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SOME PARASITIC BEES *(COELIOXYS)*.

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Coelioxys moesta Cresson.—Peachland, B. C., Aug. 9, 1909 (J. B. Wallis, a53). ♀.

Coelioxys deplanata Cresson.—Wawawai, Wash., Aug. 30, 1908 (W. M. Mann). Both sexes.

Coelioxys rufitarsis Smith.—Four females, Wawawai, Wash., Aug. 30 and Sept. 6, 1908 (W. M. Mann).

Coelioxys immaculata, n. sp.—Male; Miners, Indiana, July; collector unknown, but there is a label bearing the number 1525.

Length a little over 10 mm., robust, black, with rather dull white hair, faintly creamy on upper part of head; eyes pale green, with abundant quite long hair; antennæ and mandibles entirely black; tegulæ bright apricot colour; femora except the lower side, and tibiæ and tarsi entirely, bright ferruginous, as also are the tibial spurs; hair on inner side of basitarsi creamy; head and thorax with dense, large punctures, those of vertex larger than those on mesothorax; lower part of cheeks with a broad bevelled space, which is shining and punctured; thorax above without the usual white hair patches; scutellum broadly rounded behind, without any median projection; lateral teeth thick, not curved; abdomen shining, but well punctured, the second and third segments with deep transverse constrictions; fourth ventral segment with a weak emargination; sides of fifth segment with very short spines; sides of sixth with large thick spines; end of sixth with four teeth, the upper ones short, and directed obliquely upwards, the lower large and unusually broad. In Robertson's table (Trans. Amer. Ent. Soc., XXIX, p. 174), this runs out at 3, because of the red legs, punctured bevelled space, etc. Robertson says of male *octodentata*, "disc of abdomen opaque, densely punctured"; *immaculata* has the abdomen very conspicuously shining, except the sublateral region of the second segment just beyond the sulcus, which is dull and very densely covered with minute punctures, in complete contrast with the corresponding areas on the first and third, and with the sparsely-punctured middle of the second.

Coelioxys grindeliæ denverensis, n. subsp.—Four males; Denver, Colorado, Aug. 6 to 25, 1908 (Mrs. C. Bennett). Eyes light red (green in *C. grindeliæ* Ckll,); fourth ventral segment strongly emarginate (entire in *grindeliæ*). Otherwise they seem about the same. Face densely covered with white hair; antennæ entirely black; bevelled space on cheeks rugose but shining; anterior coxæ with large flattened spines; tegulæ black, the margin sometimes dark reddish; legs black, including tarsi; spurs dark; second abdominal segment on each side sublaterally with a more or less evident but small shining raised area; teeth on each side of scutellum long; teeth at sides of sixth abdominal segment long; lower apical teeth of abdomen not broad. In Robertson's table this runs out at 3, although the first abdominal segment is very hairy at sides, and sublaterally has distinct indications of a basal band. The anterior part of the mesothorax is conspicuously but diffusedly hairy, instead of having well-defined spots as in *C. deplanata*.

Coelioxys angelica Cockerell.—The male, previously unknown, has been taken by Mr. F. Grinnell, jr., in Strawberry Valley, San Jacinto Mts., California, alt. 6,000 ft., July 18. By its small size and general appearance, it closely resembles *C. deani* Ckll., but the sulcus on the last abdominal segment is much broader. It agrees with the female *angelica* in having a series of large pits along the basal margin of the mesothorax. The anterior coxæ have short spines.

Coelioxys texana vegana, n. subsp.—Beulah, New Mexico, 8,000 ft., August, (Cockerell). I had erroneously placed this with *C. moesta*. It differs from *C. texana* as shown in the table; by the black legs, with red only at the apices of the joints, it resembles *C. alternata* Say. It differs from Say's description of *alternata* by the dark chestnut-red tegulæ, and the total absence of any white hair band bordering the mesothorax, though there is a little tuft of hair just before the axillæ. The abdomen is sparsely punctured, as in *texana;* the fourth ventral segment has slender apical spines.

Coelioxys erysimi, n. sp.—Male at flowers of *Erysimum parviflorum;* Rifle, Colorado, July 3 to 8 (S. A. Rohwer).

Length about 10 mm.; black, with white hair, abundant on head and thorax; tegulæ black; legs entirely black; hind spurs red; eyes pale green, with long hair; antennæ and mandibles black; cheeks hairy all over; vertex, mesothorax and scutellum with large, quite dense, punctures; scutellum rounded behind; axillar spines moderately long, obtuse; wings

strongly dusky at apex; nervures dark; anterior tibiæ, and all the tarsi, with short fulvous hair on inner side; abdomen shining, strongly, not densely, punctured; apical hair-band on first segment dense and entire, the other apical bands successively thinner, except at sides, beyond the second segment hardly appreciable dorsally; transverse sulci on second segment oblique; a short white subbasal band at sides of second segment; on segments 3 to 5 very strong subbasal hair-bands, broadly interrupted in the middle; sixth segment deeply excavated in middle, the upper apical margin with seven short teeth, a broadly triangular median one, and three on each side; at the lower apical level are the usual two teeth, long and sharp, about one mm. apart; at the sides of the sixth segment the teeth are very long and sharp, but at the sides of the fifth are no teeth, although very minute tubercles can with difficulty be seen; fourth ventral bidentate.

Coelioxys quercina, n. sp.—Male; Oak Creek Cañon, Arizona, 6,000 ft., August (F. H. Snow, 1974).

Length, 11 mm. or rather over; black, with white hair; tegulæ clear red; mandibles black; antennæ black, the flagellum faintly brownish beneath; anterior femora above, in front and at apex, middle and hind femora at apex, tibiæ (the hind ones broadly suffused with blackish on outer side) and tarsi bright ferruginous; spurs red; eyes light green, with short hair (about half as long as in *C. erysimi*); thorax above with the usual large punctures; scutellum rounded behind; axillar spines long and straight; pits at base of metathorax minute and obscure; abdomen with a strong apical hair band on first segment, the others successively weaker, as in *C. erysimi*; first segment with a basal band; the others with interrupted basal or subbasal bands, becoming successively stronger, broader and less interrupted, that on the fifth almost entire; fifth segment not toothed at sides, sixth with well-developed sharp lateral teeth; apex formed as in *C. erysimi*, but the teeth are smaller; fourth ventral bidentate.

Coelioxys fragariæ, n. sp.—Male; Strawberry Valley, San Jacinto Mts., California, 6,000 ft., July 17 (F. Grinnell, jr.).

Length about 10½ mm. (abdomen extended); black, with white hair; tegulæ bright red, with a tuft of white hair in front; mandibles and antennæ black; legs black, the tarsi and spots at apices of femora and tibiæ rather dark red; eyes pale greenish-ochreous, the hair short, as in *C. quercina*; head and thorax above with the usual large punctures;

anterior border of mesothorax with the two hair patches distinct; scutellum not tuberculate in middle; axillar spines large, slightly curved; base of mesothorax without conspicuous pits; wings darkened apically; first r. n. meeting first t. c.; abdomen with hair bands as in *C. quercina;* apical structures of the same type as in *C. quercina*, but the median spine large; fourth ventral bidentate.

Coelioxys hirsutissima, n. sp.—Male; Kenworthy, San Jacinto Mts., Calif., 5,000 ft., June 8 (F. Grinnell, jr.).

Length about 8½ mm. (abdomen retracted); black, with white hair, abundant on head and thorax, and forming entire apical bands (but no subbasal ones) on all the abdominal segments; eyes light green, with long hair, as in *C. erysimi;* antennæ black; apical half of mandibles red; tegulæ red; legs red, with white hair; cheeks hairy; scutellum not tuberculate in middle; axillar teeth rather short; fifth abdominal segment without lateral spines, sixth with slender lateral spines; apex quadridentate, the two lower teeth broad, hardly so far apart as the length of one, slightly curved inwards; ventral hair bands very dense; ventral segments with numerous fine punctures, producing a rather rugose effect, wholly different from the smooth surface, with scattered strong punctures, of the venter of *C. erysimi*, *quercina* and *fragariæ*.

The following table compares the above-described species with various other male *Coelioxys:*

Abdominal bands bright orange-ferruginous, confined to the apices of the segments; no median tooth in apical emargination of abdomen (Assam).....*turneri* Ckll.

Abdominal bands not orange or red.....1.

1. Apex of abdomen red, each apical lobe strongly tridentate; anterior coxæ without spines (Willowmore, Cape Colony; *Brauns*).....*afra* Lepeletier.

Apex of abdomen not red.....2.

2 Apex of abdomen multidentate, each lobe with more than two teeth.3.

Apex of abdomen quadridentate, or quinquedentate by reason of a small median tooth.....8.

3. Segments 2 to 5 with hair bands at apex only; mandibles red (Willowmore, Cape Colony; *Brauns*).....*difformis* Friese.

Segments 2 to 5 with basal or subbasal hair bands, interrupted in middle; mandibles black; fourth ventral segment strongly bidentate apically; anterior coxæ with conical, stout, rather short spines; hind spurs red.....4.

4. Tegulæ black; lower part of cheeks covered with hair; axillary spines rather long (Colorado) ..... *erysimi* Ckll.
Tegulæ red ..... 5.
5. Sides of middle of mesothorax very densely punctured; lower part of cheeks covered with hair ..... 6.
Sides of middle of mesothorax with well-separated punctures; lower part of cheeks bare, bounded behind by a very strong keel; axillary spines very short ..... 7.
6. Face broader; anterior tibiæ, all the tarsi, and other parts of legs bright ferruginous; median apical spine of abdomen very small (Arizona) ..... *quercina* Ckll.
Face narrower; legs black, with the small joints of tarsi and apices of femora and tibiæ dark red; median apical spine of abdomen very long (California) ..... *fragariæ* Ckll.
7. Fifth abdominal segment with small lateral spines; hair of face white (New Mexico) ..... *texana*, subsp. *vegana* Ckll.
Fifth abdominal segment without lateral spines; hair of face with a yellowish tint (Washington Co., Wis.; *Graenicher*). *texana* Cresson.
8. Tegulæ entirely bright red; leg red ..... 9.
Tegulæ black, or dull and dark red ..... 12.
9. Lower apical teeth of abdomen long and slender ..... 10.
Lower apical teeth of abdomen broadened; thorax above without hair spots ..... 11.
10. Ventral surface of abdomen densely and very coarsely punctured (Boulder, Colorado) ..... *edita* Cresson.
Ventral surface of abdomen shining, with widely-separated punctures (Falls Church, Va.; *Banks*) ..... *sayi* Robertson.
11. Larger; lower apical teeth of abdomen more widely separated; second s. m. receiving recurrent nervures about equally distant from base and apex ..... *immaculata* Ckll.
Smaller; lower apical teeth of abdomen less widely separated; first r. n. joining second s. m. very near base, very much nearer than second r. n. to apex (California) ..... *hirsutissima* Ckll.
12. End of abdomen narrow and elongated, with a deep parallel-sided sulcus above; lower apical teeth very sharp; hind spurs red; very small species (Boulder, Colorado) ..... *deani* Ckll.
End of abdomen broader, the median sulcus broadened ..... 13.
13. Legs bright red; anterior coxæ strongly spined ..... 14.
Legs black, or the tarsi red ..... 15.

14. Sixth segment of abdomen, in lateral view, not much longer than high (Wawawai, Wash.).....*deplanata* Cresson.
Sixth segment of abdomen, in lateral view, very much longer than high (Willowmore, Cape Colony; *Brauns*).....*penetatrix* Smith.

15. All the apical teeth of abdomen (including lateral ones) very short and blunt; spines of anterior coxæ strong, covered on outer side with snow-white hair; fourth abdominal segment with a subbasal hair band in the transverse sulcus (New Mexico)....*soledadensis* Ckll.
Apical teeth of abdomen at least partly elongated or sharp.....16.

16. Fourth ventral segment emarginate.....17.
Fourth ventral segment entire.....18.

17. Emargination of fourth ventral segment wide, the segment not produced in middle; hair on eyes short...*grindeliæ*, subsp. *denverensis* Ckll.
Emargination of fourth ventral small and narrow, in a produced median lobe; hair on eyes long (Beulah, New Mexico).....*rufitarsis*, subsp. *rhois* Ckll.

18. Lower apical teeth of abdomen very sharp; very small species (California).....*angelica* Ckll.
Lower apical teeth of abdomen obtuse.....19.

19. Hair of eyes short; face narrower (Las Vegas, New Mexico).....*grindeliæ* Ckll.
Hair of eyes very long (Olympia, Wash.)..*ribis* subsp. *kincaidi* Ckll.

A CORRECTION.

In the key to the species of *Metopia* given in my last paper on Tachinidæ (CAN. ENT., Vol. XLIII, Nos. 8 and 9), I have stated that in *Metopia lateralis* the third abdominal segment bears six or seven marginal macrochætæ, while in *Metopia leucocephala* it bears only a single pair. This distinction was based upon the study of a few specimens after I had left the National Museum, and a re-examination of a large series of specimens of both sexes shows that the character is a variable one. In both *lateralis* and *leucocephala* the number of marginal macrochætæ on the third abdominal segment varies from two to six or seven. The tendency to the development of a considerable number of strong setæ seems to be more marked in the males than in the females.

I am indebted to Mr. H. E. Smith, of the Gipsy Moth Laboratory, who called my attention to the inconstancy of the character.

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THE BLATTIDÆ OF ONTARIO.

BY E. M. WALKER, TORONTO.

The Blattidæ, or cockroaches, are represented in Ontario by eleven species, only two of which, however, are natives, the others being, with two or perhaps three exceptions, merely accidental visitors from the south.

Ischnoptera pensylvanica (De Geer).—Generally distributed throughout Ontario as far north as the Temagami District, and locally common or even abundant. I have specimens from the following localities: Point Pelee; Toronto; De Grassi Point, Lake Simcoe; Stony Lake, Peterborough Co.; Lake Joseph, Muskoka District; Go Home Bay, Georgian Bay; Temagami Park.

This cockroach is very abundant on the rocky, sparsely-wooded country about Go Home Bay, where it occurs in rotten logs and under loose bark. It readily takes up its abode in the summer cottages, where it becomes as much at home in the kitchen and larder as its cosmopolitan relatives of the city, and is often regarded by the residents as a nuisance. I came across it also in considerable numbers on a rocky island in Stony Lake, Peterborough Co., while on a canoe trip. They were first seen at night running up and down a tree trunk in some numbers. Our provision bags became infested with them, and remained so during the rest of the trip.

More annoying still is their habit of eating the paste from book-bindings and nibbling the surfaces of the covers. On my first visit to the Georgian Bay Biological Station, being unacquainted with this habit, I left a water-colour drawing, which I had just made, upon a book-shelf in the laboratory. Next morning only a ghost of it was to be seen, so thoroughly had the cockroaches nibbled off the pigments from the surface of the paper.

The adults appear about the middle of June, remaining until some time in August. They are most abundant during July. The species hibernates in the nymph state. Full-grown nymphs are found in the latter part of May.

Ischnoptera borealis Rehn.—An adult male of this species, labelled

"Toronto," is in the collection of the Provincial Education Dept. I remember also seeing a similar pale *Ischnoptera* some years ago in the collection of the late Dr. Brodie, which I took for *I. uhleriana*, but as these two species had not been separated at that time, I am unable to say to which of the two it belonged.

I. uhleriana has also been reported by Caulfield from "Welland and westward" (Ann. Rep. Ent. Soc. Ont., 16, 1888, p. 71), but for the same reason, as pointed out by Rehn, this record may also belong to *borealis*.

Blattella germanica L.—The "Croton Bug" is probably common throughout the settled parts of the Province. I have specimens from Toronto, Hamilton, Goderich and De Grassi Point, Lake Simcoe.

Blatta orientalis L.—The "Black-beetle" is doubtless also common in every city and town in the Province, though I have specimens only from Toronto and Sarnia.

Periplaneta americana L.—I have never met with this cockroach in Canada, but it has been recorded from Essex County by Caulfield (loc. cit.).

Periplaneta australasiæ Fabr.—I have taken a single male adult, and Mr. C. W. Nash several nymphs of this insect from bunches of bananas at Toronto.

Nyctibora holosericea Burm.—Toronto. One nymph from a bunch of bananas.

Nyctibora sericea Burm.—Mr. Nash has an adult male which he took from a bunch of bananas at Toronto.

Leucophæa surinamensis L.—One specimen from bananas. Taken by Mr. Nash.

Pancheora virescens Thumb.—A single adult from bananas. Taken by Mr. Nash.

Pancheora acolhua Sauss. & Zehntn.?—Some years ago I sent a Panchlora for determination to Mr. A. N. Caudell, who labelled it somewhat doubtfully *P. acolhua* Sauss. & Zehntn. The specimen has since been destroyed by dermestids, so that the determination cannot be verified. It was taken at Toronto from a bunch of bananas.

NEW GENERA OF NORTH AMERICAN LITHOBIIDÆ.

BY RALPH V. CHAMBERLIN, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA.

In a study of the North American species of the Lithobiidæ that fall into the old genus Bothropolys as originally defined by Wood—that is, all those species having the coxal pores, in several series the writer finds that they compose in reality two clearly separated groups of generic value. In addition a third genus, represented by a species here described for the first time, is found, which, while evidently close to the other two in some features, differs from them in having the coxal pores arranged in but a single series. Diagnosis of these genera are herewith given together with those of other genera.

Genus *Bothropolys* Wood (emended).

Head margined continuously from the caudal end cephalad to the eyes on each side, the lateral margin not broken. Prosternum with a well chitinized spine on or near the anterior margin at each ectal angle; prosternal teeth more or less uniformly spaced with no diastema separating them into two groups on each side. Gonopods of the male consisting of a single undivided article. Basal spines of the gonopods of the female 2 + 2. Anal legs with the tarsal claw single; penult legs with the tarsal claw armed at base with a single small or sometimes obsolete spine or accessory claw, or this sometimes quite absent. Coxal pores in several series. (Coxæ of last two pairs of legs armed each with a stout ventral spine.)

Type.—*B. multidentatus* (Newport).

In addition to the type, *B. hoples* Brolemann and *B. permundus* Chamberlin belong in this genus.

Genus *Ethopolys* gen. nov.

Lateral margination of head ending abruptly about one-third the distance forward from the caudal edge, each lateral margin being distinctly broken—that is, rectangularly bent in at this level. A wider interval of diastema separating an ectal group of from 1 to 4 prosternal teeth on each side from an inner larger group, a slender, often more or less bristle-tipped spine, occurring in the diastema, but none at the ectal angle. Gonopods of the male distinctly biarticulate. Basal spines of the gonopods of the female 3 + 3. Tarsal claw of anal legs with a very small spine or accessory claw at base; the claw of penult legs with two accessory claws. Coxal pores in several series. (Coxæ of last two pairs of legs each armed with a stout ventral spine).

Type.—E. xanti (Wood).

In addition to the type *sierravagus* Chamberlin, *E. pusio* Stuxberg, and *E. bipunctatus* (Wood) belong to this genus, as does probably also the doubtful species *E. monticola* of Stuxberg, which I formerly have regarded as probably the same as *sierravagus* but which agrees rather better with adult *pusio*, a species which Stuxberg based on a very young and immature specimen, though differing according to the published description from either.

Genus *Zinapolys* gen. nov.

Each lateral margin of the head distinctly broken a little in front of caudal third of its length as in the preceding genus. Prosternal spine immediately caudal of the ectal prosternal tooth on each side; prosternal teeth large and uniformly spaced, no diastema separating them on each side into two groups. Gonopods of male distinctly biarticulate. Basal spines of gonopods of female 6 + 6. Claws of legs, especially of the more caudal pairs, long and rather slender, all with two accessory claws. Coxal pores in a single series on each coxa of the last four pairs of legs. (Coxæ of the last two pairs of legs each armed with a stout ventral spine).

Type.—Z. zipius sp. nov.

The type is the only species of the genus thus far known.

Zinapolys zipius sp. nov.

Antennæ short, composed of 20 articles; the articles beyond the large second one of moderate length, becoming shorter proximad of the ultimate; hairs clothing the articles usually long, mostly oblique to surface; not very dense. Eyes composed of about twenty ocelli arranged in four series, eg. 1 + 5, 5, 4 (3). The single ocellus not very large. Organ of Tomosvary large, exceeding an ocellus, well removed from the eye-patch. Prosternal teeth 6 + 6–7 + 7, the most ectal on each side largest; the others decreasing from this one to the mesal incision. Spine moderately stout at base but apically long and bristle-like. Angles of none of the dorsal plates produced. Gonopods of male distinctly biarticulate, the distal article much narrower than the proximal; subconic, pale. Claw of gonopods of female entire, curved, deeply hollowed out on ventral side. Basal spines 6 + 6, mostly thickest at middle, being acuminate distad and somewhat narrower at base. Coxal pores circular to transversely subelliptic, moderately large and distinct; 4, 4 (5), 5, 5. Spining of legs: first to seventh, $\frac{0,0,3,2,2}{0'0,2,3,2}$; eighth to eleventh, $\frac{0,0,3,2,2}{0,0,3,3,2}$; twelfth and thirteenth, $\frac{1,0,3,2,2}{0,1,3,3,2}$; penult, $\frac{1,0,3,1,1}{1,1,3,3,2}$ and 1, $\frac{1,0,3,1,0}{1,1,3,3,1(2)}$. All legs terminating in three claws. Last two pairs of coxæ armed laterally as well as ventrally and dorsally.

Original coloration somewhat uncertain because of long preservation of specimens in too weak alcohol, but apparently ferrugino-testaceous with the legs and vender more yellowish, and the caudal ventral plates and legs and the prosternum and head darker; antennæ darker than legs but somewhat paler than head. Length 17–20 mm.

Locality.—Kooteno Co., Idaho.

Genus *Paitobius* gen. nov.

Head as in *Lithobius*, as also are the mouth-parts, nearly. Coxosternum of second maxillæ with narrow median membranous strip which is thin and bent dorsally. Prosternum bearing uniformly 2 + 2 teeth of which the inner one on each side is always borne conspicuously farther forward than the outer, the line tangent to apices of teeth curving cephalad from sides to middle, i.e., being procurved. Spine at ectal angle bristle-like apically. Anterior margin narrow, the lateral slope beginning almost directly from ectal tooth. Antennæ always short, consisting of from 27 to 35 articles. Coxal pores uniseriate, circular. (Last two pairs of coxæ laterally armed). Penult legs always armed with two claws; and legs also armed with two claws (excepting in *naiwatus*). Dorsal spines of anal legs always 1,0,3,1,0; of penult, 1,0,3,1,0 to 1,0,3,2,1. Anal and penult legs always short and distinctly furrowed longitudinally along dorsal surface of third to fifth articles; furrow more distinct on third article and especially in the male in which this article is wider or more crassate than in the female. Gonopods of male small, conical, directed caudo-ectad and nearly always wholly concealed by the sternite. Gonopods of female with the claw always distinctly partite, three lobes being typically present or rarely one of these almost obliterated. Basal spines rather slender and acuminate from base, distad. Body of adults always showing a deeper violaceous or purplish or reddish-purple pigment, modifying the coloration, more or less, of entire body; and in preserved specimens, at least, distinctly colouring especially the muscles. Anal legs always dark, proximally with the tibiæ and tarsi conspicuously paler, usually yellow. The head and dorsum smooth and shining, never rugose. (In all known species the 9th, 11th and 13th, of 6th, 7th, 9th, 11th and 13th, or of 7th, 9th, 11th and 13th dorsal plates with posterior angles produced.)

Type.—*P. carolinæ* Chamberlin.

Distribution.—The South-eastern States.

In addition to the type, the genus includes the following species: *naiwatus* Chamberlin, *tabius* Chamberlin, *juventus* Bollman, and *simitus* Chamberlin.

The genus, which is compact, can readily be detected by the character of the prosternal teeth.

Genus *Taiyubius* gen. nov.

This genus is very close to the preceding, but the species composing it may always be at once distinguished by the characters of the prosternum, the teeth of which are the same in number but differ in not having the inner teeth borne far forward, and in having the axis of each of the latter directed somewhat mesad of directly cephalad, with the line tangent to apices of teeth curving caudad from the sides mesad, i.e., this line clearly recurved. Antennæ short, or very short, consisting of from 26 to 39 articles. Posterior coxæ either entirely unarmed laterally or with each one of last pair or of last two pairs with a weakly developed spine which is often difficult to detect. Anal legs always with two claws; penult with two or three. Dorsal spines of anal legs, 1,0,3,1,0; of penult, 1,0,3,1,1. Anal and penult legs very nearly as in *Paitobius*. Gonopods nearly as in *Paitobius*, but basal spines characteristically much broader and wider near middle of length. Pigmentation much as in preceding genus. In known species posterior angles of 9th, 11th, and 13th dorsal plates produced.

Type.—*T. angelus* Chamberlin.

Distribution.—Western United States.

Other species belonging to this genus in addition to the type are *satanus* Chamberlin, *harrielæ* Chamberlin, and *purpureus* Chamberlin.

Genus *Sonibius* gen. nov.

Related to the two preceding genera which it replaces in the north central section of the country. The prosternal teeth small and subequal, 2 + 2 or 3 + 3 in number, with the line of their spaces recurved.

Readily distinguished from the preceding two genera in having the short antennæ composed normally of but twenty articles which are relatively long, whereas in *Paitobius* and *Taiyubius* they are mostly very short and crowded. Last two or three pairs of coxæ laterally armed, last four or five pairs dorsally armed. Anal legs armed with two or three claws as are also the penult, the number being mostly three. Dorsal spines of anal legs 1,0,3.1,0; of penult and 13th always 1,0,3.1,1. Gonopods of female with claw partite. Basal spines characteristically short and broad. Adults not showing the peculiar reddish-purple pigment in deeper tissues manifest in *Paitobius* and *Taiyubius*. Dorsum always smooth and shining. In known species posterior angles of 9th, 11th, and 13th dorsal plates produced.

Type.—S. bius Chamberlin.

Distribution.—North Central United States.

Besides the type, other species known to belong to this group are *politus* McNeil, *numius* Chamberlin , and *yanikans*, sp. nov.

Arenotini

Most of the species of the Lithobiidæ known from Central America and from Mexico compose a group which may be designated as the Arenobini. Among other features all have the gonopods of the male, although large and prominent, composed of but a single article and the claw of the gonopods of the female wholly undivided , with basal spines 2 + 2, large and stout, and the basal article with inner sides strongly chitinized and conspicuously excavated toward base. The dorsal spines of the anal legs from 1,0,3,2,1(0) to 1,0,3.2,2 ; of the penult always 1,0,3.2,2 in the female, and either the same or 1,0,3,2,1 in the male. Excepting the new genus *Sotimpius*, proposed for *Lithobius macroceros* and *L. decodontos* of Pocock, the prosternal teeth are 2 + 2 in number with the ectal spine in many species stout and tooth-like. In *Sotimpius*, which will not be further discussed here, the prosternal teeth number 5 + 5 or 6 + 6 and the ectal spines are bristle-like.

Genus *Arenobius* gen. nov.

Body conspicuously attenuated, cephalad with first dorsal plate narrower than the third. Dorsum smooth and shining, especially the first plate and the head. Prosternal teeth 2 + 2 with in most the spines stout and dentiform or more rarely these slender and bristle-like (only in Subgenus *Sititius*). Antennæ short to medium, occasionally equalling half the length of the body ; composed mostly of from 25 to 60 articles. Coxal pores uniseriate, circular or a little transversely elongate. With one exception the anal legs are armed with two or three claws. Dorsal spines of the anal legs 1,0,3,2,1 normally, occasionally varying in individual cases to 1,0,3,2,0 or 1,0,3,1,1 ; dorsal spines of penult legs in females always 1.0,3,2,2 ; in males nearly always 1,0,3.2,1, rarely the same as in female (frequently so in immature stages) With few exceptions both the anal and the penult legs are conspicuously modified in the male, the tibiæ of both bearing special lobes, furrows or bunches of hair ; more rarely with the penult legs normal and with the first tarsal joint specially modified. Gonopods of female with claw large, strongly curved and entire ; basal spines 2 + 2, stout; first joint with distal and inner edges strongly chitinized, excavated on mesal side toward base, leaving between the two a broadly

triangular space with apex distad. Gonopods of male rather large and conspicuously exposed, but undivided.

Type.—*A. manegitus* Chamberlin.

Distribution.—From Colorado to the South-eastern States, and southward through Mexico to Central America.

In the United States, besides the type species, occur three other known species which differ from the type in having the ectal spines slender and apically bristle-like as well as in the character of the lobe on the penult legs of male. They may be placed in a separate sub-genus *Sibibius*. The species of this sub-genus are *coloradanus* sp. nov., *mississippiensis* sp. nov., and probably *ædipes* Bollman. Composing a new sub-genus *Kunobius* are the two species *pontifex* and *humberti* of Pocock, which differ in having the penult legs of male not at all modified while the first tarsal joint of the anal legs is very strongly enlarged, the tibiæ being specially modified as well. Both these species are from Province Guerrero, Mexico. The species *stolli* Pocock from Guatemala, differs from all other species of the genus in having all the dorsal plates with posterior margins straight, none of the angles being produced, and, according to the original description, in having the claw of the anal legs single. It may be placed in a subgenus *Sowubius*. Other Mexican and Central American species apparently belonging to *Arenobius* are the following: *godmani*, *salvini*, and *vulcani* of Pocock and *sontus* sp. nov., a rather aberrant species described below.

(To be continued.)

MEETINGS OF THE MONTREAL BRANCH.

Meeting Jan. 9th, 1912.—At the residence of Mr. H. H. Lyman, 11 members present. Mr. G. A. Southee in the chair. Mr. Lyman read a paper entitled "Further Notes on Types in the British Museum."

Mr. H. F. Wolley Dod, of Calgary, Alta., gave an interesting account of his visit to some of the U. S. collections of Lepidoptera. He referred particularly to those of Dr. J. B. Smith at New Brunswick, N. J.; the U. S. National Museum at Washington; the Strecker collection at Chicago, and that of Dr. Wm. Barnes at Decatur, Ill.

Discusssion followed on the various methods of collecting Noctuids.

Specimens of the genus *Xylina* were exhibited, representing about 25 North American species.

Meeting Feb. 10th.—At the residence of Mr. G. Chagnon; 6 members present. Mr. Southee in the chair.

A letter was read regarding supposed injury to greenhouse plants caused by a beetle, specimens of which were submitted. These were seen to be *Nacerdes melanura*, a European insect introduced through commerce. It is now very abundant in warehouses downtown, particularly near the wharves, and is often seen in numbers on sidewalks throughout the summer.

Mr. Winn read a short paper entitled "A Miniature Insectary," describing a space in his cellar boxed in around a south window, the inner of the double windows having been moved about three feet back, the outer window being left on during the winter and replaced by a wire screen in summer. The space only amounted to perhaps 40 cubic feet, but was sufficient to accommodate on shelves a number of breeding cages, jelly jars, boxes and tubes, and the conditions seemed to suit the insects, as there were practically no failures to get imagoes or parasites.

Mr. Moore read a paper on "Sexual Differences in Hemiptera," illustrated by specimens. Size and colour are the usual characters. Females of most species were much more seldom found in collecting than males, whether this was due to secretive habits of the females he did not know.

The Secretary followed with a paper on "The Determination of Sex in Lepidoptera. Several boxes of specimens were shown to illustrate the superficial points of distinction. The structure of the antennæ, the frenulum and some slides of genitalia were shown under the microscope.

Copies of Dr. Barnes' and Dr. McDunnough's "Contributions to N. A. Lepidoptera," Parts I–III, were shown.

Meeting March 9th.—At the residence of Mr. Lachlan Gibb; 10 members present. Mr. Chagnon, Vice-President, in the chair.

The question of finding a new place for the cabinet and book cases was taken up, owing to Mr. Gibb's departure for England, and Mr. Lyman offered to look after it temporarily.

A paper on "Rye's Newest Moth," by Henry Bird, Rye, N. Y., was read by the Secretary. The paper dealt with the discovery of *Gortyna erepta* boring in the roots of a coarse grass on the shore of the Atlantic. The species had previously been taken only in Kansas.

The chairman then announced that he had a pleasing duty to perform, and handed to Mr. Lyman an illuminated address, signed by all the members of the Branch, expressing their good wishes on the occasion of his marriage. Mr. Lyman replied, thanking the members for their gift.

Copies of two parts of the "Genera Insectorum," dealing with the family Geometridæ, were shown by the Secretary, as well as some drawings of structure of the Brephinæ.—A. F. WINN, Secretary.

INSECTS BRED FROM COW MANURE.†

BY F. C PRATT,
Late Assistant Entomologist, Bureau of Entomology.

NOTE.—This paper has been compiled from numerous notes made by Mr. F. C. Pratt some time before his death. The investigation was prosecuted with skill and enthusiasm by Mr. Pratt, and the paper gives but a slight idea of the large amount of work on the subject which was done by this assiduous entomologist.—W. D. HUNTER.

INTRODUCTORY.

In 1907, at the suggestion of Mr. D. L. Van Dine, an attempt was made by the Bureau of Entomology to breed parasites of the horn-fly (*Hæmatobia serrata* R.-Dev.) to ship to Hawaii for experiments in the control of the pests. Although a number of predators were bred, no absolute records of parasitism were obtained. However, the work resulted in the rearing of a considerable number of species which have not been known to develop in cow manure. The following list may be considered supplementary to that of Dr. L. O. Howard (CAN. ENT., Feb., 1901, pp. 42–44), which dealt exclusively with Diptera. Dr. Howard's list included 25 species of Diptera, the present list contains 31 species of that order, 17 of Coleoptera and one of Lepidoptera. Of the species of Diptera included in Dr. Howard's list, 14 occur in this one and 20 are new.

Special notes were made on the occurrence of the various species in the stables and milking-houses on account of the possibility of the contamination of the milk by disease organisms or in other ways.

The records from Victoria, Texas, were obtained by Mr. J. D. Mitchell. The species previously bred from cow manure are preceded by an asterisk. The Diptera were determined by the late D. W. Coquillett, and the Coleoptera by Mr. E. A. Schwarz.

List of species bred from cow manure.

DIPTERA.

Family PSYCHODIDÆ.

**Psychoda minuta* Banks.—Victoria, June 9. Six specimens.

Family CHIRONOMIDÆ.

**Ceratopogon specularis* Coq.—Dallas, July 26, 29, 30, Aug. 31, Oct. 21, Nov. 4. Victoria, May 27, Dec. 1. Seventy specimens.

This species has also been bred from cow manure by Long. See Biol. Bull., 1902, p. 7.

Family MYCETOPHILIDÆ.

*Sciara, sp.—Victoria, June 9. Nine specimens.

†Published by permission of the Chief of the Bureau of Entomology.

Family CECIDOMYIDÆ.

Lestremia leucophæa Meig.—Dallas, July. Two specimens. Bred from droppings one day old in pasture.

*Diplosis sp.—Victoria, June 9. One specimen.

Cecidomyia sp.—Victoria, June 9. Dallas, May to December. Seventeen specimens.

The salmon-coloured larvæ are very conspicuous. The species apparently is perfectly at home in the manure.

Family BIBIONIDÆ.

Scatopse atrata Say.—Dallas, July 26, Sept. 18. Nineteen specimens. This species was bred from fresh manure. The flies follow the cattle into the stables.

Family EMPIDIDÆ.

Tachydromia pusilla Loew.—Dallas, June 22. One specimen.

Family SARCOPHAGIDÆ.

**Sarcophaga (Helicobia) quadrisetosa* Coq.—Dallas, July 26, 29, 30, Sept. 10, 16, 18, 23, Oct. 8. Victoria, June 15, July 4, 23, Nov. 2, 24. One hundred and forty-two specimens.

This species is one of the most common in cow manure. From one dropping 78 specimens were bred. The developmental period varied from 7 to 14 days. The flies frequently invade the stables, and are often seen on the manure immediately after it is voided.

Sarcophaga incerta Wills.—Dallas, Aug. 1, 16, Sept. 3, 10, 12, 22, Oct. 18, 21, 23. Fifty-nine specimens.

This species is exceedingly common in the pastures, but is seldom seen in the stables. It develops in from 14 to 18 days in the summer.

Sarcophaga assidua Wills.—Dallas, July 26, Aug. 3, Sept. 9, 12. Thirty-eight specimens.

This species has been bred from fresh manure in the milking-houses. The developmental period in August ranged from 17 to 20 days.

Sarcophaga helicis Towns.—Victoria, Aug. 7. One specimen.

On account of the published notes on the habits of this species it is likely that the occurrence in cow manure was accidental.

Sarcophaga varicauda Coq.—Dallas, July 30. Twenty-four specimens. This species is found in and about the milking-houses more commonly than in the pastures. Development occupied from 10 to 14 days.

Family MUSCIDÆ.

Pseudopyrellia cornicina Fabr.—Dallas, July 29, Aug. 19, Sept. 10, 17, 22, Oct. 21, 23, 24, 26. One hundred and thirty-two specimens.

This species is frequently found in the stables. It places its eggs in clusters on fresh manure. In one case 285 puparia were found in one mass of manure. Development occupies from 9 to 20 days, depending upon the temperature.

Pyrellia cyanicolor Zett.—Victoria, Oct. 4. Twenty specimens.

**Morellia micans* Macq.—Dallas, 17, 22. Thirteen specimens.

**Musca domestica* L.—Dallas, Tex., June 17, 19, July 20, 31, Aug. 19. Fifty specimens.

This is one of the most common species in the stables. Fresh manure attracts it in great numbers.

Stomoxys calcitrans L.—Dallas, Aug. 3. One specimen.

This species is very abundant in and about the stables, but, judging by our records, does not breed commonly in cow manure.

**Hæmatobia serrata* Desv.—Dallas, June 22, July 26, Sept. 14, 18, 19, 21, 22, 28, Oct. 8, 14. Victoria, July 18, Oct. 4, Dec. 10. Fifty-three specimens.

This species is to be found in the milking-houses. It varies greatly in numbers with the weather. Dry weather prevents development, and a series of showers invariably brought about a sudden and conspicuous increase in numbers.

**Myiospila meditabunda* Fabr.—Dallas, July. Twenty-two specimens.

This species was not observed in the stables.

Family ANTHOMYIDÆ.

Limnophora discreta Stein.—Dallas, July 30, Aug. 31, Sept. 5, 12, 23. Victoria, May 3, 9, 25, Aug. 9, Sept. 10, Nov. 1. Ninety-eight specimens.

This is one of the most abundant species. It was not taken in the milking-houses, but was frequently bred from manure deposited in their immediate vicinity.

Limnophora debilis Will.—Dallas, July 26, Aug. 1, 24, Sept. 7, 16, 23, Oct. 7, 9, Nov. 4. Victoria, Aug. 9, Oct. 14, 20, Sept. 10, Nov. 4. Two hundred and thirty-four specimens.

This species and the preceding are apparently the most common flies breeding in cow manure in Texas, except the undetermined species of Limnosina.

Anthomyia albicincta Fall.—Victoria, June 27. Three specimens.

Apparently this species breeds in a great variety of substances.

Pegomyia fusciceps Zett.—Victoria, June 3. Fourteen specimens.

This record seems to be substantiated by the breeding from human excrement, as noted by Dr. L. O. Howard.

Family BORBORIDÆ.

Limnosina spp.—Dallas, Aug. 30. Three hundred and sixty specimens. *L. albipennis* Rond. has been recorded.

Apparently three species were bred from fresh as well as partially dried deposits.

Family SEPSIDÆ.

Sepsis pleuralis Coq.—Victoria, Oct. 10. One specimen.

**Sepsis violacea* Meigen.—Dallas, July 29, Sept. 12, 19, 20, 21, Oct. 26, Nov. 6. Victoria, Texas, July 9, Aug. 4, Oct. 10. Seventy-seven specimens.

This species was taken commonly in the stables. It breeds in fresh droppings.

Sepsis insularis Will.—Dallas, Aug. 22, Oct. 8, 18. Victoria, May 14, Sept. 10, Dec. I. Fifty specimens.

This species was taken in the stables repeatedly.

Family OSCINIDÆ,

Hippelates microcentrus Coq.—Dallas, Sept. 3. One specimen.

An allied species, *flavipes*, was bred from human excrement. See Dr. Howard's list.

Elachiptera costata Loew.—Dallas, Aug. 3. One specimen.

Family AGROMYZIDÆ.

Desmometopa m-nigrum Zett.—Dallas, Aug. 22. One specimen.

The single specimen bred was from fresh manure in a stable.

COLEOPTERA.

Family HYDROPHILIDÆ.

Cercyon nigriceps Marsh.—Dallas, Sept. 10, 14, Oct. 9, 17, 23, 26.

Two other species were bred from human excrement. See Dr. Howard's list.

Family STAPHYLINIDÆ.

Aleochara bimaculata Grav.—Dallas, Oct. 19.

This species is probably predaceous. It was taken in manure three days old.

Philonthus flavolimbatus Er.—Dallas, Oct. 19.

This species and the following were found in the breeding-cages, but there is no absolute proof that they were actually breeding in the manure.

Philonthus varians Payk.—Dallas, Aug. 6.

Philonthus longicornis Steph.—Dallas, Aug. 27.

Lithocharis ochracea Grav.—Dallas, Aug. 19, Sept. 10.

Cilea silphoides Er.—Dallas, Sept. 10.
Platystethus americanus Er.—Dallas, Sept. 23.
Platystethus spiculatus Er.—Dallas, July 30, Aug 3, 19.
Oxytelus sculptus Grav.—Dallas, Aug. 3, Oct. 28.

Family HISTERIDÆ.

Hister abbreviatus Fab.—Victoria, Oct. 14.
Hister cœnosus Er.—Victoria, April 15. Dallas, June, July.

This species is predaceous. It was found devouring the larvæ and puparia of *Pseudopyrellia cornicina*, and undoubtedly attacks other species, including the horn-fly.

Family SCARABÆIDÆ.

Canthon lævis Dury.—Victoria, April 15.
Aphodius fimetarius Linn.—Dallas, Oct. 19.
Aphodius lividus Oliv.—Dallas, Sept. 10, Oct. 18.
Aphodius vestiarius Horn.—Victoria, April 15, Oct. 20, Aug. 4.
Aphodius sp.—Victoria, April 15.

The various species of Aphodius are by far the most common beetles found ia cow manure.

LEPIDOPTERA.

Family TINEIDÆ.

Setomorpha rutella Zeller (det. Aug. Busck)—Victoria, Nov. 23.

The occurrence of this species in cow manure may be accidental.

NEW SPECIES OF THE COLEOPTEROUS GENUS *COLLOPS* ER.

BY CHARLES SCHAEFFER,
Museum of the Brooklyn Institute, Brooklyn, N. Y.

Special help employed last year at our Museum to catalogue the collections made it necessary to rearrange certain boxes as well as to identify unnamed species. In the genus *Collops* several species collected on our museum trips, and from other sources, proved to be new, were given names and entered in our catalogue. It was my intention to revise the entire genus later on and the descriptions of the different forms drawn were kept back for this reason. However, as I have for some reason, to delay at present a revision of this genus, the descriptions of the new species are published in advance, in order that the names entered in the catalogue may stand.

The measurements of the species herein described are taken from specimens with the head deflexed.

June, 1912

Collops nigritus, new species.

Head black, densely punctate; clypeus reddish. Antennæ with first joint relatively strongly angulate at middle, red with a black spot, second joint reddish, on underside blackish; following joints black, rather feebly serrate. Prothorax red; surface densely punctate with the usual short, pale and erect black hairs. Elytra black, very densely punctate. Basal half of each ventral segment black, apex red. Legs black, apex of anterior coxæ reddish. Length 3.5 mm.

Arizona.

A single male found among the unmounted material of the Dietz collection.

From all species with unicolorous elytra, this species differs by the rather strongly angulated first antennal joint of the male, the densely punctate prothorax, and the black elytra.

Collops parvus, new species.

Head bluish-black; clypeus reddish. Antennæ black, first joint red, excavate on inner side. Prothorax red; surface shining, scarcely punctate on the disk. Elytra elongate-oval, blue, feebly shining; surface moderately densely punctate. Trochanters and femora black, tibiæ and tarsi red. Ventral segments red, black at sides. Length 3 mm.

A single male in the O. Dietz collection from Arizona labelled *punctatus*.

Collops eximius, var. *floridanus*, new var.

Like *eximius* Er., except thorax red, without large, black spot. Length 5 mm.

Florida, collected by R. F. Pearsall and received from A. Nicolay.

A large series of *eximius* Er. which I have seen, shows very little variation in the form of the black spot. The series in Mr. Nicolay's collection from Florida is also constant, except that in some specimens two faint, narrow, dark spots are visible on the thorax.

Collops aulicus Er.—Entomographien, p. 55.

I have taken a female specimen in the Huachuca Mts., Ariz., which, according to the figure in the Biol. Cent. Am. Col., Vol. III, pt. 2, pl. VI, fig. 21 and 22, seems to be that species. However, I have not seen the original description, but, as the species is also reported from Guanajuato, it is more than probable that my surmise is correct. A specimen in the Dietz collection from Arizona, which agrees well with the description of

marginicollis, differs only from the above mentioned specimen by having the thorax black, with side margins near base, more or less narrowly pale. If the two should prove to be the same, *aulicus* Er. as the older name, has to be accepted for this species.

Collops argutus Fall—Occ. Pap. Cal. Acad., VIII, p. 242.

A few specimens from the Huachuca Mts., Arizona, agree closely with the description of this species, except that the abdomen is red, with last segment black. The abdomen in the description is said to be black in some specimens, and rufous at middle near base in others, which indicates that the colour of abdomen at least is variable.

Collops femoratus, new species.

In coloration, nearest to *pulchellus* Horn, but not quite as elongate; elytra more finely and closely punctate; basal antennal joint of male not excavate on the inner side; front and middle femora and hind femora at base red, tibiæ and tarsi black. Length 4 mm.

Huachuca Mts., Arizona.

The ventral segments are red in a few males; in one male and in the females they are spotted with black at sides. A female from Brownsville, Texas, with clear, red abdomen, does not seem to differ otherwise from the Arizona specimens.

Collops scutellatus, new species.

Red; metasternum and palpi black; head with central bluish spot and elytra with basal and elongate-oval, blue, apical spots; the two spots on each elytra narrowly divided. Thorax narrower than in *pulchellus*, *argutus* or *femoratus*; scutellum clear-red. Basal antennal joint rather slender, feebly enlarged towards apex, and not excavated on inner side; the outer joints feebly dilated. Length 3.25 mm.

One male, New Braunfels (O. Dietz.)

The coloration, the scarcely apically dilated basal joint of antennæ, the red scutellum and the more shining elytra will separate this from all previously described maculate species.

Collops tibialis, new species.

Head blue, clypeus and a large, oval, median spot from the clypeus to almost the middle of the head, reddish. First two antennal joints of male red, the outer blackish and feebly serrate. Prothorax shining, red, feebly punctate at middle, distinctly so at sides. Elytra with two large blue basal spots connected at suture, and oval sub-apical spot on each

side, involving largely the lateral margin. Surface punctured similarly to *quadrimaculatus*. Femora black, tibiæ red, abdomen red. Length 3 mm.

Nogales, Arizona (F. W. Nunnenmacher.)

A small species with thorax less transverse than the other species.

Collops similis, new species.

Head bluish-black, inter-antennal space and clypeus red. Antennal joints red; first joint stout, the other serrate. Thorax red at middle with two, rather indistinct, darker lines. Elytra red, with basal and oval sub-apical spot blue; surface more coarsely punctate than in *quadrimaculatus* Fab. Front and middle femora red; hind femora, tibiæ and tarsi black. Abdomen red. Length 3.50 mm.

S. W. Utah, collected by J. Chr. Weidt, of whom I bought a few specimens some years ago. This type is in the Museum collection. This species has more coarsely punctate elytra than any other of the known maculate species.

Collops punctulatus, var *texanus*.

Like *punctulatus* Lec., except that the thorax is bright red. Length 2 mm.

Brownsville, Texas.

A few specimens have the blue elytral vittæ narrowly divided, forming two large spots on each elytron; in one specimen the spots are confluent as in typical *punctulatus*.

Collops punctulatus, var. *utahensis*, new var.

Differs from *punctulatus* in having the elytral vittæ broadly divided. The basal spot is small and more or less transverse. The apical spot oval. Length 2–2.25 mm.

Buckskin, Utah. (Doll & Engelhardt.)

Apparently a constant, local form of *punctulatus*.

Collops sublimbatus, new species.

Closely allied to *C. georgianus* Fall, from which it differs in having the head polished, the disk of prothorax shining, and scarcely punctate. Length 3.5–4 mm.

Clayton, Georgia.

Through the kindness of my friend, Mr. William T. Davis, I have seen a number of specimens which agree very closely with Fall's description of *georgianus*, except as above stated. From *limbellus*, it differs in having the outer antennal joints not serrate, and the second joint is much wider than long.

ON THE LARVAL STAGES OF CERTAIN ARCTIAN SPECIES.

BY WM. BARNES, M.D., AND J. H. MCDUNNOUGH, PH.D., DECATUR, ILL.

(Continued from page 136)

Apantesis incorrupta H. Edw.

We received a ♀ of this species about the middle of June from the neighbourhood of Redington, Ariz., which had deposited numerous ova en route. The young larvæ hatched within 1–3 days after receipt of eggs. In all probability therefore, the duration of ovum stage is about 5 days. Unfortunately, owing to our absence from home, the complete larval history could not be worked out. The early stages may however prove of value, especially when compared with those of *nevadensis*, of which Dyar lists *incorrupta* as a variety. We, ourselves, see no reason why it should not enjoy specific rank.

Ovum.—Very similar to that of other *Apantesis* species; rather conical, with flat base. Yellowish, turning black before emergence, laid promiscuously.

Stage I —Head and prothoracic shield blackish, latter with 4 anterior and 4 posterior setæ. Body pale reddish, with green of the food largely showing through the skin after eating. Tubercles blackish, with a similar arrangement to that of other *Apantesis* species. Tubercle I small, with minute, white seta. The seta of tubercle II and the upper one of III black on abdominal segments; all other setæ long, white, increasing in length on rear segments. On meso- and metathorax, tubercles I and II possess one white and one black seta. Length 3 mm.

Stage II.—Head, thoracic plate, and tubercles black; body purplish brown, shading into lighter ventrally, and tinged with orange at the base of the lateral tubercles III–V. A pale, dorsal line and a broken subdorsal one on a level with tubercle III. Tubercle I minute, with single short black seta; on thoracic and two posterior abdominal segments, tubercle II possesses a single long white seta, surrounded by 6 or 7 shorter black ones; on the remaining abdominal segments the white seta is lacking, and the black setæ are 5–6 in number. Tubercle III on thoracic segments with two long black setæ and several small basal ones; on abdominal segments with very long white central seta, a ring of about 4 shorter black ones, and a small cluster of minute basal white hairs. Tubercle IV similar in arrangement to III; ventro-lateral tubercle with short white setæ. Length 5 mm.

June. 1912

Stage III.—Very similar to preceding with an increase of secondary black setæ, single long white seta present as before; whitish dorsal line slightly enlarged in centre of each segment. Length 7 mm.

Stage IV.—Head black, body purplish brown mottled strongly with whitish; pale dorsal line very distinct; subdorsal line almost lost in the white marbling. Tubercles black, lateral ones distinctly orange at bases. Long white setæ of III and IV very prominent, especially on rear segments. Tubercle V of anterior segments also bears a white seta which is lacking in the posterior half; other setæ mostly black. Lateral abdominal tubercles with several pale setæ inclining to orange; spiracle black. Prothoracic plate split up into 4 chitinous mounds of which the two anterior are the larger, bearing numerous setæ projecting over the head; the posterior carry 4 6 setæ. Legs black. Length 13 mm.

Apantesis phalerata Harris.

The larval history of this moth has been already described by Gibson (CAN. ENT., XXXII, 369; id. XXXIV, 50). We venture to add, however, some more precise details on the earliest stages, as it is probably in these that we must look for points of distinction from closely allied species.

A ♀ of the form *radians* Wlk., i. e., with W mark absent and broad black border to red hind-wings, deposited ova freely in June; these were not dropped promiscuously as in the previous form but placed neatly in rows in irregular groups on the underside of any available object. The egg itself offers no points of distinction, being similar to those species already described. We were unfortunately not able to breed the species through.

Stage I.—Head, lobes blackish; clypeus and mouth-parts as well as suture between lobes, pale brown; body pale greenish red; tubercles dark; on abdominal segments I minute, with white seta; II and III as usual. Setæ black on all segments except on 9th abdominal, where 9th dorsal tubercle bears two long white and two black setæ; remaining tubercles bear white hairs. Prothoracic plate the colour of body, except for a dark mound on each side of the central line anteriorly; these mounds bear each 2 black setæ. There is further a posterior row of four setæ, the outer (lateral) one being white. Length 2.7 mm.

Stage II.—Head as before. Body greenish brown with pale dorsal stripes and orange tinges laterally at the base of the tubercles. Characteristic of this stage is the great increase of setæ on tubercle II which bears 10-12 short black hairs. On abdominal segments III has 2 or 3

black central setæ surrounded by a ring of 4-5 small white ones; on thoracic segments III bears merely 1-2 black setæ. The lateral tubercles bear one long central black seta, the remaining ones being smaller and white. The thoracic plate shows four slightly raised darker areas, two anterior and two posterior, each bearing the black setæ. All legs the colour of the body. Length 4.8 mm.

Euchatias spraguei Grt.

Ova sent by Mr. Kwiat of Chicago in June hatched during transmission, the young larvæ eating the egg shells. From a rather crushed unfertile egg following note was made.

Ovum.—Hemispherical, with flat base; pitted with numerous slight punctures; pale orange-yellow. Diameter .4 mm.

Stage I.—Head black, with sparse black setæ. Body pale red-brown with large black almond- or kidney-shaped tubercles; arrangement of setæ typically Arctian; tubercle I about half as large as II, with short black seta; seta of II black, longest on 1st and last two abdominal segments; III with black setæ; lateral setæ short and white; thoracic plate semilunate with 4 setæ on anterior margin. When at rest the first two abdominal segments appear slightly humped. Length 3 mm.

Stage II.—Head pale yellowish; body red-brown, becoming later yellowish; tubercles black, II and III being the largest; tubercle I with two long black setæ and a couple of short white ones inclined towards the head; II with about 8 black setæ; III with 6; IV small, situated immediately posterior to the spiracle and bearing two setæ; V with 5–6 setæ of which the central one is black, the remainder white; VII larger with 2 central black and 8–10 white basal setæ; spiracle pale with black rim. Length 6 mm.

Stage III.—Head and body pale orange yellow; tubercles blackish arising out of a pale base and with numerous long plumed gray hairs; traces of a pale subdorsal line and lighter shading laterally around tubercle V. Length 13 mm.

Stage IV.—Head, body and legs pale orange with traces of a pale yellow subdorsal and a similarly coloured subspiracular line: tubercles black, giving rise to numerous long, silky, plumed, dark gray hairs, which form a thick covering over the body. Length 20 mm.

Stage V.—Head pale reddish; body dorsally pale green, shading into pale orange laterally; traces of a dark dorsal line and the pale subspiracular line of the previous stage; tubercles pale; base of hair black; body thickly

covered with long silky plumed pinkish gray hairs; the medio-dorsal hairs blackish, forming a dark dorsal line; prolegs reddish; spiracles creamy, rimmed with black. Length 28–30 mm.

Pupation in a coarse cocoon of mixed hairs and earth on or just beneath the surface of the ground.

Pupa of the usual type, with immoveable segments, dark brown. One pupa out of sixteen emerged during July; the remainder are hibernating.

Food plant.—Spurge (Euphorbia).

APHID NOTES FROM OREGON.

BY H. F. WILSON, CORVALLIS, OR.

(Continued from page 159.)

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

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, .66; 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; 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.

Lachnus occidentalis Davidson.

Quite abundant in spring and fall on the terminal shoots, where it causes the undersides of the twigs to appear bluish or smoky.

Stem-mother.—Collected on *Abies grandis*, near Corvallis, Oregon, March 18, 1911. Gregarious individuals from just hatched to two-thirds grown. Colour dark brown, body pruinose. Head and legs black except tibiæ, which are dark brown. Body with four rows of spots on the abdomen, which resemble dried spots of some white crystalline substance. The more mature specimens taken later are darker and have more of the pruinose covering. The spots are more distinct, and the underside of the body and the sides are white with this covering.

Measurements: Adult females. Length of body, 3 mm; width, 2 mm. Length of antennal segments, I, .09; II, .09; III, .35; IV, .154; V, .198; spur, .198 mm. Spur tapers into joint so that it is not distinct from segment. Total length, 1.08 mm; length of cauda, .27 mm. Nectaries small, cone-shaped, with chitinous ring at opening. Body, antennæ and legs bearing long hairs.

Spring migrant.—Found on twigs, on underside, and causing bluish colour intermixed with white flocculent castings of Aphids.

General colour; head black; rest of body dark green but whitish in appearance from flocculence which covers body and legs. Legs and antennæ light brown with dark joints, tarsi dark to black. Antennæ slender and apparently without sensoria except one large one at the distal end of the fifth segment. Third segment the longest and about equal to four and five in length. Nectaries cone-shaped, placed on the side of the body and much larger than those of the apterous forms. Fore wings with the median vein and branches indistinct, present as a mere outline. Hind wings with normal venation of two oblique veins.

Measurements: Length of body, 2.1 mm.; width, 0.9 mm. Length antennal segments, I, .066; II, .09; III, .44; IV, .176; V, .22; VI and

spur, .22; total length, 1.172. Length of wing, 4 mm.; width, 1.5 mm.; total expansion, 8.75 mm. Length of cauda, .22 mm. Body, antennæ and legs bearing long hairs.

Fall migrants not obtained.

Oviparous female.—Collected at Corvallis, in colonies on under side of small twigs. Egg deposition takes place on the needles and they are laid in a row, about five being the most found on any one needle.

General colour brown, with white powdery wax on dorsal and ventral parts of body. That on the ventral part is thicker than above and extends half way up the sides. The characteristic rows of spots as are found on all the apterous forms of this species are found on the dorsum. This form is smaller than the viviparous forms.

Measurements: Length of body, 2.8 mm.; width, 1.7 mm. Length of antennal segments, I, .066; II, .09; III, .33; IV, .176; V, .198; VI and spur, .176 mm.; total length, 1.036 mm.

Alate male.—Collected near Corvallis, Nov. 3, 1911, on same tree that the spring forms were collected on. Only a very few specimens found and these were so active and so small as to be not readily located.

General colour of body, green. Head and thorax dusky. Antennæ and legs dusky. Body almost hid in white, fluffy threads of wax which also appears on the legs. Head almost as wide as thorax. Antennæ reaching to abdomen and with small circular, raised sensoria on the third, fourth and fifth segments. From top view there are shown about sixteen on the third segment, eight on each side; the fourth has about seven to nine, and the fifth has none in one specimen and apparently three in another. The wings are large in proportion to the body and the veins are but lines, the median veins almost obsolete. Nectaries cone-shaped with flanged opening and placed on the side of the body. Cauda more distinct than in other forms and broadly angular.

Measurements: Length of body, 2 mm.; width, .78 mm. Length of antennal segments, I, .066; II, .066; III, .33; IV, .154; V, .154; spur, .176 mm. Total length, .946 mm.

Egg.—Size not ascertained but they are covered with a powdery-like substance and resemble the eggs of *Longistigma caryæ* Harris.

Originally described by W. M. Davidson, Journal of Economic Entomology, Vol II, p. 300, 1909.

GEOMETRID NOTES—TWO NEW HYDRIOMENAS.

BY L. W. SWETT, BOSTON, MASS.

(Continued from page 164.)

Hydriomena transfigurata, nov. sp.

Palpi moderate; expanse of wings 29–30 mm.

Colour of fore wings greenish gray, in faded specimens yellow or reddish mixed in with the green. Possibly there are red and yellow varieties in series. The fore wings are quite pointed, much more so than in *H. autumnalis*, and the hind wings are quite dark. Basal band in fore wing black, running diagonally from costa to inner margin, with a slight projection at R. The basal band is more regular than in *autumnalis*, and the space between is greenish gray, where in *autumnalis* it is clear gray. The mesial band of *transfigurata* is broader than in most species of *Hydriomena*, and the usually characteristic watery, irregular central band is almost lacking or can be just faintly discerned. The general colour of the entire mesial band is green, with scarcely any central band, or, if present, represented by a round spot or series of spots. Outer or intradiscal band quite regular, running diagonally, almost directly from costa to inner margin, which it strikes farther out than in *antumnalis*. There is also a tendency in almost every specimen for the intradiscal line to unite with the extradiscal at C_1 and C_2. Discal space greenish gray with linear discal line. The extradiscal line is irregular, and is farther in from the apex of the wing than in *autumnalis*. It has also a tendency to unite with the intradiscal line near the inner margin. Outer marginal space greenish gray, with a faint trace of a black, irregular, watery line, which is narrower than in *autumnalis*, and appears as a mere trace, where in *autumnalis* it is very striking.

Hind wings quite dark and smoky gray, the usual two dark lines hardly visible.

Beneath, the markings of the fore wings shows through faintly; general colour ash-gray, speckled with black atoms. On the hind wings only the extradiscal lines show, and these but faintly.

This is a very peculiar species, quite distinct from *autumnalis*. It resembles *californiata* Pack. closely in some respects, but differs in the time of its appearance, as well as in the markings.

My attention was first attracted to this species by a unique specimen from Newfoundland, taken by Mr. Owen Bryant in early August, which I could not associate with any other. Later, my friend, Mr. William Reiff,

turned up four specimens at Forest Hills, and Mr. Bryant seven males at Cohasset, Mass., and I also took a few myself.

This seems to be a very early species, occurring with *ruberata*, and seems distinct enough from *H. autumnalis* to deserve specific rank. The peculiarly shaped fore wings, the broad mesial band and the tendency for the extradiscal and intradiscal lines to unite near the inner margin will help to separate it from any other species.

Type ♂, Forest Hills, Mass., May 16, 1911; type ♀, Forest Hills, Mass., May 11, 1911. Paratypes, 8 ♂s, 3 ♀s, Newfoundland in August; Forest Hills, Mass., May 5–11, 1911, and Cohasset, Mass., May 10, 1907, in coll. Boston Society of Natural History.

BOOK NOTICE.

MEMOIRS ON THE COLEOPTERA. By Col. Thos. L. Casey, Part III, 1912. The New Era Printing Co., Lancaster, Pa.

The third part of these Memoirs has been recently issued, the first and second parts having been published in 1910 and 1911 respectively.

This last one treats of three different families, viz: "A Descriptive Catalogue of the American Byrrhidæ," "A Revision of the American Genera of the Tenebrionid Tribe Asidini," and "Studies in the Longicornia of North America."

The first mentioned is a revision and synopsis of the family, occupying 67 pages, in which are fully described 6 new genera, 4 new subgenera, 48 new species and 10 new subspecies.

The second is a study in the tribe Asidini of the family Tenebrionidæ; to this is devoted 155 pages, in which are fully described 14 new genera, 129 new species and 28 new subspecies.

The third being studies commencing with the family Spondylidæ and embracing the Cerambycidæ as far as the genus Microclytus, 162 pages are devoted to this portion, in which are described 19 new genera, 4 new subgenera, 170 new species and 39 new subspecies.

In addition to the new genera and species, many of the older ones are described and very many useful notes are interspersed throughout; the whole forming a valuable addition to the literature on these families.

J. D. E.

Mailed June 12th, 1912.