

SPECIES OF APANTESIS.
UPPER ROW—*A. phyllira* Dru., male and female. LOWER ROW—*A. placencia* A. & S., male and female.

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NOTES ON TWO SPECIES OF APANTESIS.

BY WM. BARNES, M. D., AND J. MCDUNNOUGH, PH. D.

During March and April of this year we received from N. Carolina a number of Arctian larvæ found on lupine which could at once be recognized as representing two distinct species. The larger, and seemingly rarer of the two, was entirely-velvety black with a broken orange-red dorsal stripe, which showed in some cases a great tendency to become obsolete. It seemed most closely to agree with Abbott and Smith's figure of the larva of *A. placentia*. A reference to the literature on the subject, however, failed to clear up our doubts; Dyar, in the Journal N.Y. Ent. Soc., VIII, 42, remarks that this figure has never been verified and that no description of the larva is extant, and our search through the later literature failed to give any further data. Nothing, therefore, remained but to let Nature take its course, and to await the emergence of the imago to settle the question. The larvæ fed up well on dandelion and pupated at long intervals under a slight web on the surface of the cage. The first specimen to emerge proved a great surprise; it was a splendid male, but instead of having the fore-wings black, with several white spots, as in Abbott's figure of *placentia*, our specimen showed a very close resemblance to what we have always considered to be *phyllira*. In the course of a couple of weeks two more males similar in every particular had emerged, and we began to have wild dreams of a possible new species.

In the meantime our other group had reached maturity and pupated; they were considerably smaller and could at once be separated from the first mentioned larvæ by the fact that the tubercles were nearly all prominently tipped with ochreous, the spiracles were light orange, instead of black, and the dorsal stripe was usually broad, continuous, and creamy yellow, instead of orange-red; this latter feature, however, showed considerable variation, some of our larvæ having a much broken and reduced stripe. As these larvæ agreed fairly well with Abbott and Smith's figure of *phyllira* larva, and with Packard's description of same (Jour. N. Y. Ent. Soc., III, 178), as far as could be judged, we awaited with a good deal of impatience the first imagines, in order to carefully compare the

two species. The first specimen to emerge, a male, proved to be an almost exact counterpart of the right-hand side of Drury's figure of *phyllira* (both sides are not similar), and we had no hesitation in identifying it as such. Compared with our first species, we could note following differences: (1) in species No. 1 the medial band of primaries is distinctly outwardly oblique being much closer to the postmedial band on the inner margin than on the costal edge; in *phyllira* the two bands, when present (the medial band is often absent), are practically parallel; (2) in species No. 1 the underside of abdomen and the anal tuft are entirely black, in *phyllira* the anal tuft is bordered with cream and the underside is creamy, with two rows of black dots. Using these differences as a basis of separation, we examined the series of specimens already in the collection of Dr. Barnes under the name of *phyllira* and were able to separate out a series of each; of *phyllira* both males and females were represented; of our species No. 1, however, we noted that only males were forthcoming, when, in addition, a survey of the series of *placentia* brought to light the fact that it consisted entirely of females, we began to "smell a rat" and remember that such a factor as sexual dimorphism must always be reckoned with. In neither of the latest works on the subject (Neumoegen & Dyar Revision of Bombycid Moths, Hampson Cat. Lep. Fal., III), could we obtain any information; both authors describe *placentia* according to Abbott's figure; in fact Hampson seems to have confused the two males under the name *phyllira*, for he notes under this species that the abdomen is black beneath, a statement that does *not* hold for the true species. At last, in Stretch's plates of Arctiidae, recently published in the Jour. N. Y. Ent. Society, we came across a figure of *placentia* male, which exactly agreed with our species No. 1; others before ourselves had evidently arrived at the same conclusion; as, however, no text had been published to the figures, we were unable to determine whether the grounds for such a conclusion were sufficient; a few days later a freshly emerged typical female *placentia* in our breeding cage removed the last remnants of doubt we may have had, and proved conclusively that *placentia* shows a marked sexual difference. How far this fact is generally known we are unable to determine; we know, however, of no published statement concerning this variation, and trust that our remarks on the subject will not be entirely without interest. A reference to the accompanying plate will show more clearly than we can explain the points of similarity and difference between the species. We have been successful in obtaining two pairings of *A. phyllira* and the

young larvæ have already emerged; we have also hopes of securing a pairing of *placentia*; in any case, we have received a living female of this species from S. Carolina, which has already deposited several hundred ova.

If we succeed in breeding these species, we hope later to publish the full life histories. For the present, we append at the conclusion of this paper a more detailed description of the final stages of *placentia* and *phyllira* than given above.

As to whether *phyllira* is specifically distinct from *rectilinea* we are at present unable to judge; there seem to be certain points of difference between our description of mature *phyllira* and Mr. A. Gibson's of *rectilinea* (CAN. ENT., XXXV, 117); this may, however, be merely due to the different modes of expression used; we would be very pleased to receive eggs of the true *rectilinea* in order to try and settle the question by breeding.

Apantesis placentia (mature larva).

Head black, palpi and mouth parts slightly flesh-coloured; body velvety black, occasionally somewhat marbled with light gray; tubercles, entirely black, with the exception of I very large, rather conical from an irregular quadrate base, shiny, with bunches of stiff, black setæ, which show but few traces of spines; a broken orange-red dorsal stripe, rarely present on the thoracic segments, and often almost entirely lacking; spiracle black; prolegs reddish-pink, with a few scattered black setæ.

Length, $1\frac{1}{2}$ -2 in.

A. phyllira (mature larva).

Head black; base of palpi ochreous to reddish orange; body black, more or less strongly marbled with dark gray, often leaving portions of the ground colour showing as subdorsal black stripe just below tubercle II; laterally and ventrally lighter, due largely to increase of marbling; tubercles, especially laterally, more or less strongly tipped with pale orange or ochreous, the base remaining largely black; tubercle I very minute; others large, more regularly rounded than in *placentia*, with bunches of stiff, black, strongly barbed setæ, which show a tendency to become whitish laterally; a prominent dorsal stripe, narrow on anterior portion of segment, broadening out behind tubercle I, varying in colour from creamy to orange yellow, occasionally reduced to a series of dorsal spots; spiracle narrowly oval, orange; legs black, sometimes white-striped; prolegs orange-yellow.

Length, $1\frac{1}{4}$ - $1\frac{1}{2}$ in.

NOTES ON MYRIOPODS FROM ALASKA AND WASHINGTON

BY RALPH V. CHAMBERLIN, PROVO, UTAH.

Through the courtesy of Prof. Harold Heath and Dr. E. Bergroth, I have received for study two small collections of myriopods from Alaska and the State of Washington. The material received from Prof. Heath was collected on St. Paul Island, Alaska, during the summer of 1910. The specimens sent by Dr. Bergroth were taken by him several years ago at Snettisham, Alaska, and Bremerton and Madison, Washington.

1. *Lithobius sulcipes* Stuxberg.

Two females and a male from St. Paul Island, Alaska.

It is doubtful whether *L. stejnegeri* Bollman can be maintained as a species distinct from this one. *L. arcticus* Attems, described from Behring Island, whence Bollman's types also came, is likewise very close to and probably not different from the form described as *stejnegeri*. In the description of *L. stejnegeri*, as published in the Bull. U. S. Nat. Mus., No. 46, p. 200, the spines of the anal legs are given as 1, 3, 2, 6; but there seems little reason to doubt that the 6 is here a misprint for 0, and consequently that Attems's stated ground for separating his *arcticus* is fictitious. The claw of the female gonopods varies from practically entire, as stated by Stuxberg for *sulcipes* and by Attems for some specimens of *arcticus*, to trilobed, as in the types of *stejnegeri* and part of the specimens upon which *arcticus* was based.

2. *Lithobius iginus* Chamberlin.

1911.—*Lithobius iginus*, Proc. Acad. Sci. Phil.

Several specimens from Madison, Washington.

3. *Geophilus glyptus* Chamberlin.

1902.—*Geophilus glyptus*, American Naturalist, p. 477.

One specimen from Madison, Wash., fully agreeing with type.

4. *Geophilus glaber* Bollman.

1889.—*Geophilus glaber*, Entom. Americana, 88, p. 229.

Two specimens from Bremerton, Wash.

5. *Linotenis chionophila* (Wood).

1814?—*Geophilus acuminatus* Leach, Trans. Linn. Soc. Lond., XI, p. 386.

1862.—*Strigamia chionophila*, Journ. Phil. Acad., V, p. 50.

1909.—*Scolioptanes acuminatus* Attems, Arkiv. för Zoologi, V, No.

3, p. 25.

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A male and a female from Snettisham (Bergroth), and twenty-two females and twenty-nine males from St. Paul Island (Heath).

Specimens of the present species studied by Attems from Behring^{*} Island are said by him to be identical with the European *L. acuminatus*, excepting in the larger number of legs, and they are accordingly listed under this name. A specimen from the same island is listed by Bollman as *L. chionophila*, and specimens from Popof and Kodiak Islands and from Sitka and Lower Inlet are likewise identified by Cook. There is no room for doubt that this northern form is the typical *chionophila* of Dr. Wood, whose original specimen, a female, was taken at Fort Simpson, on the Red River of the North; but if Attems is right in his identification, as he most likely is, the name *attenuatus* will have to be used. In view of the different mode in pairs of legs, and a few other points, however, it seems best to keep Wood's designation for the present and until the forms have been better studied as to distribution and variation.

Of the 22 females from St. Paul Island, 16 have 45 pairs of legs and 6 have 43. The female from Snettisham has 45. Wood's type has 43. Of the 29 males from St. Paul Island, 27 have 43 pairs of legs, one has 45 pairs, and one has but 41 pairs. The male from Snettisham has 43 pairs. Attems states that among his specimens from Behring Island one male had 41 pairs and one 45 pairs of legs, the others having 43; while but one female had 43 pairs of legs, the others having 45. Thus it would seem that the number of pairs in the male is almost constant at 43, individuals with 41 and 45 being occasional; while in the female the typical number is 45, variation to 43 being frequent.

In the case of European specimens of *L. attenuatus*, the number of pairs of legs is nearly always smaller. In Austria-Hungary Latzel found among 60 specimens studied that all the males had 39 pairs of legs; while in the females the number was either 41 or 43. Meinert similarly gives the number of pairs of legs in the male as constantly 41, but gives the number in the female as 41 or 47 pairs, one specimen having the latter number. In Die "Myriopoden Steiermarks," Attems states that all the males studied by him from that country had 39 pairs of legs, excepting one, which had 41, while all the females had 41. The same author, however, found among specimens from Transylvania four males with 37, two males with 35 and five males with but 33 pairs of legs; and of females, nine with 39, one with 37, and seven with but 33 pairs of legs. It will be seen, then, that in European specimens of *L. attenuatus* the typical number of pairs of legs in the male is 39, and that in some parts this number seems to be fixed, or nearly so; but that in other sections variation below

this number may be frequent or the rule. Similarly the typical number for the female is 41, but variation is more frequent than in the male, the number sometimes being 43, or, in sections where the variation in the number in the male in the minus direction is frequent, falling to 37, and even to 33. Neither males nor females with 35 pairs of legs have been reported.

In the United States the form commonly referred to *L. chionophila* differs from the northern specimens and agrees with the European *L. attenuatus* in having the number of pairs of legs in the male practically fixed at 39. In the female the number varies from 41 to 37. Of 22 females from Ithaca, N. Y., the author finds six to have 41 pairs, eight to have 39 and eight to have 37 pairs.

It may be added that the number of coxal pores in specimens of the European *attenuatus* and in the form of *chionophila* found in the United States averages considerably higher than in the Alaskan specimens here listed. Of the 22 females from St. Paul Island, eight have six pores, five have five, five have seven, three have eight and one has nine; of the males, sixteen have six pores, ten have five, two have seven and one has eight. The mode is thus six pores on each side.

6. *Hypozoneum anurum* Cook.

1904.—*Hypozoneum anurum*, Harriman Alaskan Expedition, I, p. 63.

One specimen from Bremerton, Washington. The type was taken at Seattle in the same State.

7. *Paraiulus furcifer* (Harger).

1872.—*Iulus furcifer*, Amer. Jour. Sci. and Arts, IV, p. 119.

A number of specimens from Bremerton, Washington.

This is a very common species throughout the Pacific Coast region, from Southern California to Canada.

8. *Paraiulus alaskanus* Cook.

1904.—*Paraiulus alaskanus*, Harriman Alaskan Exped., IV, p. 70.

Five specimens from Snettisham, Alaska.

Previously known from Juneau, Sitka, and Yakutat Bay.

9. *Scytonotus Bergrothi*, sp. nov.

Dorsum dark brown, the prozonites often paler, light brown; a narrow dark median longitudinal line, which is usually obscure over the anterior region, but more distinct over the median and posterior segments; carinæ light brown. Venter light brown. Legs light brown proximally, darker and often of reddish tinge distad. Frontal and clypeal region of the

head pale brown or yellowish, with a dark area ventrad of the base of each antenna, and with less deep mottlings elsewhere, part of which border and delimit a narrow median pale stripe. Antennæ brown, with the last two articles commonly darker.

In the female the body is narrowed from the posterior region, cephalad to the sixth and seventh segments, where it is narrowest, again widening from there to the head. In the male the body is narrowed, both caudad and cephalad, from the middle region.

A sharply impressed median longitudinal line extends about half way across the vertex; from its anterior end two less sharply impressed lines diverge forward and outward, one running to the socket of each antenna. Vertes granulate. Frons and clypeus clothed with rather short setose hairs of uniform length.

Antennæ long; clavate, the penult article large; subdensely hirsute. First dorsal plate clearly narrower than the head, inclusive of genæ. Anterior margin semi-circular; from each carina the margin runs caudomesad in a straight line to the mesal transverse portion, which is straight. An impressed line or sulcus parallel with the anterior margin and behind the first row of tubercles. Depressed along the median longitudinal line. Carinal and caudo-lateral borders distinctly margined. Tubercles strongly developed; arranged in about eight transverse rows. Carinæ each incised, producing two blunt teeth, of which the caudal is the larger; on the margin cephalad of the anterior one a number of much smaller denticulations, some of which become obscure.

Second dorsal plate with the lateral portions bent strongly cephalad; but remaining free from the first plate. Cephalo-lateral angle rectangular in outline, but well rounded; on its anterior or antero-mesal side a minute or almost obscure denticulation, and just caudad on the lateral margin a distinct acute tooth, which is succeeded by five others, which become wider and lower in going caudad on the lateral margin, and three low teeth or crenations on the caudal margin. Carinæ sub-horizontal or a little elevated, the intercarinal portion of segment, as in subsequent metameres, strongly convex. Tubercles on all segments strongly and distinctly developed. Transverse sulcus distinct over the median portion.

Third dorsal plate very similar to the second, less strongly bent forward at the sides. Carinal margin a little shorter. Teeth very similar, but the anterior denticulations more distinct, and those of the caudal margin more strongly developed.

Fourth dorsal plate like the third; but the carinal margin longer and the teeth of the caudal margin still more strongly developed.

On the subsequent plates the entire carinal margin presents about twelve distinct teeth. In preceding caudad the caudo-lateral angles of the carinæ become first more and more rectangular, and then more and more distinctly produced caudad as usual.

Anal scutum with conical setigerous tubercles well developed; arranged in transverse rows. Each lateral margin with about seven distinct serrations. Apical process rounded distally; not decurved.

Anal valves smooth; mesal edges strongly margined. Lateral margins widely convex.

Anal scale with the lateral margins incurved. Caudal margin deeply, concavely excised, leaving at each lateral angle an acute conical projection.

Sterna with both longitudinal and transverse sulci distinct, the longitudinal one more sharply impressed.

Legs of median length; hirsute. In the male the second pair of legs of the ninth segment have a conspicuous, flattened appendage extending dorso-caudad from the distal end of the penult joint. Similar processes are present on both pairs of legs of the succeeding three segments, but the processes become progressively smaller on the legs of the thirteenth segment, being obscure or absent as such.



FIG 16.—*Scytonotus Bergrothi*, sp. nov.—Gonopods of the male seen in caudo-ventral aspect.

The gonopods of the male of the general form typical for the genus, but differing in details from those of the previously described species. (See fig. 16.)

Length, 17 mm.; width, 2.3-2.4 mm.

Locality.—Bremerton, Wash.

Five specimens collected by Dr. Bergroth, after whom the species is named.

10. *Polydesmus bonikus* Chamberlin.

1911.—*Polydesmus bonikus*, Proc. Acad. Sci. Phil.

One specimen from Madison, Wash.

11. *Leptodesmus armatus* (Harger).

1872 — *Polydesmus armatus*, Amer. Jour. Sci., 3rd ser., Vol. IV, p. 118.

A number of specimens from Madison, Wash.

TACHINIDÆ, NEW AND OLD.

W. R. THOMPSON, ITHACA, N. Y.

In the following paper are included the descriptions of two new species of Tachinidæ and some miscellaneous observations upon several described genera and species. I wish to acknowledge gratefully my indebtedness to Miss A. C. Stryke, of the Department of Entomology of Cornell University, for help with the drawing of the head of *Schizotachina vitinervis*; to Dr. A. D. MacGillivray, who suggested the method of preparing accurate figures of the wings, and very patiently went over the paper with me, offering a great many useful suggestions for its improvement; and to Dr. D. W. Coquillett, who helped me out at several difficult points, and offered much valuable advice and criticism.

Linnæmya Desv. and *Bonnetia* Desv.

Bezzi and Stein, in their Katalog der Paläartischen Dipteren, have recognized the two genera, *Linnæmya* and *Micropalpis*. They include in the genus *Linnæmya*, *comta* Fall., and two other species. They include in the genus *Micropalpis* *hemorrhoidalis* Fall., *vulpinus* Fall., and several other species. They apparently have overlooked the fact that Desvoidy had designated *silvestris*, a new species described by him, and now known to be the same as *vulpinus* Fall., as the type of *Linnæmya*. They were evidently also unaware of the fact that *comta* had been designated by Westwood as the type of *Micropalpis*. In other words, they have included under the generic name *Linnæmya*, the type of the genus *Micropalpis*, and under *Micropalpis* they have included the type and species belonging to the genus *Linnæmya*. *Micropalpis* was described by Macquart in 1834. The genus *Bonnetia*, described by Desvoidy in 1830, also has as type *comta* Fall., so that *Micropalpis* Macq. becomes, therefore, a synonym of *Bonnetia* Desvoidy. Mr. Coquillett has pointed this out in his paper, "The Type Species of North American Genera of Diptera."

As I have not had at my disposal specimens of many of the European species included in these two genera, nor even satisfactory descriptions of all of them, I cannot definitely say what characters have been used for their separation. So far as I can gather, *Linnæmya* includes only forms like *hemorrhoidalis* Fall., in which only the females possess orbital bristles, while under *Bonnetia* are placed those species of which both sexes have orbital bristles. The North American representatives of the genera, including the new species of *Linnæmya* described below, may be separated as follows:

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- Cheeks bearing black bristly hairs or macrochaetae at middle; males without orbital bristles *Linnæmya* Desv.
 Cheeks without black bristly hairs or macrochaetae at middle, with only silky, yellow pile; males with two pairs of orbital bristles *Bonnetia* Desv.

The presence of a delicate yellow pubescence on the parafacials in *B. comta* is another character which distinguishes it from the two North American species of *Linnæmya*; in rubbed specimens, however, this pubescence is sometimes very difficult to discern. In *comta* the palpi are very small, and often partially covered by the folds of the proboscis so that only their tips are visible. The palpi of *hæmorrhoidalis* are much larger, and, in comparison with those of *comta*, quite well developed, while the palpi of the new species described below are somewhat intermediate in development between those of *hæmorrhoidalis* and *comta*. The American species of *Linnæmya* may be readily separated as follows:

- Postacrostichal bristles in three pairs; sternopleural bristles three; thorax and abdomen black, covered with grayish pollen, with darker reflecting spots *hæmorrhoidalis* Fall.
 Postacrostichal bristles in one pair; sternopleural bristles four; thorax and abdomen coal black, polished, very thinly grayish dusted *anthracina*, n. sp.

L. hæmorrhoidalis is the species referred to in Mr. Coquillett's "Revision," p. 87, under the name *picta* Meig. The latter species is now considered by European authors to be a synonym of *hæmorrhoidalis*.

Linnæmya anthracina, n. sp.

Thorax, legs and abdomen black, polished, very thinly dusted with whitish pollen, the apical half of the scutellum and a small spot on the side of the second abdominal segment in the male red; calypteres deep yellow.

Front in male about two-thirds, in female about five-sixths as wide as the eye, frontal vitta dark brown, thinly dusted with whitish pollen; face and front black, in the male silvery-gray pollinose, in the female the pollen present on the parafrontals only on a small space above the base of the antennæ, and as a narrow strip along the margin of the eye, fading out opposite the apex of the ocellar triangle, remainder of the parafrontals polished black; frontal bristles descending nearly to the apex of the second antennal segment, only a few fine hairs outside the frontal row in the male, in the female type three strong orbital bristles on one side, and

two, separated by a wide space, on the other; antennæ reaching at least three-quarters of the distance to the oral margin, black, including the arista, and thinly dusted with whitish pollen; second segment slightly shorter than the third; arista thickened on the basal three-fourths, its second segment a little over twice as long as wide; parafacials and cheeks thickly, the facial plate and occiput rather thinly silvery-gray pollinose, cheeks below the end of the eyes and the extreme edge of the oral margin tinged with reddish; vibrissæ situated well above the oral margin, which projects beyond the vibrissal angles for a distance greater than half the length of the second antennal segment; oral margin caudad of the vibrissæ, with a row of strong macrochætæ, facial ridges bristly on the lower fifth; width of cheeks equal to about one-half of the height of the eye, cheeks with black bristles and bristly hairs at middle; palpi small, in female type not much longer than, in male co-type about twice as long as, the greatest diameter of the mediproboscis, their surface black, thinly whitish-dusted.

Mesonotum black, appearing when viewed from above polished, appearing thinly dusted with grayish pollen when viewed from behind; pollen becoming more dense anteriorly and upon the humeri; anterior part of the mesonotum indistinctly vittate; pleura very thinly whitish-dusted; four sternopleural bristles, formula 1: 2: 1, three pairs of postsutural and but one pair of postacrostichal bristles; scutellum polished, with rather more than the apical half red, the remainder blackish, three strong marginal, a pair of weak discal, and a pair of cruciate apical macrochætæ, the latter backwardly directed; legs black, polished, thinly dusted with grayish pollen, coxæ faintly tinged with reddish, claws and pulvilli in male elongate, in female short, anterior tarsi of the female broadened and flattened, middle tibiæ with several strong macrochætæ on the front side near the middle; calypteres orange; wing venation as in *L. hæmorrhoidalis* F., the wings grayish tinged, the veins dark brown, bordered with dilute brownish, four or five bristles at base of R_{4+5} , and the median cross-vein almost straight.

Abdomen black, polished, very thinly grayish dusted; the pollen only apparent when the specimen is viewed from behind; in the male a small spot on each side of the abdominal segment red; second segment with strong median discal and marginal macrochætæ, and third segment with median discal discals and a marginal row of macrochætæ; fourth segment rather thickly covered with macrochætæ; sides of abdomen with both discal and marginal macrochætæ, more prominent in

the female; hypopygium of male prominent, the unchitinized portions reddish tinged. Length, 9 mm.

Described from one male and one female received from Dr. C. Gordon Hewitt, Division of Entomology, C. E. F., Ottawa, Canada. Specimens bred by Mr. Arthur Gibson from larvæ of *Hyphoraia parthenos* Harris, received from Mr. H. Dawson, Hymers, Ontario, Canada. Type, the female, No. 13,387 of the United States National Museum collection. Male co-type in collection of Division of Entomology, Department of Agriculture, Dominion of Canada. This species, which is very distinct, resembles *Lydina areos* Walk. in colour characters, but it is not so highly polished.

Schizotachina Walk. and *Acronarista* Town.

From a lot of the needles of *Pinus rigida* Mill. infested by larvæ of the Tineid *Paralechia pinifoliella* Chamb., collected by Mr. W. F. Fiske near Lowell, Mass., there issued, with some interesting hymenopterous parasites, a number of specimens of a small Tachinid. By the table to genera in Mr. Coquillett's "Revision," these specimens were determined as *Schizotachina*, but on comparison with a male specimen of *S. convecta* Walk., in the collection of the Boston Society of Natural History, they were found to differ from the latter species in having the vein M_{1+2} missing beyond the bend. The specimen of *convecta* had M_{1+2} distinct to the tip. Mr. Coquillett kindly examined the specimens in the United States National Museum collection, and found nine specimens which had been placed in the *convecta* series, having M_{1+2} obsolete beyond the bend. Since then I have examined these and find that they agree with my specimens. In all I have examined twenty-eight specimens of the form described below and six of the form which I identify as *convecta*. The species may be separated as follows:

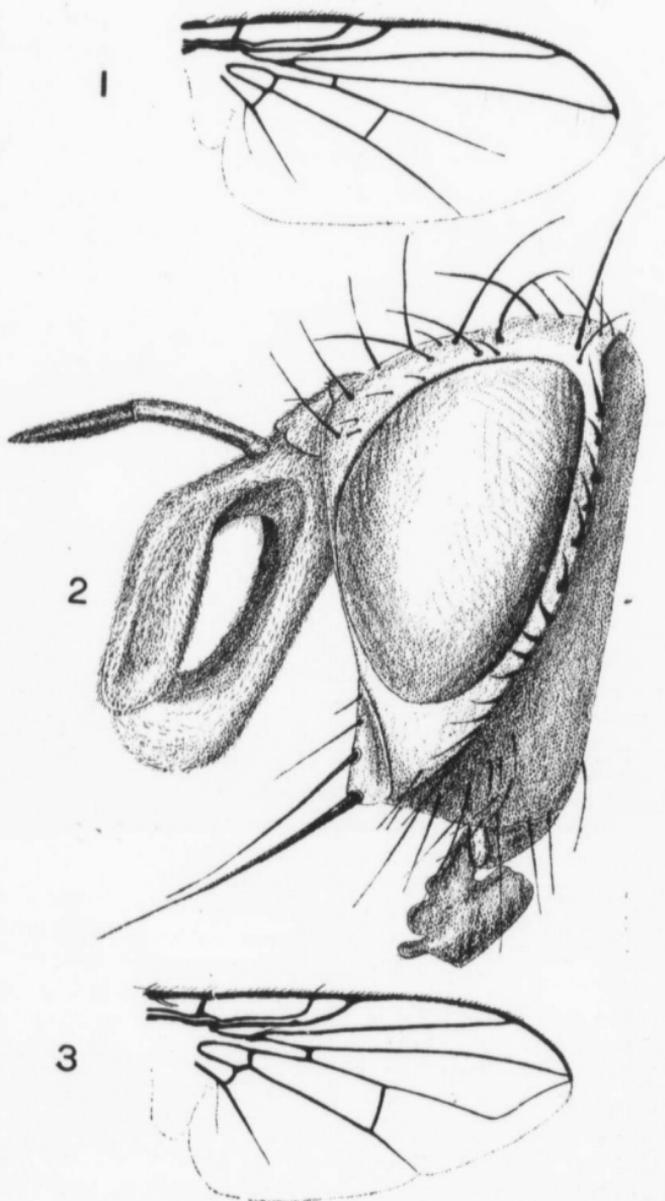
Vein M_{1+2} distinct to the margin of the wing *S. convecta* Walker.

Vein M_{1+2} missing beyond the bend *S. vitinervis*, n. sp.

Schizotachina vitinervis, n. sp. (Fig. 1, wing; 2, head.)

Black, less frequently partly or largely reddish, head and thorax bluish-gray pollinose, abdomen polished, only the narrow bases of the segments white pollinose; legs somewhat polished, thinly dusted with grayish pollen; palpi yellow; third antennal segment in male divided longitudinally, in the female more or less broadened and flattened; vein M_{1+2} entirely wanting beyond the bend.

Head at least twice as broad as long, front in the male broad, at narrowest part at least one and one-half times as wide as the eye; frontal



Schizotachina vitinervis, n. sp.—Fig. 1, wing; fig. 2, head.
Schizotachina convecta, Walk.—Fig. 3, wing.

vitta brownish, dusted with grayish pollen; two strong proclinate ocellar bristles; frontal bristles descending to insertion of arista; outside the frontal row two proclinate orbital bristles and a number of short black bristly hairs in both sexes; facial plate widening very strongly below, the parafacials at lower corner of eye almost linear; facial ridges ciliate on the lowest fourth; oral margin, cheeks and the occiput on and near the margin with black bristles; width of the cheeks less than one-half the height of the eye; head at vibrissal angles shorter than at base of antennæ; front, face, cheeks and occiput covered with bluish-gray or lead-coloured pollen; antennæ reaching to oral margin, which is not produced, second segment short, third about five or six times the length of the second segment, in the male cleft almost to the base as in *S. convecta* Walk.; the outer ramus, which bears the arista at its base, is laterally compressed and at a point about one-third of its length from the base, convex on the outer and concave on the inner edge, the lower two-thirds of the outer ramus perceptibly directed downward and inward toward the tip of the inner ramus; inner ramus rather broad, and antero-posteriorly compressed; when the antenna is retracted, the inner side of the inner ramus is closely appressed to the facial plate, and only its tip is visible from the side; inner ramus gently arcuate on its proximal three-fourths, the distal fourth bending forward, its tip reaching a little below the tip of the outer ramus, the two sometimes touching; antennæ dark brown, in some lights grayish silvery; female with the third antennal segment entire, not cleft, from one-third to about half as wide as long, more or less broadened and flattened, the lower hind corner rounded, the front corner angular, sometimes more or less projecting, the segment in some specimens more or less reddish tinged, especially along the inner border; arista basal, dark brown, with very short whitish pubescence, thickened almost to the tip, its first segment short, second segment subequal or two-thirds the length of the third; palpi varying from yellow to brownish, more or less flattened, in some specimens about half as wide as the proboscis.

Thorax in ground colour black, rarely reddish tinged. covered with bluish-gray, lead-coloured pollen, including the pleura; with two strong and two weak sternopleural bristles; with three postsuturals and one postacrostichal; the mesonotum also with numerous short suberect bristly hairs; scutellum concolorous with mesonotum; with two pairs of strong lateral and a pair of weak apical macrochætæ, and numerous strong, bristly hairs.

Legs black, rarely reddish, thinly grayish dusted; claws and pulvilli in both sexes short; hind tibiæ not ciliate, with a row of bristles of irregular length; middle tibiæ bearing a single macrochaeta on the front side near the middle.

Wings hyaline, subcosta entering costa at an acute angle, third vein with a single long bristle at base, anterior end of median cross-vein at end of first third of the distance from the radio-medial cross-vein to the bend of M_{1+2} ; M_{1+2} entirely wanting beyond the bend; calypteres whitish.

Abdomen black, polished, only the narrow bases of the segments white pollinose, the fasciæ generally interrupted medially; first three segments with marginal and fourth with discal and marginal macrochaetæ; abdomen with many rather strong bristly hairs, mostly appressed, when erect having in some specimens the appearance of discal bristles: hypopygium black, polished, thinly dusted with grayish pollen. Length, 2.5-3 mm.

Described from 15 males and 13 females, as follows: 1 female from Bisc. Bay, Fla., Mrs. Slosson coll.; 1 male bred by Mr. A. Busck from *Aristotelia roseosuffusella* Clemens, issued July 28, 1902; 2 males and 5 females, Nos. 16a and 16aa, labelled "par. on Tineid of *P. australis*, iss. Feb. 20, 21, 1880"; 12 males and 7 females, G. M. L., No. 2267T, bred from larvæ of *Paralechia pinifoliella* Chamb., infesting leaves of *Pinus rigida*. Material collected by Mr. W. F. Fiske near Lowell, Mass. Type, 1 male and 1 female from the last mentioned series, Gipsy Moth Lab., No. 2267T. Type No. 13398, U. S. N. M.

Schizotachina convecta Walker. (Fig. 3, wing.)

There seems to be no doubt that the specimens in the U. S. N. M. collection, which remain after the separation of *S. vitinervis*, represent the species described by Walker. In the wings of typical specimens the subcosta enters the costa perpendicularly, and the position and inclination of the median cross-vein are as shown in the accompanying figure; the facial ridges are strongly ciliate on almost the lower two-thirds, and the third arisal segment is twice as long as the second. However, among the half dozen specimens I have examined, I find some which have the facial ridges ciliate on only the lower third. The median cross-vein varies in position from one-third to one-half the distance from the radio-medial cross-vein to the bend of vein M_{1+2} . Vein M_{1+2} is always quite distinct to the margin of the wing, but the close relation of the species to *vitinervis* is evidenced by the fact that the part of the vein beyond the bend is weaker than the penultimate section. I have, therefore, refrained from

adding a new genus for the reception of *vitinervis* to the already too long array of Tachinid genera.

There are no definite host records for *convecta*. One specimen, G. M. L., No. 2152E, June 29, '10, bred at the Gipsy Moth Parasite Laboratory, issued from a box of material from which an adult of *Tortrix albicomana* Clem. afterward emerged, and it is possible that the Tachinid developed in another larva of the same Tortricid.

The determinations of the microlepidopterous hosts are by Mr. August Busck, to whom I am much indebted.

(To be continued.)

A NEW PSEPID WASP FROM PERU.

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

Psenulus (Neofoxia) Townsendi, new species.

Piura, Peru, April 2nd, 1911. (C. H. T. Townsend).

♀.—Length a little over 6 mm.; black, with the second abdominal segment above and below, and the third (except a broad apical triangle of black above, nearly reaching basal middle) bright ferruginous; extreme apex of first segment also red at sides; inner orbital margins strongly convex; face covered with silvery hair; scape black; flagellum pale, dull reddish beneath, strongly infuscated above, not so robust as in *M. Eressoni* Packard; vertex shining; cheeks with silvery hair; mesothorax shining, minutely and sparsely punctured; scutellum very smooth and shining; postscutellum with brilliant silvery hair; area of metathorax triangular, with a few ridges, the same kind of sculpture continued on sides of metathorax; mesopleura with silvery hair; tegulae pale yellowish; wings hyaline, very iridescent; *second r. n. meeting second t. c.; submedian cell of hind wings squarely truncate at end*; knees, anterior tibiae, hind tibiae broadly at base and narrowly at apex, and the tarsi, pale ferruginous; petiole of first abdominal segment rather short.

♂.—Flagellum long and slender; abdomen long and cylindrical, black, with the second segment at apex, and the third and fourth slightly, ferruginous. Easily known from *P. medius* Smith by the sparsely punctured thorax.

Type.—Cat. No. 14096, U. S. Nat. Mus.

[This species belongs to the group of Nearctic species, composed of *tibialis* Cresson, *suffusa* Fox and *Sayi* Rohwer, which is characterized by the narrow pygidium, no tubercle between the bases of the antennae, slender petiole, which is nearly as long or longer than the rest of the first segment. (S. A. Rohwer.)]

August, 1911

THE PREPARATION OF A CATALOGUE OF THE INSECTS OF CANADA.

BY C. GORDON HEWITT, D. SC., DOMINION ENTOMOLOGIST, OTTAWA.

At a meeting of the Executive Committee of the Entomological Society of Ontario, held at Guelph, Ont., on November 4th, 1910, it was unanimously agreed that the preparation of a catalogue of Canadian insects was desirable, and that such a list should be dedicated to Dr. C. J. S. Bethune, in recognition of his long and valuable services to Canadian entomology as editor of THE CANADIAN ENTOMOLOGIST. A special committee of the society was appointed to arrange for and take charge of the work of preparing the proposed catalogue.

The following members constitute the committee: Dr. E. M. Walker (Pres.), Dr. C. Gordon Hewitt (Vice-Pres.), Messrs. G. Chagnon, N. Criddle, J. D. Evans, Arthur Gibson, W. H. Harrington, T. D. Jarvis, H. H. Lyman, G. A. Moore, G. E. Sanders, J. M. Swaine, A. F. Winn, F. H. Wolley-Dod, and Prof. T. D. A. Cockerell.

Suggestions as to the form and scope of the catalogue, and the method of preparation, were drawn up and submitted to the members in a circular, issued on March 10th, 1911, with a request that it should be considered, and that further suggestions should be submitted.

Opinions on the suggestions which were submitted, and further suggestions on the part of members of the committee have resulted in the formation of the following scheme, which will be adopted in the preparation of the catalogue, as they represent the views of the majority of the members.

1. The list will be entitled, "A Catalogue of the Insects of Canada and Newfoundland," and it will include all species known to occur in Canada (including Labrador) and Newfoundland, whether previously recorded or not. Alaskan species will not be included, but may be published as an appendix.

2. The various species will be classified under the orders, sub-orders, families, sub-families, and genera, in ascending order wherever possible. The arrangement of the genera will be systematic and, so far as is possible, the species also.

3. The names will be given of the authors of all generic and specific names mentioned, with the date (year) in the case of each genus.

4. Under each species will be given:

(a). A reference to one or two good descriptions of the insect, not necessarily the original one; these will be descriptions which

- are as accessible as possible. If possible reference will be given to a good published figure, and if such is contained in one of the references it will be indicated by the addition of (fig.) after the reference.
- (b). The geographical distribution within Canada and Newfoundland; this will be indicated, as a rule, by Provinces, in order from East to West, e. g., N. S., Ont., B. C., etc. The characteristic faunal zones inhabited by the species will be indicated, so far as it may be possible, by abbreviations; thus: Ar.—Arctic, H.—Hudsonian, C.—Canadian, T.—Transition.* Where a species is known from a few localities only, the names of these will be given with the name of the captor in cases where the species recorded is of great rarity.
 - (c). If the type locality of a species is Canadian it will be given, and the places where type specimens of Canadian species are deposited will also be given when possible.
 - (d). The Latin name of the chief food plants will be given in the case of the Lepidoptera, Cecidomyidæ, Aphidæ, Coccidæ, phytophagous Hymenoptera and Coleoptera. (Gray's New Manual of Botany, 1908, will be used throughout for the names of the food plants).
 - (e). In the case of parasitic species the name of the host or chief hosts will be given wherever known.
5. Recent important changes in synonymy will be noticed.
 6. In the case of new and previously unpublished records the collector's name will be given in every case.
 7. No species of which there is no trustworthy record or specimen available is to be included.
 8. Fossil species will be included, and also introduced species, including greenhouse species, but the fact that they have been introduced will be indicated in those cases in which the fact is known.
- The work of preparing the catalogue will be divided among the members, approximately, as follows:
- Aptera, Orthoptera and Neuropteroid Orders.—Dr. E. M. Walker.
 Hymenoptera.—Messrs. W. H. Harrington, G. E. Sanders, and Prof. T. D. A. Cockerell.
 Coleoptera.—Messrs. J. M. Swaine, G. Chagnon, N. Criddle, and J. D. Evans.

It is intended to publish a map indicating these zones at an early date in this journal.

Lepidoptera.—Messrs. Arthur Gibson, H. H. Lyman, A. F. Winn, and F. H. Wolley-Dod.

Diptera and Aphaniptera.—Dr. C. Gordon Hewitt.

Hemiptera.—Prof. T. D. Jarvis, and Mr. G. A. Moore.

These members will be responsible for the lists prepared by them, and such lists will be published under their names. In the preparation of such lists it will be necessary to seek the co-operation and assistance of other specialists and all such assistance will be fully acknowledged.

The division of the work in the different orders will be systematic rather than according to the geographical regions in which the members may be located; this will necessitate the co-operation of workers in different regions.

In the compilation of the catalogue it is intended to index the species on the regular card, catalogue cards 5 in. x 3 in., which will be supplied to the members. A single species will be listed on each card. The card will thus contain the information which it is intended to include in the catalogue. For example, the Spruce Budworm, *Tortrix fumiferana* Clemens, would be indexed and listed as follows:

T. fumiferana Clemens.

Proc. Ent. Soc., Phila., v 139, 1865.

U. S. Ent. Comm., 5th Rep., pp. 830-838 (Packard), 1890.

Dist.: Eastern Can., Man., B. C.

Food Plants: Abies, Picea, Pseudotsuga.

The catalogue will be published, under the editorship of the writer, by the Geological Survey of Canada, by arrangement with and the consent of the Minister of Mines and the Director of the Survey. It will appear in parts as the different orders, or families, in the case of large families, are completed, and its publication will necessarily extend over a number of years.

NEW COCCIDÆ WITH NOTES ON OTHER SPECIES.

BY E. M. EHRHORN, HONOLULU, HAWAII.

Kermes shastensis, n. sp.

Female scale enveloped in a thick white, brittle, waxy secretion, making scale very striking and easily detected on the twigs of the trees. Scale round about 5 mm. in diameter. After removing waxy secretion, colour of scale is mahogany brown, very shiny, with usually three distinct dark brown lines across the dorsum. Derm, after boiling in K. O. H.,

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remains light brown, with numerous round glands consisting of 6 or 7 small openings in a circle. Antennæ very small and indistinctly 6 jointed. Joint 5 apparently shortest, joint 3 longest, the whole antenna measuring 160 μ . Joint 6 has several stout hairs. Legs short and stout, with a few hairs. Femur very much swollen, almost as broad as long. Tibia 40 μ , tarsus 80 μ , claw rather stout and slightly curved.

Larva lemon-yellow of the usual type. Antennæ well developed, quite stout, 6 jointed, joint 6 as long as 3 + 4 + 5. Joint 1 and 2 subequal, joint 4 and 5 subequal. Formula 63 (12) (45), also 6 (123) (45). Legs short and stout. Caudal lobes well formed, with long setæ. Larvæ found in body of female.

Habitat.—On *Quercus chrysolepsis*, Shasta Springs, Siskyou Co., California.

Eriococcus eriogoni, n. sp.

Female enclosed in a closely felted, white sac, about 2½ mm. long and 1½ mm. broad. Female naked, shiny, chestnut brown. When seen through lens, quite bristly, segmentation very distinct. When boiled in K. O. H., body turns crimson and derm becomes transparent, all chitinous parts remaining light brown. Antennæ short and stout, 6 jointed, with joint 3 longest, longer than joints 4 + 5 + 6. Joint 2 about twice as broad as long. Joints 4, 5 and 6 are much narrower than joints 1, 2 and 3. The following formulæ have been observed: 3, 1, (2, 6) (4, 5)–3 (1, 6) 2, (4, 5)–3, 1, 6, 2, (4, 5). The following measurements in μ have been observed: Joint 1, 36; 2, 32, 28; 3, 80, 92; 4, 20; 5, 20; 6, 32 and 36.

Dorsum thickly covered with conical spines, varying in length from 28 μ to 42 μ . Caudal lobes well developed, with very long, stout setæ, about 280 μ , and two very stout spines and several long bristles. Anal ring ordinary, with 8 long, stout hairs. Legs short and stout, with the following measurements in μ : Coxa 100; trochanter plus femur 188; tibia 104; tarsus 120. Trochanter with a stout bristle measuring 60 μ . Claw stout and slightly curved, with denticle on inner curve. Digitules of tarsus long, fine-knobbed hairs, reaching to end of claw, those of claw, fine-knobbed hairs, reaching beyond claw. The legs are quite hairy.

Habitat.—On *Eriogonum stellatum* stems close to the ground. Flagstaff, Arizona.

Eriococcus salinus, n. sp.

Young larvæ rose coloured, very active. Antennæ stout, 6 jointed, each joint with several fine hairs. Joint 6, with numerous stout hairs at

apex, ending with stout spine. Formula: 6, 1, (2, 5) 3, 4. Measurements in μ are 1-40; 2-28; 3-24; 4-20; 5-28; 6-68. Legs long and stout. Coxa almost twice as broad as long, tibia shorter than tarsus, claw slender and slightly curved. Digitules fine hairs. Trochanter with long hair and tibia with two stout spines near distal end.

Caudal tubercles quite prominent, with long setæ. Anal ring with the usual hairs and a number of shorter spines. Adult female in sac about 5 mm. long and 2 mm. broad, tapering almost pyriform, snow-white of dense cotton. Dead female removed from sac reddish brown, segmentation distinct, about $4\frac{1}{2}$ mm. long, 2 mm. broad, convex above. Body almost void of powdery secretion and somewhat shiny. After gestation, body shrivels and sac becomes filled with loose cotton, in which the eggs are laid. When boiling in K. O. H. body turns cardinal, derm becomes colourless, with numerous small, round glands and fine spines. Antennæ 6 jointed, joint 1 much broader than long, joint 6 longest, then 1, then 2 and 3, which are subequal, joint 4 being the shortest. Formula: 6, 1, (2, 3) 5, 4. Measurements in μ are as follows: 1-64; 2-40; 3-40; 4-24; 5-35; 6-68. Some specimens have joint 6 subequal with joint 1 and joint 5 subequal with 2 and 3, so that the following formula is noticed: (1, 6) (2, 3, 5) 4. Each joint has several hairs, and joint 6 has a whorl of hairs at apex.

Legs short and stout, coxa broader than long, trochanter with spine about as long as tarsus. Tarsus quite hairy, claw long and sharply curved, digitules fine hairs. Anal ring about 80μ in diameter, quite pronounced, with 6 long, stout hairs about 160μ long. Caudal tubercles not conspicuous, with long setæ about 200μ and with numerous spines and round glands.

Habitat.—On grass roots (*Distichlis* sp.?) in salt marsh, Alameda shore, Alameda, California. July 25, 1906.

Sphaerococcus cupressi, n. sp.

Adult female imbedded in a pit between the dry and growing bark, lying on and covered with cottony secretion, hiding the entire insect. Body about $1\frac{1}{2}$ mm. long and about 1 mm. broad, quite convex, resembling a *Diaspine* in outline. Colour pale pink, more or less transparent. When placed in boiling K. O. H., turns dark red, and after boiling derm becomes transparent.

Antennæ 6 jointed, short and stout. Joint 6 with numerous stout hairs. Some of the measurements in micro-millimeters of the joints are

as follows: 1, 24-20-20; 2, 24-23-24; 3, 32-24-20; 4, 20-16-12; 5, 24-16-16; 6, 44-36-32. The following formula have been observed: 6, 3, (1, 2, 5), 4-6, 3, (1, 2), (4, 5)-6, 3, 5, (1, 2, 4)-6, 2, (1, 3), 5, 4.

Legs short and stout, tibia and tarsus subequal. Trochanter with a slender spine, tibia with two spines, which extend half the length of tarsus. Claw long and slender, digitules long, fine-knobbed hairs, reaching beyond claw. Anal opening very small, hairless. There are several small spines near opening. Margin beset with small spines at intervals of about 60μ . Caudal end of body shows many circular spinnerets and numerous fine spines.

Young larva light yellow, very active. Antennæ 6 jointed. Joint 6 longest, then 3; joint 1 and 2 subequal; joint 4 and 5 subequal. Joint 6 with several stout hairs at end. Legs short and stout. Tarsus a trifle longer than tibia. Femur + trochanter almost twice as long as tarsus. Numerous stout hairs on each segment. Caudal setæ very stout and 160μ long. There are several stout hairs between caudal setæ.

Habitat.—Under the dry bark and in crevices on the trunk of *Cupressus macrocarpa* at Niles, Alameda Co., San José, Santa Clara Co., Feb., 1903, and at Belvedere, Marin Co., California, 1908.

Ceroputo Koebeli, n. sp.

Adult female thickly covered with white secretion. The specimens were received alive in rather bad condition, but after feeding and resting the insects reconstructed a large cottony sac, almost like a large *Pulvinaria*, in which eggs were laid. One individual measured, with sac, 10 mm. long and 4 mm. broad. Adult female is about 4 mm. long by about $2\frac{1}{2}$ broad at posterior end, narrowing cephalad a little. Body not very convex, dorsum quite rugose, segmentation distinct, posterior margin with deep cleft. After boiling in K. O. H., the derm becomes almost colourless except the area surrounding the marginal spines, legs, antennæ and mouthparts, which remain a dark brown. Antennæ 9 jointed, each joint with several long, fine hairs, joint 9 with several stout hairs near apex. Joint 3 longest, about twice as long as 2, joints 4 and 5 subequal, and joints 7 and 8 subequal. Measurements in micro-millimeters are as follows: 1-40, 2-40, 3-75, 4-55, 5-54, 6-48, 7-38, 8-35, 9-47. Formula approximately 3-4-5-6-9-(1-2) 7-8; or 3-(4-5) 6-9 (1-2) (7-8). Legs long and stout and quite hairy. Trochanter + femur very little longer than tibia. Tarsus less than $\frac{1}{3}$ of tibia, claw very strong, with well developed tooth, digitules not reaching to end. Spine on trochanter about as long as the outer curved margin of it.

Eggs light lemon-yellow.

Young larvæ lemon-yellow, covered with the usual cottony secretion and marginal tufts. Dorsum with three carina running longitudinally, marginal tufts composed of two and three joined filaments, resembling *Orthesia*. Legs dark brown, quite hairy. Tibia very little longer than tarsus, trochanter with long, slender hair. Margin with dark brown glands composed of short, stout spines, usually 3 in number. Antennæ 7 jointed, each joint with several long hairs. Formula: 7-3-5-(4-6) 2-1.

Habitat.—On *Quercus englemanni*, Benson, Arizona, A. Koebele, Mar. 25, 1907.

Trionymus californicus, n. sp.

Female elongate parallel-sided about $1\frac{1}{2}$ -2 mm. long by about $\frac{1}{2}$ mm. broad, slightly covered with white powdery secretion, not hiding segmentation. Colour of body lemon-yellow. Where insects are found between the sheaths, there is quite a lot of white powdery secretion, no ovisac present, female body containing young.

When placed in boiling K. O. H., body turns crimson and after boiling is colourless.

Antennæ 8 jointed, each joint with several short, fine hairs. There is quite a variation in the segments, even on the same specimen. The following formulæ have been found:

Joints in μ : 1-48, 2-48, 3-32, 4-24, 5-32, 6-28, 7-36, 8-64. Formula: 8(12) 7(35) 6.4, also 1-40, 2-28, 3-24, 4-24, 5-16, 6-28, 7-68. Formula: 7.1. (2.6) (3.4) 5. Also 1-48, 2-48, 3-36, 4-28, 5-28, 6-28, 7-32, 8-80. Formula: 8. (1, 2) 3. 7. (4, 5, 6). Joint 8 ending in long bristle about $\frac{1}{2}$ its length, antennæ about 200 μ apart.

Legs short and stout, quite hairy, middle leg about 400 μ long, tibia twice as long as tarsus. Anal ring quite large, with 6 hairs (80 μ), lobes very low, with long bristle (80-90 μ), and two stout spines, several hairs and numerous spinnerets. Margin sparsely set with short, curved spines. Digitules of tarsus long, fine-knobbed hairs, those of claw curved clubs.

Habitat.—On *Festuca* sp., near Lathrop, California.

XVLOCOCCUS MACROCARPÆ Coleman.—(Journal N. Y. Ent. Soc., Vol. XVI, p. 198).

I found this species very abundant on *Libocedrus decurrens* at Sisson and Shasta Springs, and also on the same plant in the Yosemite Valley, Cal. This insect was doing considerable damage to young trees; this was

especially true where new forest was forming and where the young trees were close together and well shaded.

ORTHEZIA CALIFORNICA Ehrh.—(CAN. ENT., XXXVIII, p. 329).

A new locality for this species is on Mt. Tamalpais, Marin County, California, collected by Dr. E. C. Van Dyke.

ERIOCOCCUS HOWARDI Ehrh.—(CAN. ENT., XXXVIII, p. 331).

Received specimens collected by Mr. E. K. Carnes on *Quercus* sp., Cachecreek, Yolo County, California.

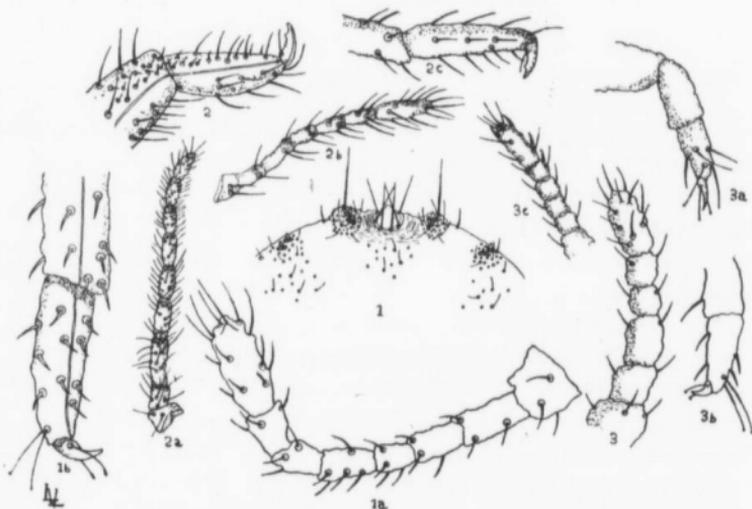


FIG. 17.—New Coccidæ, Ehrhorn.

EXPLANATION OF FIG. 17.

1. Caudal lobes of *Trionymus californicus*.
- 1a. Antenna of adult female of *Trionymus californicus*.
- 1b. Tarsus and claw of adult female of *Trionymus californicus*.
2. Tarsus and claw of *Ceroputo Koebelei*.
- 2a. Antenna of adult female of *Ceroputo Koebelei*.
- 2b. Antenna of larva of *Ceroputo Koebelei*.
- 2c. Tarsus and claw of larva of *Ceroputo Koebelei*.
3. Antenna of adult female of *Sphaerococcus cupressi*.
- 3a. Tibia, tarsus and claw of adult female of *Sphaerococcus cupressi*.
- 3b. Tarsus and claw of larva of *Sphaerococcus cupressi*.
- 3c. Antenna of larva of *Sphaerococcus cupressi*.

FURTHER NOTES ON ALBERTA LEPIDOPTERA.

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

(Continued from page 236.)

170. *H. sora* Smith.—Vide notes under previous species. Banff, July 16th to 22nd, several specimens, from Mr. N. B. Sanson. The difference in dates of the Banff specimens is evidence in favour of distinctness of this form from No. 169. My remarks concerning *auranticolor* in my original note on this species (XXXVII, p. 21, 1905) should be disregarded.

171. *H. montana* Smith appears to be the correct name for this species, which is sometimes a day-flier at snowberry flowers on the prairies. *Montana* was described from Colorado as a probable variety of *inordinata*, and stands as a variety in Smith's Catalogue and Check List, and as "ab. 2" of that species in Hampson. Prof. Smith states that his type is in the Washington Museum. The specimen there bearing the Museum "type" red label is marked "? Type" on another label, and comes from Platte Canyon, Colo. A Denver, Colo., specimen in my own collection is exactly like some of my local series. *Inordinata* was described from Massachusetts, and most eastern specimens that I have seen are darker, and have maculation much more distinctly cut and contrasting, and have a somewhat strigate appearance. Some Colorado specimens that I saw in Prof. Smith's collection appeared about intermediate, so I do not wish to challenge the specific reference. But the only eastern specimen in my collection, from Stonnington, Conn., differs from my Colorado and local series much more than many eastern and western forms do from each other which are claimed to be good species. Hampson's figure seemed to me to be too even and brown for any specimen that I compared with it in the British Museum, but Massachusetts is given as the locality in the key to the plate. Except in having a distinct postmedial line on secondaries, it much more nearly resembles *montana* than most eastern specimens that I recollect having seen.

The type of *semilunata* Grote is a female in the British Museum from Washington Territory. It is grayer and more suffused than any of the specimens above mentioned, and lacks the reddish brown shades on primaries. My notes indicate that I thought it very probable that it might be a smoky dark female of *inordinata*. But a female from Washington stood under *semilunata* in the New York Museum, mixed with *montana*, which I noted was "dark, suffused, even and distinct" (*i. e.*, from

montana), though I did not compare it with Hampson's figure of *semilunata* type.

172. *H. allecto* Smith.—This was described from six specimens from Calgary, Alta.; Brandon, Man.; and Volga, S. D., which were stated to be like *mactata*, but black and gray instead of brown. In my original notes I stated that I had brown Alberta and Manitoba specimens, and in a bracketed note appearing a few pages further on, which I added in the proofs and intended as a footnote, I expressed doubt as to the validity of *allecto* as a species. I still maintain this view, and have several western prairie specimens, which grade through to the grayest forms, which could not possibly be distinguished from my Pennsylvania series without the aid of the labels. I have not taken the species here for some years, but some of my oldest specimens are my grayest. I have strong suspicions, however, that the gray specimens are apt to fade, especially as my notes tell me that the types which I examined at Washington in February, 1910, are distinctly brown. I should have called the male type from Brandon typical *mactata*, and the female type is scarcely grayer.

173. *H. egens* Walk. appears to be a prior name to *transfrons* Neum., as Sir George Hampson makes it. Walker's type is a badly rubbed specimen from "Hudson's Bay (Barnston)" according to the catalogue. This may mean close to the borders of Ontario, as many similar records do. *Bridghami* G. & R. is a close ally probably occurring in that region, of which I have no specimens in my collection. The type of *transfrons* is presumably in the Neumægen collection at Brooklyn, as stated in Smith's Catalogue, but I have no note of having seen it there. It is attributed to "B. C.," but that may mean Alberta. I never saw an authentic B. C. specimen.

174. *H. albertina* Hamps. (Cat. VII, 413, 1908)—Sir George Hampson has thus named this species from Calgary and Aweme, Man. specimens, making a Calgary male the type, and placing it, together with *claudens* and *hillii*, in the genus *Eremobia* Steph. He characterizes *albertina* as having ground colour bluish white and orbicular very oblique, as against ground colour gray and orbicular less oblique in *claudens*, of which he figures the type, a male from St. John's, Nfld. My own notes add that in type *claudens* the discoidal spots lack the pale annuli present inside the blackish defining lines in *albertina*. Type *leucoscelis*, which Hampson makes a synonym of *claudens*, is a female from Racine, Wis., and is like *claudens* but darker. I have a very pale series

from Vancouver Island which seem to answer Sir George Hampson's figure and description of *hillii* Grt., which he makes distinct on strength of a single male from Lewis Co., New York, from the Hill collection, not the type. The "*claudens*" recorded from Kaslo in the Record for 1906 was on my authority. But it was compared and agreed with my Calgary series, and must therefore be *albertina*. I am short of outside material in this group, and further notes will not be of much value at present. The *claudens* of the Washington Museum appeared to me to be the *hillii* of Hampson.

175. *Polia contacta* Walk.—The form occurring here is bluer gray than typical *pulverulenta*, which was described from Colorado, or than true *contacta* = *diffusilis*, the former type being from St. Martin's Falls, Hudson's Bay Territory, and the latter from Lewis Co., N. Y. Sir George Hampson had only a single Calgary male as *pulverulenta*, of which the figure is not good. In the tables he separates them by a darker termen in *contacta*, against concolorous in *pulverulenta*. Many of my local specimens have dark suffusion beyond the s. t. line, reaching sometimes nearly to the termen, indicating that this is probably a variable character. A series of Kaslo, Calgary and New York specimens stood in the Washington collection as "*contacta* = *sansar*." I am inclined to agree with Dr. Barnes in considering the Calgary species identical with *contacta*. Whether *pulverulenta* is really distinct I am not in a position to say. The only Colorado material I have examined are the types at Washington, and one or two in the Strecker collection. The distinctness was by no means clear to me, and the antennæ are alike. The type of *extincta* Smith, which seems another close ally, I overlooked. But Sir George Hampson is quite wrong in referring *sansar* Strecker to *contacta*. On whose authority he did this I know not, but the same error appears in the Washington collection, and *sansar* is wrongly recorded from Kaslo in the Kootenai List. The type is a female from Seattle, Washington, and may turn out to be *ædon*, which comes from Washington also. Hampson's figure of this was not available when I was at Chicago for comparison.

176. *P. medialis* Grt.—I believe all the specimens before referred to by me under this heading to be of this species. I have a pretty good series (twenty specimens in all) from Montreal, and from Miniota and Cartwright, Man., from which latter locality I compared one with the type in the British Museum, a female from Schenectady, N. Y. Some specimens are black and gray only, others are rather strongly tinged

throughout with olivaceous brown. The orbicular varies from small and nearly round, dark-centred, and completely defined, to large, oblique, ovate or irregular, uniformly pale, incomplete above, sometimes produced to a point posteriorly. The reniform sometimes runs back, and in one specimen fuses broadly with the orbicular. The t. p. line varies from moderately dentate to very strongly so. The median band is often not merely constricted but actually divided in the submedian interspace by the anastomosing of the pale-filled t. a. and t. p. lines. This variation appears to me to cover Sir George Hampson's diagnosis of *acutissima*, of which I have examined the male type from Montreal in the British Museum, figured by a woodcut in the Catalogue. I doubted their distinctness when I saw both in the British Museum, and the doubt has augmented considerably since seeing more material. I refrain from direct reference till I have recompared specimens with both types. *Acutissima* seems to be characterized by the very strongly dentate t. p. line, and the obliquely V-shaped orbicular, the V being slightly curved.

As yet I have seen nothing under the name of *confragosa* that I suspect of being distinct. I have not seen the description, and the type, according to Smith's Catalogue, is in Abbé Belanger's collection, wherever that may be.* Hampson's figure of a Wisconsin specimen in the Washington Museum does not help me, being well within the observed variation.

177. *Hyppa* sp.?—This is not *xylinoides*, meaning thereby the species commonly passing under that name in the east, which has male antennal branches about one-third longer. There are slight differences in the arrangement of colour and shades, but I had never suspected them to be of specific value until I noticed the antennal differences, which, so far as I have observed in a large number of specimens from many localities, are quite constant. Species in this genus are not, as a rule, very variable, and the colour differences in this case are far less than what I often claim to denote mere local variation in other genera. But though inclined to be evanescent, they appear to be correlative with the antennal differences, suggesting that they are peculiar to the species. I have a fine male of *xylinoides* from as far west as Miniota, Man., whilst of the distinct Calgary form I have a good series from Winnipeg and vicinity from Mr. Wallis, who, so far, has not sent me *xylinoides* male. The Calgary form also occurs at Kaslo and Ainsworth, B. C., and, I think, on Vancouver Island, though I have only poor females from thence, and I am not sure. B. C.

*Laval University, Quebec (per A. F. W. in litt.).

specimens are larger, but the slight colour differences hold. As a whole, my species has more gray, and less red than *xylinoides*, in this respect approaching *indistincta*, of which I am not sure that I have yet seen a male. Sir George Hampson did not notice the antennal differences, as he catalogues Calgary specimens with *xylinoides*, which, as I understand it, his figure of a New York specimen well represents. Guenée's species, however, is claimed to have two synonyms, *contraria* Walker and *ancocisconensis*, Morr. Re-examination of the types of Guenée and Walker, both from Trenton Falls, N. Y. (Doubleday), and both in the British Museum, will be necessary before pronouncing them the same as Hampson's figure. Of Morrison's species, I have not seen the description, nor do I know the location or origin of the type, nor the meaning of the name he chose. I should prefer to see his type, or at least to hear more about it, before publishing my manuscript name for No. 177. *Rectilinea* Esp., of Europe, has antennal branches shorter than the form under discussion.

178. *H. brunneicrista* Smith.—In mentioning *xylinoides* in my comparison with this, it must be understood that I referred to my No. 177. The differences apply about equally well, however, to *xylinoides*, except that the length of the pectinations in *brunneicrista* male do not exceed those of *xylinoides* by as much as they do those of No. 177. Whilst they are about double the length that they are in the latter, they are only about one-quarter longer than in *xylinoides*. In other respects *brunneicrista* is less closely related to *xylinoides* than is No. 177. A good series was taken at treacle in 1909, between June 21st and 30th, and several at light last year, so that I have been able to distribute quite a number amongst other collections. On both occasions its congener was more rare. I saw a female from California in Prof. Smith's collection.

181. *Homohadena badistriga* Grt.—Of the three specimens previously referred to under this heading, a pair, dated Aug. 3rd, 1897, and Aug. 8th, 1901, are the species described and figured by a woodcut as *badistriga* by Sir George Hampson. I have seen neither Grote's description nor type, so have no means of verifying the name. The species has a whitish ground, sparsely irrorated with gray, and conspicuously streaked and suffused with cupreous brown and streaked with black, with cross lines generally distinct in my specimens. The secondaries are whitish, usually outwardly in the male, darker in the female. I have a male and three females from Milwaukee Co., Wisconsin, which are like my Calgary pair, but the male has whiter secondaries and the females are paler

throughout. The collar is contrastingly pale, whitish, black lined. It is not the species figured by Holland as *badistriga*, to which my third specimen referred to in my original notes probably belongs, and to which I shall refer under the additions. The species of this group appear to be much missed in eastern collections, and as they do not seem common, I am somewhat at sea as to the variation.

185. *Oncocnemis poliachroa* Hamps. (Cat. VI, 175, 1906).—Sir George Hampson has thus described the species I had listed as *chandleri*, and all previous records of *chandleri* from the Northwest and from B. C. that I have been able to verify refer to his species, of which the type is from Calgary, and which is the *chandleri* of Holland's Moth Book. As it happens, I have a specimen of true *chandleri* from High River, which I have compared with the type, and which will be referred to later.

NEW TIPULIDÆ (DIPTERA).

BY CHARLES P. ALEXANDER, ITHACA, N. Y.

The following crane-flies are believed to be new to science :

Adelphomyia minuta, sp. nov.

Antennæ, first segment light reddish-yellow, remainder light brown, with a thick, white pubescence; rostrum reddish-brown, palpi brown; front and vertex reddish-yellow, thinly grayish-pruinose; a row of pale yellow hairs along the inner margin of the eye; occiput reddish-yellow. Pronotum yellow; mesonotum, præscutum brownish-yellow, with a thin white bloom, a row of long yellow hairs on either side of the median line; scutum and scutellum pale yellow; metanotum almost white. Abdomen yellow, with a white pruinosity on the caudal margin and with long scattered yellow hairs; ovipositor brownish yellow. Halteres yellow, knob barely darker. Legs pale yellow, darker on the tibiæ and tarsi. Wings hyaline, stigma indistinct, yellowish; veins pale yellow, C, R and Cu somewhat brownish.

Subcosta quite long, extending almost to the anterior margin of cell R_3 ; Sc_2 far distant from the tip of Sc_1 , so that Sc_1 is four times the length of Sc_2 . Radius long, cross-vein r far back from tip, about four times its length and near to the anterior end of cell R_2 . R_5 moderately long, arcuated at origin, about equal to R_3 ; R_{2+3} from one to one and one-half the length of the basal deflection of Cu_1 ; basal deflection of R_{4+5} about

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one-half of cross-vein $r-m$; $r-m$ usually about as long as the basal deflection of Cu_1 . Petiole of cell M ($M_{2,3}$) usually long, two-thirds the radial sector. Cu_2 usually about twice the basal deflection of Cu_1 . Basal deflection of Cu_1 under the middle of the discal cell. In most specimens the cross-vein m is much reduced, or even lacking, due to the great length of the second deflection of M_3 .

Length, ♂, 3.3-4.4 mm.; average, 3.6 mm.; wing, 4.1-4.2 mm.

Length, ♀, 4.5-4.9 mm.; average, 4.7 mm.; wing, 4.6-4.7 mm.

Type.—♂, Coy Glen, Ithaca, N. Y., May 21, '11.

Co-types.—12 ♂ s, 3 ♀ s; same time and place as the type.

This tiny species is quite similar in venation to the species which I have determined, provisionally, at least, as *Adelphomyia senilis* Hal. In that species cross-vein m is always present in the scores of specimens examined.

The two species are of nearly the same size, with *minuta* averaging smaller. Although the distal cells of the wings of *senilis* are notably pubescent, and of *minuta* entirely glabrous, except in a few abnormal specimens, I have no hesitation in referring both species to the same genus, because of the similarity of venation and genitalia of the ♂. The valves of the ovipositor of the ♀ are much more curved in *minuta* than in *senilis*.

The species was very common on rank vegetation near rapids in Coy Glen.

Phylodorea subcostata, n. sp.

♂.—Eyes black, with a purple reflection. Antennæ, first segment, elongate-cylindrical, somewhat broader distally; second globular; third to last similar to one another in shape, cylindrical-ovate, with four or five long black hairs arranged in a partial verticil about the center; the last few joints are more slender and shorter than those preceding; antennæ black, with a thick gray pubescence throughout; the extreme base of segment three is brown in some specimens. Rostrum and palpi black. Entire head black, with a gray pruinosity. Pronotum light gray pruinose; mesonotum black, with a thin yellow bloom on the sides, middle of præscutum shiny black; postscutum gray-pruinose. Metanotum gray. Sides of thorax, including base of coxæ, thickly gray-pruinose. Fore leg, tip of

coxa, trochanters and basal third of femur light yellow; remainder of femur, tibia and tarsus dark brownish-black; middle leg similar to fore, but apical half of femur dark coloured; hind leg similar to fore, but only the apical third of the femur is dark, tibia paler brown; tarsus as in fore leg. Halteres rather long, yellow throughout. Abdomen above black, the dorsum of each segment being paler in the basal two-thirds; genitalia black; beneath dirty blackish-yellow.

Wings hyaline, stigma rather indistinct, brown; veins at base of wing strongly yellow, giving this colour to the wing at this region; subcosta is yellow for its entire length, the other veins for a short distance only; radius and costa of a paler brown than the other veins.

♀.—Similar to ♂, but genital segment light brown.

Subcosta long, fork very close to tip, Sc_2 being about twice as long as Sc_1 , ending anterior to cell R_3 . Radius long, cross-vein r at tip; radial sector often angulate, with a spur at the angulation, rather short, longer than R_2 , but not as long as R_3 . Vein R_{2+3} about equal to the basal deflection of Cu_1 . Basal deflection of R_{4+5} shorter than R_{2+3} ; cross-vein $r-m$ two-thirds the length of the basal deflection of Cu_1 . Petiole of cell M (vein $M_{1.2}$), variable in length, from as long as the $r-m$ cross-vein, to one and one-half the length of the basal deflection of Cu , or from two-fifths the length of cell M_1 to nearly twice as long as this cell. Very considerable variation occurs in the two wings of the same specimen. Basal deflection of Cu_1 , under the middle of cell 1st, M_2 . Cu_2 equal to, or very little longer than, the basal deflection of Cu_1 . $Cu_1 + M_3$ about equal to basal deflection of Cu_1 . Cells R_3 , R_5 and 1st M_2 usually in one line.

Length, ♂, 5.9–6.3 mm.; ♀, 6.5–7.3 mm.; wings, ♂, ♀, 6.5 mm.

Type.—♂, Coy Glen, Ithaca, N. Y., May 21, '11.

Co-types.—♀ ♀, Coy Glen, May 21, '11; ♀, Six-Mile Creek, Ithaca, N. Y., May 21, '11. (Thompson and Rutherford.)

This species belongs to the *fratria* group, and appears to be closest to *costatu* Coq. from New Mexico; from *fratria* and *costata* it differs in being much smaller and decidedly distinct in coloration.

PECULIAR HABITS OF A HEPIALID MOTH.

WITH SOME REMARKS ON THE SYNONYMY OF SAME.

BY J. MCDUNNOUGH, M.D., DECATUR, ILL.

During the summer of 1910, while on a collecting trip for Dr. Wm. Barnes, of Decatur, Ill., I spent the second week of August at Cloud Cap Inn, on the northern slope of Mt. Hood, Oregon. While collecting during the early afternoon, about 2.30 p.m., on some steep, sandy slopes covered with asters and short grass, at an altitude of 6,500 feet, I noticed what I took to be some species of small Noctuid, darting with extreme rapidity in a zig-zag erratic flight close to the ground up and down the slope. The insect would fly to the top of the slope, which was bordered with dwarf pines, then turn and dart downwards, always remaining in the hottest sunshine. Following it was out of the question, owing to the nature of the ground and the rapidity of the flight; in fact, it was only with difficulty that I could keep the moth in sight at all. Finally it flew straight towards me, and by a lucky stroke of the net I secured it. My surprise was great on finding that I had captured a small *Hepialid*; I had always been under the impression that the flight of this entire group took place at dusk, for a few minutes only, and was of a heavy hovering nature rather than a swift, powerful flight; to find, therefore, a species flying in the bright sunshine with the rapidity of a bee-moth proved rather astonishing.

I kept my eyes open for further specimens, and was soon rewarded by seeing several skimming up and down the slopes in an identical manner. It was, however, one thing to see them and quite another to catch them, and after an hour's hard work I had only succeeded in securing four specimens. After 3.30 the flight seemed to die down, and I saw no more. As all the specimens taken appeared to be males, it occurred to me to search in the low herbage for females, and I was rewarded by obtaining a pair in coitu, sitting on a low stalk just above the ground.

The following day I was on the spot bright and early, but before 1.30 p.m. saw not a single specimen. The main flight occurred as on the previous day, between 2.30 and 3.30 p.m.; the insect was fairly common, but most difficult to approach. I secured two pairs in the grass and seven or eight on the wing, mostly freshly-emerged specimens.

On the third day the flight was not so good, the weather being cooler. I had, however, the good fortune to discover, about 2.30 p.m., a virgin ♀

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ascending a grass-stalk ; arrived near the top it folded the hind wings closely around the body and commenced vibrating the fore wings rapidly—almost immediately the summons was answered, a male appeared on the scene, and before I could prevent it coition had taken place. No further males were taken that day. During the remainder of my stay the weather was cold, cloudy and windy, and I saw no further specimens. There seems no reasonable doubt but that the species flies only in the hottest sunshine of early afternoon, and that flight ceases once copulation has been effected. It is possible that the cool nights prevalent at this high altitude have caused the alteration in habits, although I have taken *H. humuli* at a similar altitude in the Swiss Alps at dusk, as usual.

At the time the identity of the species was unknown to me. I could only note that the species showed apparently great sexual dimorphism, the males being deep reddish-brown, with numerous silver spots and bands on primaries, whilst the females were lighter brown, in one case immaculate, in the others with an irregular black broken line, following the course of the silver bands in the male.

On returning home, with the excellent collection and library of Dr. Barnes at my disposal, it was easy to identify my species as the one commonly known as *hyperboreus* Möscl., according to Dyar's Catalogue. Considerable doubt exists in my mind as to whether the synonymy as given by Dyar is entirely correct, and with a view of perhaps eliciting further information on the subject, I propose to make a few remarks on the different names :

H. hyperboreus Möscler.

The species was described from a single male from Labrador ; according to the figure and description, the band extending irregularly from base to apex is broken, and does *not touch the inner margin of wing* ; there are several silver spots on the outer margin, besides those at base and along costa ; the ♀ is undescribed. Holland (Moth Book) figures a specimen from the U. S. Nat. Mus., with no locality given. It agrees fairly well with Möscler's figure, but the band appears to touch the inner margin. I have seen no specimens from Labrador or the extreme East, and should advise collectors in these localities to keep a sharp look out for it.

H. pulcher Grote.

Described from a single male from Colorado. Female undescribed. Grote's figure and description agree well with those of Möscher, although there is a wide difference in locality. I am inclined to agree with Dr. Dyar in making it a synonym of *hyperboreus*. I have seen no Colorado material, but would place my species from Mt. Hood under this name, as the males appear to agree. As in *hyperboreus*, the band does *not* touch the inner margin, and is more or less broken; the arrangement of spots on outer margin, costa and base is also very similar. In the ten males captured on Mt. Hood, considerable variation exists; the band is mostly broken and very irregular; in three cases, however, it is entire, but *in no case does it approach* the inner margin; the silver spots of the outer margin are always present, also the large spot at end of cell; the costal and basal spots vary somewhat in each specimen; as stated above, four of the females captured show no traces of silver, one being immaculate, light brown, and the others with traces of a thin black line following the general course of the silver band of the male sex. On spreading the specimens I came across a single female with silver markings, which I had evidently taken on the wing and confused with the males. The band is entire and rather broad and regular, well removed from inner margin; the other silver markings are much reduced, but there are traces of spots along outer margin. Long series from Colorado will be necessary to establish the identity of our form.

H. MacGlashani H. Edw.

Described from a series of specimens of both sexes from Truckee, Calif. As described by Edwards, the band is continuous and *connected with the inner margin* by a spur of silver. The spots on outer margin *are lacking*. Both sexes are similar.

The species bears great resemblance to *ganna* Hbn., from Europe. We do not know this species, but a figure is given in Spuler, Die Schmetterlinge Europas. Dr. Barnes possesses a single ♀ from the type locality; further, four pairs from Hymers, Ont., collected by Mr. Horace Dawson, and three specimens from Calgary, Alta. These all show a marked similarity; the band is continuous, the spur to inner margin broad, and the silver spots of outer margin lacking; the sexes are practically similar, and Mr. Dawson tells us that of about 100 pairs captured the females were in every instance silvered. Further, the species is a

typical dusk-flyer. Mr. McGlashan informs us that he always takes his specimens at dusk; the Hymers specimens were also captured at this time of day. Taking all the above points into consideration, we are inclined to think that, if not synonymous with *ganna*, *MacGlashani* is a perfectly valid species.

H. Matthewi H. Edw.

Species described from Brit. Columbia, listed by Dyar as variety of *hyperboreus*. Dr. Barnes possesses only a single rubbed male from Victoria, B. C., which is too poor to make much of. From the description it might be closer to *MacGlashani* than *hyperboreus*. The male alone was described. It behooves our Western friends to furnish good series of this in both sexes.

H. confusus H. Edw.

The type was a single specimen from Alaska. The silver banding appears from the description to be replaced by pale fawn, but we have seen neither the type nor any specimens agreeing with the description. We do not know Dr. Dyar's reasons for placing it as a variety of *hyperboreus*.

H. roseicaput N. & D.

Described from a single male (?) from Cascade Mts., B. C. The description reads rather like that of our female *pulcher* from Mt. Hood, except that this latter species has no blackish subterminal line. Possibly this may be the ♀ of *Matthewi*, described in error as a male; the localities are certainly closely approached.

A NEW SPECIES OF THE SCELIONID GENUS *ACOLOIDES*
HOWARD.

BY A. ARSENE GIRAULT, CHAMPAIGN, ILL.

Superfamily Proctotrypoidea.

Family Scelionidæ.

Subfamily Bæinæ.

Genus *Acoloides* Howard.

1. *Acoloides aureus*, species nova.

Normal position.

Female.—Length, 1 mm. Moderate in size for the genus.

Usual to the genus with the exception of the parapsidal furrows, which are slightly indicated. Winged, the wings short, with moderately

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long fringes; mandibles tridentate; basal nervure absent. Postmarginal vein as long as the marginal or slightly longer.

Agreeing with *melleus* Ashmead, in general colour, but differing in that the first funicle joint is slightly wider than long, not twice longer than wide, distinctly not half the length of the pedicel; also all the other funicle joints are distinctly wider than long. Also agreeing with *ochraceus* Ashmead, but the abdomen is not striated longitudinally (excepting basally at the second and third segments), the antennæ not marked with brown-black, the wings not subhyaline, but deeply fumated and with rather long fringes.

General colour honey-yellow, the vertex and sides of abdomen inclined to be darker; eyes dark, naked; all appendages concolourous excepting wings, which are deeply fumated throughout, the fumation deepened somewhat under the stigmal vein and including its knob. Vertex and mesonotum rather coarsely, reticulately punctured, the punctures not deep. Ocelli pallid. Venation dusky.

Fore wings much shorter than the abdomen, petiolate, the blade ovate and fringed with moderately long, silky marginal fringes, the longest of which are about two-thirds the wings greatest width; apex obtusely pointed.

Stigmal vein long and slender, ending in a small knob; the marginal vein very short, punctiform, the postmarginal vein moderately short, about a fourth the length of the stigmal; discal ciliation of the fore wings dense, short, uniform; a half dozen or more long bristles from the venation. Strigil present on cephalic legs. Abdomen depressed rounded ovate, the first and second segments longitudinally striated at base, the ovipositor exerted slightly, very slender.

Antennæ 7-jointed, capitate, the club large, solid, compact ovate, the scape long and cylindrical, longer than either the club of itself or the funicle plus the pedicel; the latter about equal to the first three funicle joints combined (no ring joint), or slightly shorter; funicle plus pedicel subequal in length to the club; first funicle joint subquadrate, slightly wider than long, the other three funicle joints transverse, subequal, a third shorter than the first. Pubescence of antenna short and sparse.

Male.—Unknown.

Described from a single female specimen found mounted on a slide in a collection of some Signiphorinæ loaned to me for study by Dr. L. O.

Howard, and bearing the labels, "248. 1247. 1247 ♀. Aphel. 248 do. C. H. T. Mch. 15, 10. T. Johuaimaji. Feb. 11."

Habitat.—Peru, South America.

Type.—Type No. 14026, United States National Museum, Washington, D. C., 1 female in xylol-balsam (mounted with a single female of *Signiphora*).

BOOK NOTICES.

THE HOUSE FLY.

"THE HOUSE FLY," by L. O. Howard. XIX + 312 pp., 1 pl., 40 figs. Frederick A. Stokes Company, New York, 1911.

One of the most extraordinary examples of the fickleness of human nature is furnished by our attitude towards the commonest of all insects. Even the youngest of us was brought up in companionship with this homely creature, and taught to regard with painful horror the iniquity of destroying, however painlessly, this permanent guest. Well might we say when introducing this volume to the public, *Tempora mutantur, nos et mutamur in illis*. From the high pedestal of kindly regard *Musca domestica* has sunk to depths so loathsome and portentous as to make even an entomologist recoil from these "winged sponges spreading hither and thither to carry out the foul behests of contagion," to quote the words of Lord Avebury, written so long ago as 1871.

The credit of first seriously attracting public attention to the possible dissemination of disease germs by the house-fly belongs to investigators in the United States. The experience of the Spanish-American war, with its excessively heavy mortality from typhoid fever, was repeated in the South African war a few years later. Circumstantial evidence has been confirmed by exact experiments, which, though in many instances they may modify primary conjectures, have shown that the house-fly, if the necessary conditions prevail, will serve as a most serious carrier of pathogenic organisms. On this account, therefore, it ranks as one of the proven disease-carrying insects, and must be included with the mosquito, the tse-tse fly and the flea in that class of insects which bear a serious relation to national welfare. No one has done more to inculcate these ideas into the minds of people, obsessed with the customary apathy, than Dr. Howard, who was one of the first to consider the house-fly and to study it in its new relation, deserving well the title of "Commander-in-Chief of the Fly-fighting Army," recently conferred upon him by a well-known journal. From Dr. Howard

we should expect the best possible account of this insect and its disease-carrying proclivities, and to say that he has not disappointed us is only half of the confession. The remaining half is known by those who know the author, and will soon be discovered by the readers of this book who have not that good fortune. "This book," the introduction states, "is not intended to be a scientific monograph; it is simply an attempt to tell in an understandable way what is known about the subjects indicated in the title." Such a book, giving in a readable and complete fashion an account of the house-fly, its habits and development, its relation to disease and methods of control, was greatly needed, and we are glad that such an account is now available for the general reader. The first hundred pages are devoted to the fly, its life-history and habits and its natural enemies. The succeeding chapter gives a most complete and succinct account of the carriage of disease by flies, which, by its extent, will surprise many readers who have not devoted much attention to the subject. In an excellent and most practical chapter the various means of preventing and eradicating this potential disease-carrier are described and fully discussed; this chapter is probably the most valuable contribution to this question which has yet been made, and we sincerely hope that it will find its way into the hands of sanitary authorities and others, upon whom the solution of this problem largely depends. An account of other species of flies inhabiting houses is given and is fully illustrated. The illustrations are excellent and well chosen. We have, however, one serious criticism to make: by force of habit we turned to refer to the index; there is no index.

C. GORDON HEWITT.

THE TSE-TSE FLIES.

"A HANDBOOK OF THE TSE TSE FLIES (GENUS *Glossina*)," by Ernest E. Austen. X + 110 pp., 10 coloured plates and 24 figs. in text. British Museum (Natural History) London, 1911.

In no branch of medical entomology and pathology has so rapid progress been made during the past few years as in the causes of those dread diseases, the human disease known as Sleeping Sickness, and the disease of domestic animals, known by the native name "Nagana." These diseases are caused by microscopic protozoal organisms called *Trypanosomes*, which are carried by several species of Tse-tse flies. The Tse-tse flies are related to our own *Stomoxys*, but are confined to the Ethiopian region. Among the Diptera they are most remarkable for their method of reproduction; instead of depositing eggs the female produces a single full-grown

larva at each birth, and this immediately crawls away and pupates, having been nourished by special glands associated with the female reproductive organs. The deadly nature of these diseases is now well known, and, as the author asserts in the opening paragraph, these insects are of vital importance to the prosperity and future development of tropical Africa.

Eight years ago the author published his "Monograph of the Tse-tse Flies." At that time the relation of *Glossina palpalis* to Sleeping Sickness had not been determined, and little was known with regard to the habits of that species. Seven species of Tse-tse flies were described and illustrated. That volume is now out of print, and the present volume is an attempt to bring the subject up to date. Fifteen species are described, including two described for the first time. The author has made excellent use of the valuable material, probably unique in its extent, which he has at his disposal in the collections of the British Museum, and the present account of the group will be of very great value to workers, especially to those engaged in the field. The brevity of the accounts of the bionomics of the species, with the exception of *G. morsitans*, indicates how much there is to be learnt, in what is, from the point of view of prophylactic measures, the most important section of the subject.

We note with regret that the author does not regard *G. submorsitans* Newst. as specifically distinct from *G. morsitans* Westw., but considers it as a form of *G. morsitans*. While agreeing with the author, that the wide distribution of *G. morsitans* might account for the variability in colouration, we do not think that he can ignore, as he appears to do, the differences in the male genitalia. Newstead's species was created after the examination of 93 examples, and the illustrations in his account of the male genitalia of Tse-tse flies clearly indicate that the male genitalia of *G. submorsitans* Newst. are morphologically distinct from those of *G. morsitans* Westw. in the character of the superior claspers. Newstead's excellent paper is further evidence of the fact that in so highly organized a group as the Muscidæ, and, one might say, in the Diptera generally, we shall have to take into consideration such important specific characters as are indicated by the male genitalia. This fact is also shown in the study of the Tachinidæ. Specific distinctions cannot always be based on external form, but are often dependent on other morphological characters, which the systematist must necessarily take into consideration, and of these the genitalia are important, not only in Diptera, but also in Lepidoptera and Coleoptera.

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