of R_5 distinctly shorter than $R + Sc_2$, frequently less than one-half the length of this vein; the free part of Sc_1 almost twice as long as the free part of Sc_2 ; Sc_1 much more oblique than Sc_2 ; the cell R_3 usually divided by a supernumerary cross-vein; the hind wings with free part of R_5 present; the clypeus not triangular in outline, the median portion but little if any longer than the lateral portions; the antennæ with the third segment as long as all the following segments together; the claws with an erect tooth at middle. Type, *Xyela aenia* Nort.

Itycorsia angulata, n. sp.—Female: body olivaceous with the basal segments of the antennæ, the clypeal suture, the furrows of the head, the postocellar area in great part, two irregular spots on the posterior orbits,

a crescent-shaped mark on each side on the vertex between the postocellar area and the orbital spot, an irregular band between the dorsal margins of the compound eyes, including the ocelli, the pronotum except the lateral and caudal margin, a spot on the cephalic half of the median lobe of the mesonotum, a spot on each lateral lobe, a round spot on the disk of the mesonotum, the dorsum of the metathorax in great part, the basal plates, the pleural and sternal sutures, and the caudal surfaces of the femora, for the most part, black; the median fovea a pit nearer the ocelli than the antennæ, with a tubercle at its ventral end; antennæ with about thirty-five segments, the third segment as long as the next two; the postocellar area broadly convex, higher than the ocelli; mesal eye-margin distinctly angulate; the head sparsely, punctately roughened except the declivous area, which is polished; front wings with the free part of R_5 and the radial cross-vein interstitial. Length 14 mm.

Habitat.—Axton, N. Y. (C. O. Houghton and the author, collectors); Manchester, Conn. (A. B. Chamberlin, collector); Wallingford, Conn. (J. K. Lewis, collector).

This species is closely allied with *luteomaculata* Cress.

Cephaleia distincta, n. sp.—Male: Body black with the clypeus, the supraclypeal area, the head between the compound eyes and the antennal sockets, a faint spot on each vertical furrow, the posterior orbits, the tegulæ, a band on the mesopleuræ, the prosternum, the legs beyond the coxæ and the lateral margin of the abdomen, yellow; antennæ with about twenty-five segments, the third segment longer than four and five together; the median fovea extending to the median ocellus; the clypeus slightly carinated; the head sparsely punctured, punctures confluent in the region above the antennal sockets; the mesonotum sparsely punctured; the scutellum almost smooth. Length 10 mm.

Habitat.—Mt. Washington, N. H.; Mrs. Annie Trumbull Slosson, collector.

This species would fall in a table near *mathematicus* Kirby, from which it can be differentiated by the black head.

Cephaleia criddlei, n. sp.—Female: body black with the clypeus, a spot on the inner margin of the compound eye, a broad spot on each vertical furrow, the posterior orbits, a long spot on the lateral lobes of the mesonotum including the scutellum and the dorsum of the abdomen, and extending as an angulated band along the lateral margin, rufous; the antennæ beyond the pedicel, and the legs beyond the tip of the femora,

yellowish white; the head deeply, sparsely punctured; the pleuræ and notum deeply, closely punctured; the median fovea indistinct, not connected with the median ocellus; the wings with a dusky band in the region of the stigma. Length 14 mm.

Habitat.—Aweme, Manitoba; Norman Criddle, collector.

This species is similar to *fascipennis* Cresson. The densely banded wings will differentiate it.

Cephaleia jenseni, n. sp.—Female: body rufous with dusky spots on the antennal sockets; median fovea, posterior orbits, postocellar area, the meson of the prothorax and line at sides of the prothorax, a line on the median lobe of the mesonotum, the coxæ and the cephalic and caudal margins of the femora, black; the posterior orbits and the antennæ, white, somewhat rufous at base; median fovea a rounded pit; median ocellus in a rounded depression; the head sparsely punctured; the median lobe of the mesonotum, the shoulders of the lateral lobes and the scutellum, polished; the remainder of the notum sparsely punctured; the third segment of the antennæ longer than the fourth and fifth together; the wing-veins brownish, slightly infuscated along the veins. Length 11 mm.

Habitat.—Eagle Bend, Minnesota. J. P. Jensen, collector.

This species is similar to *criddlei* Mack. It lacks the fuscous banded wings and the form of the median fovea is different.

Pamphilius transversa, n. sp.—Female: body black, with the clypeus, the face, the first segment of the antennæ beneath, the antennæ on its apical third, the cheeks, the posterior orbits, the tegulæ, the scutellum, the legs except the posterior tibiæ, and the abdominal segments three and four and part of five, varying from whitish to yellowish and rufous; the wings hyaline; the veins brownish; the stigma dark; the head finely sparsely punctured; the notum almost smooth, sparsely punctured on the posterior angles; the scutellum roughened; the antennæ with the third segment wider and slightly longer than the fourth; antennæ with about twenty-eight segments; the mesopleuræ finely roughened and setaceous. Length 12 mm.

Habitat.—Franconia, New Hampshire. Mrs. Annie Trumbull Slosson, collector.

This species is similar to *perplexa* Cresson.

Pamphilius dentatus, n. sp.—Body black with the terminal half of the antennæ, the clypeus, a dentate spot on the inner orbits extended as a parenthesis-shaped mark to the caudal aspect of the head; an emarginate

spot in front of the median ocellus and an angular line behind it, a parenthesis-shaped mark at the lateral margin of the vertical furrow, the margin of the pronotum, the tegulae, the V-spot, the scutellum, the postscutellum, a spot on humeral angle beneath the wings, the front and middle legs and the hind legs except the tibiae, white; the abdomen rufous beyond the basal plates; antennae with about twenty-seven segments; supraclypeal area carinated; head depressed about the median ocellus, sparsely punctured; declivous area smooth; median lobe of mesothorax smooth, lateral lobes densely punctured and scutellum sparsely punctured: wings hyaline; veins brownish. Length 8-10 mm.

The male differs in having the entire declivous area yellow and the notum, except the scutellum and the postscutellum, black.

Habitat.—Wilbraham, Mass.—J. O. Martin, collector. Hamden, New Haven, and Wallingford, Connecticut—B. H. Walden, collector.

This species is near *rubi* Rohwer.

Pamphilius fletcheri, n. sp.—Male: body black with the front and clypeus below the transverse ridge, the proximal segment of the antennae beneath, the apical half of the antennae, the inner and posterior orbits, a line on each side of the caudal margin of the head, a narrow line on the collar, the tegulae, the scutellum, the postscutellum, and the legs except the posterior tibiae, the tarsi becoming more or less rufous, white; abdominal segments three to five rufous; antennae with about twenty-six segments, the second and third segments equal in length; the declivous part of the head roughened; the median ocellus in a heart-shaped depression, the apex being behind the ocellus, the median fovea a pit below this depressed area; the head strongly elevated and roughened on each side between the lateral ocelli and the compound eyes; the mesonotum polished; the scutellum sparsely punctured; wings hyaline. Length 8 mm.

Female.—Body black, with an anchor-shaped area on the head, the front margin of the clypeus, the mandibles, the distal half of the antennae, a line on the posterior orbits, the cheeks, the inner orbits, bifurcating near the middle of the compound eyes, one part extending obliquely toward and almost to the lateral ocelli, the other extending along the margin of the compound eyes, swollen at their upper inner margin, narrowed again on the posterior orbits, triangularly expanded at the caudal margin of the head and extending along its caudal margin on each side, two spots in front of the median ocellus, a line on the collar, the tegulae, two converging bars on the median lobe of the mesonotum, the scutellum, the post-

scutellum, and the legs below the middle of the coxæ, except the distal five-sixths of the posterior tibiæ, white; the abdomen beyond the first segment rufous; the head and mesonotum sparsely punctured; the third segment of the antennæ distinctly longer than the fourth; antennæ with about twenty-four segments; the median foveæ wanting; the median ocellus located in a heart-shaped depression; the frontal declivity broadly and deeply broken by the antennal furrows; wings hyaline, the veins and stigma brown. Length 9 mm.

Habitat.—St. John, New Brunswick.

Described from two males and a female received from Dr. C. Gordon Hewitt, Division of Entomology, Ottawa, Canada, where the type is deposited. These specimens were reared from larvæ received from St. John, New Brunswick. The larvæ feed on the leaves of raspberry (see Annual Report of Experimental Farms for year 1899 (1900), pp. 180-181). The species is named for the late Dr. James Fletcher.

This species is near *rubi* Rohwer and *dentatus*.

SMERINTHUS CERISYI KIRBY AND *SMERINTHUS OPH-
THALMICUS* BDV.

BY F. H. WOLLEY DOD, MILLARVILLE, ALTA.

It is not very often that I take notes on Sphingidæ, or take much notice of them at all outside my own district; but recent observations casually brought to my notice the fact that two good species were probably involved under the above two names, though I had long ago taken it for granted that such was not the case, and I became immediately interested, and followed the matter up. My first observation in the matter was made while I was somewhat hastily glancing through this family in Mr. Winn's collection at Montreal last January. Thereon I wrote: "Under *cerisyi*, two specimens, Biddeford, Me. and Montreal; have much crenate s. t. lines and apical mark almost lunate as in *geminatus*," and "two from B. C. under *ophthalmicus* have lines fairly even, wavy, and apical marks not lunate." Shortly afterwards, whilst in England, I compared this note with Kirby's figure and concluded that it must really represent the form I have so long known as *cerisyi* at Calgary which is the one Mr. Winn has taken on the east coast. Kirby's figure is probably somewhat exaggerated, and has the apical mark almost as lunate, well defined and contracting as *geminatus*. The dark marks near the anal angle of primaries are also more

like those in *geminatus*. These exaggerated characters may of course have been the result of figuring from a specimen with worn margins.

In the British Museum I found a Calgary *cerisyi*, another from Vernon, B. C., and a third from Ashnola, taken by Mrs. Nicholl. Under "Subspecies of *ophthalmicus* Bdv.", I found Butler's type of *vancouverensis* from Vancouver Island, and other specimens from there, Frazer Pines and California, which appeared to agree with it. This is the form which Mr. Winn had as *ophthalmicus*, and is that of which Holland figures a female on Plate VII, Fig. 3, as *cerisyi*. Without having seen Boisduval's type, which, if it still exists, is probably somewhere in France, I must assume that it is the form subsequently described by Butler. All the Calgary specimens at present in my collection are *cerisyi*, and had I even taken *ophthalmicus* here I should probably have noticed the difference. I have a series of the latter from Vancouver and the Island, but no *cerisyi* from outside Alberta, though it evidently occurs right across the continent. Besides the differences mentioned, *ophthalmicus* has the terminal dark shade wider centrally. The two have exactly similar antennal structure, and the only structural difference I can find elsewhere is in the outer margin which has fewer dentations and more acute apices in *ophthalmicus*. I may be in error about their distinctness, and the point requires working out carefully with far more material than I have been able to examine; and, know, for all I may have been so worked out. Holland for instance states that "they run into each other to such an extent as to make it often impossible to distinguish them" and treats them as do most others, as subspecies. Crenations rather than undulations is the rule throughout in *cerisyi*, in lines, apical marks and outer margins, though I feel bound to admit that the variation in my two series is such as to suggest that a large increase of material might result in increased difficulty in separating them. But with closely allied species such is often the case.

European *ocellatus*, of which I have four specimens, resembles *ophthalmicus* rather than *cerisyi*, though the top one of three figures given in Mr. Richard South's "Moths of the British Isles" has the cranate apical marks exactly as in *cerisyi*. The outer margin is more entire than in *ophthalmicus*, and antennal structure is similar to both.

SOME COCCIDÆ FROM THE GRAND CANON, ARIZONA.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Mr. E. Bethel, when recently visiting the Grand Cañon, was so good as to collect some Coccidæ for me, and the species prove so interesting that they are herewith recorded:

1. *Ceroplastes irregularis* Ckll.—In quantity on *Atriplex*, July 22

2. *Orthezia garryæ* Ckll.—On *Fendlera*, July 21. Previously known only on *Garrya*, from a single locality in New Mexico. The following notes are based on the Arizona material:

Pale pea-green; last antennal joint very slender, dark; first joint narrow, bent; legs very long; skin densely spiny as usual.

Measurements in microns: Middle leg, femur and trochanter, 800; tibia, 832; tarsus (without claw), 384.

Antennal joints: (1) 176, (2) 128, (3) 192, (4) 192, (5) 160, (6) 120, (7) 120, (8) 192-208, or counting apical spine, 208-224.

3. *Phenacoccus betheli*, n. sp. (possibly subsp. of *P. cockerelli* King).—On *Amelanchier*, July 21. Adult females solitary on twigs; hemispherical or nearly; about 4 mm. long, $2\frac{3}{4}$ broad, a little over 2 high; dark raspberry-red, covered dorsally with white mealy secretion in small tufts, like a deposit of alkali on the soil, the surface more or less visible between; short, thick irregular marginal tufts. On boiling in KHO, turns the liquid red. Legs and antennæ extremely small, as also are the mouthparts; legs slender, claws with a very distinct inner tooth.

Measurements in microns: Middle legs, femur and trochanter, 165; tibia, 118; tarsus (without claw), 63.

The same measurements for hind leg are 175, 125, 70.

Antennal joints: (1) 33, (2) 48, (3) 45, (4) 18, (5) 38, (6) 33, (7) 33, (8) 35, (9) 53.

Larva pale yellow, elongate oval, 560μ long and 240 wide, of the ordinary Pseudococcine type; antennal joints in μ (1) 20, (2) 23, (3) 20, (4) 18, (5) 18, (6) 60.

Related to *P. cockerelli* King, but peculiar for the very short fourth antennal joint, and in spite of the rather large size of the insect, the very small legs. It may be only subspecifically distinct, but no intermediates are known, and it has the aspect of a distinct species. The first three antennal joints are like those of *P. rubivorus*, but not so the others.

A NEW APHID FROM OREGON.*

BY H. F. WILSON, CORVALLIS, OREGON.

Lachnus pseudotsugæ, n. sp.

Stem-mother.—Collected on terminal shoots of *Pseudotsuga douglassii* about Corvallis, Oregon, March 15th, 1911.

General colour light brown with two rows of black spots extending midway along the dorsum to the middle of the abdomen. These spots sometimes join so as to give the appearance of two dark lines extending along the body. Body semi-shining and with faint traces of a light flaky powder on dorsum. Legs and antennæ dusky brown. After having been mounted on slides for some time this species turns red and a deep red colour is assumed by the balsam surrounding them. The abdomen is quite large in comparison with the head and is almost globular. Antennæ VI segmented, and about one-fifth the length of the body. The nectaries are but small round tubes slightly elevated; they are about as wide as long and are situated on the side of the abdomen about two-thirds of the way from the base of the thorax to the base of the cauda. Cauda broad and slightly angled, very short.

Measurements: Length of body, 3.8 mm; width 2.99 mm. Length of antennal segments, I, .09; II, .09; III, .3; IV, .135; V, .135; VI, .12; spur, .045 mm; total length, .87 mm. Length of cauda, .3 mm; nectaries, .022 mm.

Spring migrant.—Collected June 4, 1911, on terminal shoots of same host plant. General colour of head and thorax dark or dusky. Abdomen greenish brown, with colouring of white powder. Legs and antennæ, except tarsi and tips of third, fourth, fifth and sixth segments, light brown. Other parts dusky to black. Antennæ about one-fourth the length of the body. Head rounded in front and with a suture or line extending from back to front midway between antennæ. Wings hyaline. The first anal and cubital veins quite distinct while the median with its two branches, remains only as faint lines. The nectaries of this form are cone-shaped with a flanged mouth and are apparently not placed as far forward as in the earlier forms. Cauda short and broadly angular.

*We regret that, owing to a printer's error, which escaped us, the present description of *Lachnus pseudotsugæ* was published in the June number of the Canadian Entomologist (pp. 192) without the name. We therefore republish the description in full with the name added.

Measurements: Length of body, 2.84 mm.; width, 1.09 mm.; length of wing, 3.65 mm.; width, 1.1 mm.; total wing expanse, 8.08 mm. Length of antennal segments, I, .066; II, .11; III, .44; IV, .154; V, .198; VI, .11; spur, .045 mm.; total length, 1.123 mm. Length of nectaries, .064 mm. Length of cauda, .22 mm.

The fall migrant was not secured.

Egg-laying female.—Collected on terminal shoots of above plant, Oct. 30, 1910, and Oct. 27, 1911, along with the alate males. General colour brownish with ash-grey powder on body, and with two more or less regular stripes down the back; and with a wide brown stripe extending across the body from one nectary to the other. At the base and above the cauda another transverse band is usually present. Antennæ and legs, except tips, light brown; other parts dusky to black. Body robust and with large semi-conical nectaries which are brown in colour. Antennæ and legs hairy; antennæ one-third the length of the body.

Measurements: Length of body, 2.9 mm.; width, 1.7 mm. Length of antennal segments, I, .066; II, .09; III, .35; IV, .176; V, .176; VI, .11; spur, .045 mm.; total length, 1.013 mm. Length of nectaries, .06 mm., and cauda, .35 mm.

Alate male.—Collected on terminal shoots of host plant Oct. 30, 1910, and Oct. 27, 1911, about Corvallis, Oregon.

General colour: Head and thorax black with green abdomen. Abdomen with a series of black, transverse, more or less distinct, bands. Antennæ yellow at base, dusky at tip. Femora and tibiæ dusky at middle to black at ends; tarsi black. Wings hyaline but with costa dark brown, median vein and branches almost indistinct; other veins dusky. Nectaries slightly bell-shaped with a flanged opening. Third antennal segment about equal in length to fourth and fifth segments and with about 30 to 39 visible small circular sensoria. Fourth segment with 10 to 12 circular sensoria which appear slightly larger than those on the third segment. Fifth with about eight medium-sized, and one large, visible sensoria at the distal end. Sixth segment with one large and apparently six small sensoria at base of spur.

Measurements: Length of body, 2 mm.; width, .87 mm. Length of wing, 3.87 mm.; width, 1.52 mm.; total expanse, 8.61 mm. Length of antennal segments, I, .066; II, .11; III, .51; IV, .242; V, .3; VI, .154; spur, .066 mm.; total length, 1.448 mm. Length of nectaries, .045 mm.; cauda, .176 mm.

Females along tips of needles, depositing from 5 to 8 eggs.

COLLECTING COLEOPTERA IN A MAINE SAWMILL YARD.

BY C. A. FROST, FRAMINGHAM, MASS.

One of the most prolific and interesting collecting places that I have ever found, is the yard of an old sawmill situated on the banks of the Cochnewagin Stream, below the village of Monmouth, Maine. This mill was a picturesque and weatherbeaten structure as long ago as I can remember, and has been built and in constant operation for at least a hundred years. The logs are hauled into the yard during the winter months and remain there under natural conditions of moisture until they are converted into lumber; thus they do not come in contact with the water for a long period as is usually the case. I have not been able to find many specimens in the yard of a steam sawmill near the lake where the logs remain in the water all the spring.

For several years past, while on my vacations, I have spent many hours collecting on the logs, and the slab and board piles, to the neglect of other localities. During the first hot period of 1909 (June 20 to 26) I collected nearly eight hours each day for three days in this mill-yard and secured over five-hundred specimens, exclusive of a hundred *Monohammus scutellatus* which swarmed in such numbers that I think three hundred more could have been taken.

From June 20 to 25, 1910, fairly hot weather prevailed, but, on account of the previous cool weather and the greatly diminished amount of lumber, the collecting was not as good as in former years. The slab piles below the mill, however, yielded many good things as did the alder bushes and dying trees along the brook.

The following notes, concerning species that have been taken in or near this mill-yard, may be of interest.

The Carabidæ were limited to specimens of *Tachys nanus* and *flavicauda* under bark, and a few specimens of *Pterostichus adoxus* which were hiding under bits of wood near the slab piles beside the brook. *Pterostichus rostratus*, *Chlanius sericeus*, and several species of *Bembidium* and *Platynus* have also been taken in this locality if not actually in the yard.

The *Staphylinidæ* have been represented thus far by a few bark-haunting species, and one or two others on the flowers of *Viburnum* growing near the logs. On these flowers were taken *Cercus abdominalis* and *Epuræa* sp. representing the *Nitidulidæ*, with *Cryptorhopalum hæmorrhoidale* of the *Dermestidæ*.

Silvanus bidentatus, *Læmophlæus biguttatus* and *adustus* were found

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under the bark of the slabs, while a fungus growing on an elm log yielded *Cucujus clavipes* and *Tritoma thoracica*.

Hister lecontei, and *coarctatus*, *Plegaderus transversus* and *sayi*, *Teretrius americanus*, and two specimens of *Hister carolinus*, were all the *Histeridae* discovered; all were taken under bark or crawling over the logs.

Of the *Elateridae*, one or two *Alaus oculatus* were found resting on the side of a log as if they had just alighted from a flight; *Adelocera brevicornis* and *obtecta* were taken, the latter always on the board piles. Several *Elater apicatus* were taken on the trunk of a partly dead elm in the daytime, while a single specimen of this species was found on an elm log at the same place by use of a dark lantern. This was the only specimen of *Coleoptera* (excepting two or three *Magdalis armicollis* which were evidently hiding in crevices in elm bark) that was taken by this method of collecting. Several specimens of *Elater sanguinipennis* were beaten from *Alnus incana* which grows abundantly in the pasture near the mill.

Chalcophora brevicollis Casey was taken quite commonly on the slab piles, while *liberta* was rarely seen. *Dicerca divaricata* was common on the maple cordwood, and *caudata*, a very distinct species, was beaten in numbers from *Alnus incana* sprouts. *D. tuberculata* L. & G. and *chrysea* Mels. (commonly confused with *tenebrosa*) were taken on the slab piles. Fifteen specimens of the latter were found on the trunks of a few fire-injured fir-trees (*Abies balsamea*) from June 20 to 25, 1910. From my observations it seems probable that it breeds in this conifer. It may be noted here that *tuberculata* was taken at Wales, Me., ovipositing in the bark of a healthy twelve-inch hemlock, two or three feet above the ground.

Buprestis sulcicollis was taken once on the logs and once flying near a steam saw-mill about half a mile away. (This species was also taken at South Paris, Me., on slab piles, June 14, 1910.) In previous years single specimens of *B. maculiventris*, *consularis*, and *impedita* Say (commonly called *striata*) have been taken on the logs. It may be recorded that this latter species was taken ovipositing on the stump of a large white pine that had been cut the previous winter. The beetle was hidden by the scarf of the cutting and was laying the eggs in the cut surface of the stump; the date was June 23, 1910. *Pocilonota erecta* L. & G., formerly called *cyanipes* Say, has occurred at Monmouth once or twice. Large numbers of *Melanophila fulvoguttata*, and a few *acuminata* were taken, the former always on hemlock logs. It was also very abundant on hemlock bark in a clearing at Wales, Me. A single specimen of *Anthaxia viridicornis* has been taken.

Chrysobothris dentipes and *scabripennis* were running over the white pine logs in numbers, and there were also a few *femorata* about these logs, but the majority of this species showed a preference for the beech and maple cordwood. *C. trinervia* was taken several times at South Paris, Me., and *azures* has been taken twice on the dead twigs of the beech and willow at Wales, but neither species has yet been seen at Monmouth. *C. sexsignata* has been taken but once, and that emerald gem, *harrisii*, has evaded capture on several occasions.

It was noticed that the species of *Dicerca* and *Chalcophora* could be picked up in the fingers or caught in the hand as they dropped, while the species of *Chrysobothris* were exceedingly lively and it required active use of the net to secure them. The species of *Buprestis* were generally easy to get by brushing into the net, but those of the genus *Melanophila* were active or sluggish according to the temperature. *M. fulvoguttata* has a habit of running around the log and slipping out of reach between it and an adjacent one.

Near the mill-yard *Eupristocerus cogitans* was beaten from *Alnus incanus* sprouts in numbers, on June 22. This species rests on the upper side of the leaf near the centre and slides off over the edge when disturbed; it was unusual to find more than a pair on a single bunch of the bushes.

Large numbers of *Enoclerus quadriguttatus*, together with the variety *rufiventris* Spin., were running over the logs in company with lesser numbers of *Thanasimus dubius*. The former species and variety were seen feeding on adult *Scolytide*.

Some, but not all, of the following *Ptinidæ* have been taken in the mill-yard; *Ernobius mollis* and *luteipennis*, *Hadrobregmus carinatus*, *Microbregma emarginatum* Duft., *Trypopitys sericeus*, *Xyletinus fucatus*(?) and *Ptilinus ruficornis*.

The species of *Cerambycidæ* have been nearly as well represented as those of the *Buprestidæ*. Three specimens of *Physocnemum brevilineum* were taken running up the trunk of a decaying elm. A large number of *Orthosoma brunneum* were found hiding under the bark of pine stumps. A dozen or two *Phymatodes dimidiatus* were taken on some spruce logs, which are rarely seen in the yard.

Hiding in the inequalities of the bark of the logs or slabs, *Asemum moestum* was often found. *Callidium antennatum* and *janthinum*, much more abundant, were often seen perched on the slab piles; this latter species and *Monohammus scutellatus* were much sought after by birds. *Acmaeops proteus*, varying from black to nearly all testaceous, were common

on the piles of newly sawn lumber. *Xylotrechus fuscus* occurred on the logs and board piles at rare intervals, and a specimen was taken on the trunk of a partly dead fir high up among the branches. This specimen has the pubescence of the prothorax and elytra in excellent preservation and clearly shows that *fuscus* is entitled to specific rank. It is undoubtedly, as noted by Col. T. L. Casey (Mem. on the Col. III, p. 359), more nearly allied to *nauticus* than to *undulatus*. *X. colonus* was taken but once.

Neoclytus erythrocephalus was often seen running over ash logs, and a few specimens of *N. muricatus*, so much resembling ants that they may have been unnoticed many times, were taken. The variation in size of these species was strikingly great; specimens at hand measure from five to twelve millimeters in length. It may also be noted here that specimens of *Monohammus scutellatus*, selected from the very large amount of material available at that time, show a variation in each sex of from 13 to 25 mm.

Acanthocinus obsoletus was abundant and almost invisible against the bark of the white pine logs on which they rested. *Ecyrus dasycerus* was beaten from the branches of a dead poplar near the logs, and a single *Purpuricenus humeralis* was once swept from a low bunch of *Salix* near the road.

I have at hand a single example of *Saperda calcarata* of uncertain date but which was undoubtedly bred in the poplars that fringe the high bank between the yard and the pond.

Even now in fancy, I can see the old sawyer as he stood with hand on the lever that controlled the log carriage and watched the saw tear through the huge pine logs. One day he called me, then a small boy, to see "this funny looking bug" pinned on the beam behind him. It was *Saperda calcarata* and the specimen formed the nucleus of a very heterogeneous collection which has, like the old sawyer, long since crumbled into dust.

Saperda obliqua, and the variety of *lateralis* having the post-median cross bar on the elytra, have been beaten from *Alnus incana* on two occasions. A variety of *Oberea tripunctata* Swed. (possibly *amabilis*) has occurred in some numbers on this plant, both at Monmouth and Wales. Variations of *affinis* and *mandarina* have been beaten and swept from bushes. One specimen of *S. vestita* was taken on a board pile in the yard.

One of the rarest and most interesting of the Cerambycidae was taken wandering over the pine needles beneath a huge white pine near the yard. It was *Pachyta rugipennis* and nearly escaped me by its superficial resemblance to *Rhagium lineatum* which is not rare on the logs.

The Chrysomelidæ were not represented except for a number of *Calligrapha scalaris* and larvæ which were swept from the low *Alnus incana* in the pasture.

Tenebrionidæ.—*Alobates pennsylvanica*, *Iphthimus opacus*, *Tenebrio tenebrioides*, *Hypophloeus parallelus*, and *Xylopinus saperdioides* were taken commonly under bark or on the slab piles. *Upis ceramoides* was common, flying and on slabs. One specimen of *Platydemus americanum* was taken. *Arthromacra ænea* was beaten from *Alnus* in large numbers.

Of the Melandryidæ, *Penthe obliquata*, *Synchroa punctata*, *Melanodrya striata*, *Phloetria liturata*, *Eustrophus bifasciatus*, *Orchesia castanea* were taken on the logs or slabs. *Enchodes sericea* was beaten from the dead branches of a large rock maple, and also found on a log of this tree at Wales, Maine. *Salpingus virescens* and *Pytho planus* were both taken on one occasion under bark or slabs. *Ditylus cæruleus* was captured a few times on the logs and was also seen flying in the daytime. *Dendroides canadensis* and *concolor* were both taken; the former under bark and by beating, the latter by beating maple sprouts in a wood clearing at Wales.

Tomoxia lineella was seen on the trunk of a decayed elm, and a single specimen was captured while unguardedly trying to rid itself of a large mite. Several specimens of this species were taken several years before on a dead tree in the woods.

Hylobius pales was sometimes present in large numbers especially under bits of slabs that had fallen to the ground. *Pachylobius picivorus* was less common, in fact rare. *Pissodes affinis*, *strobi*, and a single *dubius* were taken from the piles of lumber; *affinis* was the most abundant. *Mononychus vulpeculus* was swept from the flowers of the blue iris near the brook.

Large numbers of Scolytidæ were taken flying in the late afternoon. The spruce logs were very badly riddled just beneath the bark by some species of this family. Among those that have been identified are *Dendroctonus valens*, *Hylurgops pinifex*, *Hylesinus aculeatus*, *Xyloterus bivittatus* and *Hylastes cavernosus*.

Taking into account the undetermined species and a few specimens that may be in alcoholic material not yet examined, the number of species taken in and about the mill-yard will not fall much short of 125; many of them which are rare under ordinary conditions are here abundant, while excessively rare species appear with gratifying frequency. If it were possible to collect in this yard frequently from June 1st to August 15th, I feel sure that the results would be surprising. Any collector who can visit a place where lumbering operations are carried on, even on a moderate scale, will be amply repaid.

OBSERVATIONS ON THE LIGHT-EMISSION OF AMERICAN LAMPYRIDÆ.—FOURTH PAPER.

BY F. ALEX. McDERMOTT, PITTSBURG, PA.

In continuation of his former observations on the light-emission of American Lampyridæ and its relation to the sexual life of the insects (CAN. ENT., 1910, Vol. 42, pp. 357-363; 1911, Vol. 43, pp. 399-406; 1912, Vol. 44, p. 73), the writer has made during 1912 the observations recorded below on species of Lampyridæ not heretofore encountered by him, which support his former observations and show specific distinctions which are of interest. About the time of the publication of the second paper of this series, Dr. S. O. Mast, of Johns Hopkins University, read the a paper embracing very similar observations on (probably) *Photinus ardens* Lec. and emphasizing the bearing of the behaviour of these insects on the theory of phototactic orientation (Abstract in Science, 1912, Vol. 35, p. 460.)

Photinus marginellus Lec.—This species was first observed in Ashland, Ohio, during the latter part of June. In the late afternoon, several hours before sunset, both sexes were found in flight and resting on the leaves of low plants. As mentioned by Leconte, the male greatly resembles *P. scintillans* while the female, instead of being apterous as in the latter species, has wings and elytra as fully developed as those of the male. The flash of the male is a single, short, sharp one, and in colour appears to the eye more yellowish than that of *scintillans*, though resembling that of the male of the latter species in intensity and manner of delivery. The flash of the female *marginellus*, however, differs distinctly from that of the female *scintillans*; instead of being a single flash, somewhat slower than that of the male, as in *scintillans*, the flash of the female *marginellus* consists of two coruscations, the first being brighter and of shorter duration than the second, which follows the first immediately. The flash of the female is delivered with only a very short interval after the flash of the male she is answering. It will be noticed that this double flash of the female *marginellus* differs decidedly from the double flash of the male of *P. consanguineus* previously described.

*Photinus castus** Lec.—This species was found during June and July in open places, particularly in Schenley Park in Pittsburg, Pa.

*See following footnote.

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As with *scintillans* and *marginellus*, the flash of the male is a single, short, bright scintillation. The males of *castus* and *marginellus* were frequently found flying together over the same plot of ground, and it proved quite easy to distinguish them by the characteristics of their light-emission. The flash of the male *marginellus* is decidedly shorter and more sudden than that of the male *castus*. *P. scintillans* was not observed at this time, and hence could not be compared.

The female *castus* has the wings and elytra fully developed, but like *marginellus* female, flies but little. The flash of the female *castus* is very much like that of the female *scintillans*—a single, short scintillation, slightly more prolonged than that of the male, somewhat less intense, and with no indication of doubling (difference from *P. marginellus* ♂). It is delivered immediately after the flash of the male answered, without any distinct pause.

The mating process in both *P. marginellus* and *P. castus* is exactly the same as described for *P. pyralis* and *P. scintillans*, and needs no further comment. The females of *marginellus* and *castus* will not answer with any certainty the flare of a match; in fact, in a large number of trials, only one distinct answer, from *P. castus* ♂ was observed. As in the other species of *Photinini* heretofore observed, the females of these two species are much less numerous than the males, and with *marginellus* the writer observed for the first time among our Lampyrids the attempted coupling between males, reported by Oliver (Ier. Cong. Internat. d'Entomol., Brux., 1910, pp. 143-144). While the females of both species fly readily they are comparatively rarely found in flight, preferring to creep to the tips of blades of grass, upper edges of leaves, etc., where they remain until mated. As in the species of *Photinus* previously described, the luminous apparatus of the males of both *castus* and *marginellus* covers the entire ventral surfaces of the 5th and 6th abdominal segments, and a good portion of the 4th, while the organ of the female consists of a small rectangular spot on the 5th abdominal segment; in both species the eyes and antennæ of the male are somewhat larger than those of the female.

Where the males of both species were seen flying over the same area, careful watching showed the presence of the females of both species in the vegetation. Although especially watched for, no case of interbreeding was encountered, and indeed no case of approach between the sexes of the different species. In both species, flying males have been seen to respond (apparently) to males of the same species in the vegetation. In both of these species one will frequently find a pair in copula, surrounded by several

more males; at first this suggests that a specific odor may also play a part in the attraction, but the observations of Mast (ante) are opposed to this view, as are also those of Emery (see the writer's second paper). The presence of these extra males is probably accounted for by the attraction of several males before actual mating, as females of *Photinus* do not appear to flash while coupled, unless disturbed.

P. marginellus and *P. castus* also differ in their conduct in the late evening; *marginellus* ♂ continues to flit around the vegetation for a long time, thus resembling *P. scintillans*, while the *castus* ♂ flies aimlessly high above the vegetation after the time of maximum activity, thus more closely resembling the habit of *P. pyralis*.

Rileya (Lucidota) atra* Oliv.—The first specimen of this species taken this year was a larva, found in a decayed stump at Niagara Falls, N. Y., on May 6th. This glow-worm was kept alive and subsequently developed, the imago proving to be this species. The adult was but faintly luminous, and for only a very little while after emergence, and no excitation produced light-emission during the remainder of the time (about a week) that it was kept alive. Subsequently several adults of this species were taken in flight in the daytime in July, near Sharpsburg, Pa., and in no instance was there any indication of luminosity. All specimens taken were apparently males. The luminous apparatus of the adult is represented by two small brownish scales on the last segment of the abdomen; the larva was quite as luminous as that of *Photinus pyralis*, which it much resembled. The reared adult, with its larval and pupal skins, is deposited in the U. S. National Museum.

Rileya (Lucidota) punctata Lec.—This species closely resembles the foregoing, but is only about $\frac{3}{5}$ as long. Both sexes were taken in flight in the daytime, in woods near Sharpsburg, in July, and neither showed any indication of luminosity, although the brownish scales representing the luminous apparatus were present, as in *R. atra*. In this species the eyes of the male are larger and the antennæ longer than in the female.

Lecontea angulata Say.—Numerous males of this species were observed at Canajoharie, N. Y., on June 28th, flitting about over the flats on the south bank of the Mohawk River, in a manner very similar to that described last year for *L. lucifera*. As the time available for observation was very brief, no females were found.

*Ern. Olivier (Revue scient. du Bourb. et du cent. de la France, 1911-12) has recently segregated these two species, giving them the generic name *Rileya*.

A NOTE ON *PHOTINUS CASTUS* LEC.

BY F. ALEX. McDERMOTT, PITTSBURG, PA.

During the course of the observations recorded in the preceding paper, it became evident to the author that the insects usually classified as *Photinus marginellus* and *Photinus marginellus* var. *castus*, are actually distinct species. As brought out in the foregoing paper, the manner of the light-emission of the males of the two differ somewhat, and that of the females very distinctly. Such distinctions among the Lampyridæ cannot be other than specific, especially in view of the very close resemblance which many of the known distinct species bear to one another, and while a definite boundary between species and varieties, which is satisfactory to everyone, has not been established, and possibly never will be, it still seems proper to consider that when a Lampyrid shows such differences from other forms in its manner of light-emission as to almost preclude the possibility of interbreeding, it is due the position of a distinct species.

LeConte established the species "*Photinus casta*" for an insect from Georgia, U. S. A., in the same paper in which he established "*P. marginella*" for specimens from Missouri and elsewhere. (Proc. Acad. Nat. Sciences, Phila., 1851, p. 335.) Subsequently he appears to have abandoned this arrangement, and grouped the "*casta*" as a variety of "*marginella*," and in his List of the Coleoptera of North America (Miscellaneous Collections of the Smithsonian Institution, No. 140, p. 51, 1866), he gives *Photinus marginellus* var. *castus*; this is the earliest reference to the change in the classification of this insect which I have been able to locate. The insect is thus listed as a variety of *marginellus* in the Genminger-Harold Catalogue (Vol. 6, p. 1,643), and in Ern. Olivier's recent lists (Wytzman's Genera Insectorum, Fasc. 43; Schenkling-Junk Catalogus Coleopterorum, Pars 9).

In view of the specific differences in light-emission, above referred to, it has seemed best to re-establish the species under LeConte's (corrected) name. The species differs from the other species heretofore described in these papers, most particularly in the pale gray colour of the elytra; by transmitted light the latter appear to be almost pigmentless, except at the margins; the central black spot on the disc of the thorax is small and more frequently wanting than in the true *marginellus*; the insects average somewhat larger than either *P. marginellus* or *P. scintillans*, but are distinctly smaller than *P. consanguineus*.

The writer is indebted to Dr. Samuel Henshaw for his kindness in comparing specimens sent him with LeConte's types in the Museum of Comparative Zoology.

BOOK NOTICES.

ELEMENTARY ENTOMOLOGY, by E. Dwight Sanderson and C. F. Jackson, Ginn and Co., Boston. Price \$2.00.

The appearance of this work so soon after the senior author's excellent book on "Insect Pests of Farm, Garden and Orchard" comes as a surprise but a very welcome surprise to students of entomology. The book is intended primarily as a text book for short courses in entomology, but covers the systematic side of the work so well that it will probably be used by many teachers for all but their most advanced classes.

The book contains three hundred and seventy-two pages with four hundred and ninety-six illustrations of a very superior character. It is divided into three main divisions. Part I, consisting of sixty-six pages, deals with the structure and growth of insects. A few pages of this section are given to a description of the differences between insects and closely allied invertebrates; the remainder is devoted to a concise and clear account of the external and internal anatomy of insects, and to their growth and transformations, the latter being illustrated by the life history of a few common species. The section throughout shows abundant evidence of skilful handling of a somewhat difficult subject. The only criticism that suggests itself is that instead of taking two examples of complete metamorphosis from Lepidoptera, it might have been better to have chosen one of these from some other order. However, this is a minor point.

Part II, which contains two hundred and two pages, deals with the classes of insects. For convenience these have been divided into nine groups: Aptera, Orthoptera, Neuroptera and Pseudoneuroptera, Platyptera, Hemiptera, Coleoptera, Lepidoptera, Diptera, and Hymenoptera. The various orders which have been put into one group, such as, for instance, the Neuroptera and Pseudoneuroptera, are mentioned and their characteristics briefly given. In each order a large percentage of the families are described, those of economic importance being given the preference. In bringing out the characteristics of the different families, copious illustrations have been used. One can scarcely give this side of the work too much credit as the photographs and drawings are not only excellent works of art in themselves but in a very large proportion of cases show the different stages in the life history of the insect described and thus enable the student to understand and remember them much better.

By conciseness of language and the use of illustrations the senior author, who is responsible for parts I and II, has succeeded remarkably well in giving a good general view of all the orders. About three hundred different species of insects have been described and illustrated in this section.

Part III, consisting of almost one hundred pages, is devoted to laboratory exercises and outlines a fairly comprehensive course of study of the external and internal anatomy of types of the more common and important orders, giving special attention to a comparative study of the mouth-parts. Hints are also given on the proper methods of studying life histories. One of the most useful chapters in this division of the book consists of a series of keys to the various orders and families. Most of the keys are simple and easy to use, being based on characteristics that can readily be seen with a hand lens. In the case of the Lepidoptera and Diptera it was of course found necessary to use the wing venation in constructing a satisfactory key. In doing so the author has inserted diagrams of wings of most of the families included in the keys to these two orders. It is doubtful, however, whether it would not have been an improvement to have devoted a short chapter of four or five pages to a study of wing venation and the method of clearing wings of the Lepidoptera.

The remainder of part III outlines methods of collecting, preserving and studying insects, and many suggestions are given that will be helpful to all but the most experienced entomologist. This part does much to remedy a long-felt defect in entomological text books and will help greatly to give the book a wide circulation among students and teachers of entomology.

As is usual in a work of this character, there are a few errors of minor importance, chiefly of a typographical character. *Promethia* (page 216), *Velidæ* (page 309) and *Physopodæ* (page 308) are clearly cases of this nature. In part II (page 116) Negro Bugs are classed as *Corimelænidæ* and in the key as *Thyreocoridæ*. *Æcanthus niveus* (page 87) should clearly be *O. nigricornis*. On page 161 it is stated that "the lady bird beetles form the only family of the Trimera. This is rather misleading, as is also the statement on page 75 that springtails "are never injurious." These, however, are insignificant mistakes and do almost nothing to lessen the value of the book.

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THE FUNGUS GNATS OF NORTH AMERICA. By Oskar A. Johannsen, Ph.D. Parts I-IV, from Bulletins 172, 180, 196 and 200. Maine Agricultural Experiment Station, Orono, Me.

The concluding part of this admirable work was issued in June of the present year, the first part having appeared in Dec., 1909, and the second and third parts in June, 1910, and Dec., 1911, respectively. It is a work of 306 pages, whose aim is to "present a synopsis of the fungus gnats, or Mycetophilidæ, of North America, giving descriptions of and tables to all the genera and species and life-histories when known." On account of their small size and unattractive appearance, these flies have hitherto received little attention from systematic entomologists, so that the preparation of the keys and descriptions of the 82 genera and 428 species must have been a task of unusual difficulty, demanding an exceptional amount of patience and industry on the part of the author, who is therefore the more to be congratulated upon his having so successfully accomplished it.

In the first part the general characters of the family in their various stages are discussed, special attention being given to the venation and the form of the hypopygium of the male. There is also a short discussion of the habits and economic relations of the groups as a whole and an analytical key to the eight subfamilies. The remainder of Part I is devoted to the systematic treatment of the first five subfamilies (Bolitophilinæ, Mycetobiinæ, Diadocidiinæ, Ceroplatinæ and Macrocerinæ), all of which are comparatively small groups. Fifteen genera and 71 species, of which 11 are new, are described in this part.

Part II deals with the Sciophilinæ, and includes a short account of their habits and earlier stages, in addition to the tables and descriptions. Twenty-nine of the 69 species described in this part are new, most of these belonging to the two largest genera, *Sciophila* and *Mycomya*.

Parts III and IV treat of the Mycetophilinæ and Sciarinæ, the two groups of the most economic importance. The former is the largest of the subfamilies, embracing 48 genera and 110 species, of which 54 are described as new. In the Sciarinæ 9 genera and 56 species are described, 46 of the latter belong to *Sciara*, including 22 new species.

In all the tables the venational characters take the most prominent place, but many others are also employed, such as the position of the ocelli, structure of the palpi and antennæ, and particularly that of the hypopygium of the male. There is considerable variation in the length of the descriptions, some of the diagnoses of new species being only four lines in length, while others occupy 20 lines or more. The descriptions are supplemented by a series of tables giving the relative measurements of the various joints of the legs. There is also an index to the genera and a series of well executed plates, mostly in half-tone, illustrating structural features, chiefly the wings and the hypopygia of the males. It is not quite clear why the plates have not been numbered.

THE Canadian national collections in the Victoria Memorial Museum at Ottawa should be the results of efforts to increase knowledge and the exhibit should be made in a manner to diffuse knowledge. They should not be collections of curios. All Canadians, especially educators, will be interested to make use of the collections often, and should direct others to do so as well as students. It is hoped that time may dispel rapidly the idea, which unfortunately too many people have, that the place is a storehouse for curiosities or abnormal and monstrous things rather than that it is an institution of learning. Some of the staff will always be glad to meet classes or visitors and to give them such assistance as is possible. Pending the completion of the lecture hall, informal talks in the laboratories or offices may occasionally be arranged, especially if a few days' notice is given. As time goes on, the institution will probably be able to loan pictures, lantern slides, maps, labels, casts, and even specimens for educational purposes,

HARLAN I. SMITH.

CHANGE OF NAME.—Dr. Brölemann has called my attention to the fact that my genus *Poabius* is preoccupied by *Poabius* of C. L. Koch. It may be replaced by *Pokabius*.—R. V. CHAMBERLIN.

CORRECTIONS.—In my last paper on the genus *Hydriomena* (CAN. ENT., XLIV, Aug., 1912) the following corrections should be made:—P. 225, lines 16, 17 and 19, for "*Bockhausen*" read "*Borkhausen*." P. 226, line 12, for *Thmb.* read *Thunb.* P. 229, No. 11, and p. 230, No. 11, for "*Janavahrata*" read *banavahrata*. P. 230, line 11, for "(d) *Mesial lines smutty*" read "(d) *Mesial space smutty*." L. W. SWETT.

Mailed October 12th, 1912.