

PROCEEDINGS

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Biological Society of Washington

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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

All correspondence should be addressed to the Biological Society of Washington, % U. S. National Museum, Washington, D. C.

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Errata Slip

This is to call attention of librarians and others intending to bind this volume eventually that inadvertently page numbers 43 and 44 have been duplicated, as well as paper No. 9 for two papers, as follows:

paper No. 9, pp. 43-44, by F. C. Hottes, issued April 11, 1958
paper No. 9, pp. 43-48, by M. S. Wilson, issued May 9, 1958

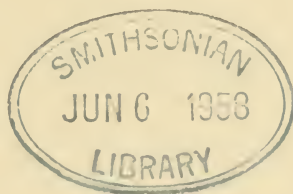




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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

The two meetings during 1957 were held in Room 43 of the United States National Museum.

1023d Meeting — March 26, 1957

SEVENTY-EIGHTH ANNUAL MEETING

President Friedmann in the chair; 26 persons present.

New members elected: Ardon H. Brame, Jr., Bernard R. Feinstein, Robert S. Simmons, Charles J. Stine.

The reports of the Recording Secretary, Corresponding Secretary, Treasurer, and Committee on Communications were presented.

The following officers and members of council were elected: President, Herbert Friedmann; Vice Presidents, H. B. Owens, D. H. Johnson, A. C. Smith, Allen J. Duvall; Recording Secretary, S. F. Blake; Corresponding Secretary, J. L. Paradiso; Treasurer, B. R. Feinstein; Members of Council, M. K. Brady, C. O. Handley, Jr., J. P. E. Morrison, Louis M. Russell, Viola S. Schanz.

The business meeting was followed by an illustrated talk by A. C. Smith, The Bredin-Smithsonian Caribbean Expedition.

1024th Meeting — November 25, 1957

President Friedmann in the chair; 26 persons present.

New members elected: Thomas E. Bowman, Charles E. Cutress, Wayne H. Davis, Robert J. Drake, James S. Harvel, Ernest A. Lachner, Tom McIntyre, Robert L. Packard, William J. Schaldach.

Elected to Emeritus Membership: Albert W. Herre, Colin C. Sanborn, Harry B. Weiss.

Several changes in the By-Laws were adopted.

Formal Communication: Laurence Irving, Biologist, Arctic Health Research Center, Anchorage, Alaska: Adaptation of warm-blooded animals to arctic cold.

PROCEEDINGS
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FOUR NEW SPECIES OF CONIFER FEEDING APHIDS

BY F. C. HOTTES

The conifer Aphids described herewith were taken in the Pacific Northwest. Two of the new species are named after their collectors, Dr. Louis G. Gentner, and Mr. Joe Schuh, both of Oregon, in appreciation of their efforts in adding to the Aphid fauna of their state.

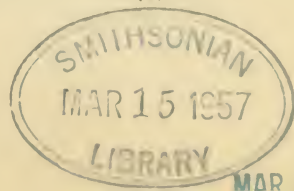
Cinara gentneri n. sp.

Apterous viviparous female.

Length and general color.—Length from vertex to end of anal plate of cleared specimens varying from 5.55-5.77 mm. Color probably quite similar to color of oviparous female, recorded, by Dr. Gentner as light yellowish-brown.

Head and thorax.—Length of antennal segments as follows: III .825-.975mm., IV .45-.53mm., V .555-.63mm., VI .27-.30 + .09mm. Third antennal segment without sensoria, sensoria on fourth segment variable, sometimes with only primary, which is normal in size and position, sometimes without primary and with 1-3 small secondary sensoria, sometimes with only one large sensorium, but this removed from the end of segment. Fifth antennal segment with narrow rimmed, large primary sensorium, and one comparatively large secondary sensorium. Primary sensorium on sixth antennal segment tuberculate, marginal sensoria on this segment arranged in an irregular row, and as a rule six in number. Hair on antennae numerous, almost upstanding, fine, sharp pointed, on third segment varying from .07-.09mm. in length, slightly longer than width of segment, the ratio of length to width of segment being 6-5. Hairs on sixth antennal segment longer than width of segment, rather droopy, extending to base of primary sensorium. Second antennal segment with numerous hairs, the hairs covering all of the surface, hair on first antennal segment limited to apical half of segment, more numerous than usual. Median transverse suture variable, as a rule absent, at times represented by an extremely short line, only rarely is it complete, and when so very indistinct.

Rostrum when extended reaching to or slightly beyond genital plate, in one case exceeding length of body. Last three segments of the rostrum with following lengths: .42, .38 and .10mm. Compound eyes small, round, ocular tubercles present, but so small that they have to be looked for. Median mesosternal tubercle absent. Length of prothoracic femora varying from 1.50-1.65mm. Length of metathoracic femora varying from 1.84-2.17mm. Length of metathoracic tibiae vary-



ing from 2.82-3.07mm. Length of first and second metathoracic tarsal segments .15 and .45mm. Hair on metathoracic tibiae numerous, fine, tapering to a long fine point, more numerous on inner margin but not so long or upstanding, as on the outer margin where they are about .10mm. in length. On the outer margin the hairs are set at an angle of more than sixty degrees near middle and basal regions of segment, and slightly less towards the apex. Ventral surface of first tarsal segment with about fourteen hairs. Hairs on ventral surface of second tarsal segment more numerous and shorter than those on dorsal surface. Union of first and second tarsal segments about equal to width of second segment, or to length of dorsal surface of first tarsal segment.

Abdomen.—Dorsal and ventral surfaces of abdomen with numerous hairs, which are similar on both surfaces as to length and coarseness. These hairs are similar to those found on the cornicles. Dorsum of abdomen without pigment spots, except for the two transverse spots anterior to the cauda which have from two to three rows of coarse hairs on their posterior margins. These spots are provided with very poorly developed setulae. Directly anterior to the transverse pigmented spots the abdomen is almost free from hairs, but the region between them has several hairs similar to the hairs found on them.

These hairs are much coarser than those on the dorsum of the body. Dorsum of abdomen with about four rows of very small wax pore plates. Cornicles with outer margin very irregular, often with small clear areas. Anterior portion of cornicles extended forward, giving them a longer axis than their width, this anterior projection of the cornicle is very irregular, and has several clear areas. Hairs on cornicles of one kind, about .15mm. in length, on outer margin where the hairs are fewer, the hairs are more numerous and slightly shorter on cone. Genital plate very large, unusually deep, with a narrow notch located in the median region of the anterior and posterior surfaces. Median posterior region of genital plate free from hairs. Hairs on lateral regions very coarse, much longer than hairs located in median region. Surface of genital plate indistinctly covered with setulae. Cauda and anal plate provided with numerous long coarse hairs.

Oviparous female.

Dr. Gentner sent me living specimens. They arrived dead but nevertheless in a life like condition, so that color notes could be made. Head thorax and abdomen dusky dark brown. Pits on pro and mesothoracic segments slightly pruinose. Anterior and posterior margins of prothorax yellowish. Abdomen dusky dark-brown. Cornicles brown, but much darker than abdomen. Antennae and legs brown, with the ends of segments dusky.

Size and lengths of antennal segments, and legs within range of similar structures of the apterous viviparous female. Hind tibiae with almost no swelling, most unusual in the presence of only a meager number of sensoria, which are widely scattered, small, non tuberculate, and three to six in number. Other structures as in apterous viviparous female.

Holotype, apterous viviparous female. Morphotype, oviparous female. Both deposited in the United States National Museum. Host, *Abies grandis*. Union Creek, Jackson Co., Oregon. Holotype taken Sept. 21,

1956. Morphotype taken Oct. 15, 1956. Collected by Louis G. Gentner.

Specimens of this species key, in Palmer's key to the genus *Cinara*, in "Aphids of the Rocky Mountain Region" to *Cinara curvipes* (P), a species from which it differs in almost all respects except those made use of in the key. To enumerate, the unguis is nail-like, the color is brown not black, the hairs on the antennae, legs, and cornicles differ, none of the hairs are ever dull at the apex, those on the tibiae are upstanding, the antennae are not imbricated, the cornicles have many more hairs, the hind tibiae are not so bent, the antennae have many more hairs. This species may be differentiated at once from *C. kiusa* to which it is closely allied by the very large, and deep genital plate.

Cinara kiusa n. sp.

Apterous viviparous female.

Length from vertex to end of anal plate of cleared specimens varying from 3.25-3.67mm. Color in life not recorded. Head and thorax dusky brown. Abdomen free from pigmented spots. Cornicles dusky brown. First antennal segment concolorous with head. Second antennal segment slightly lighter in color than first segment. Remaining antennal segments pale dusky with apical portions of segments brownish. Color of all femora much the same, medium dusky brown, with the extreme apex, almost black. Basal portion of tibiae deep brown, followed by dusky brown, which becomes deeper brown beyond middle, and continues thus to apex. Tarsal segments brown shaded with black.

Head and thorax.—Antennal segments with the following lengths; III .825-915mm., IV .42-535mm., V .525-.575mm., VI .24-.25 + .09mm. Third antennal segment without sensoria, fourth segment with only primary sensorium, fifth segments with one secondary sensorium and primary. Hair on antennae numerous, upstanding, on third segment, varying from slightly less than width of segment to equal to width, or about .10mm. Hair on sixth segment more numerous than usual, extending to mid region of primary sensorium, almost straight. Unguis distinctly nail-like. Second antennal segment with numerous hairs, hair on first segment confined to apical half. Median transverse suture indistinct, narrow, rather pale in color. Hairs on vertex and dorsum of head numerous, fine, about .11mm. long. Eyes comparatively small, ocular tubercles small, difficult to differentiate. Rostrum when extended reaching slightly beyond the cornicles. Last three segments of the rostrum measuring .42, .40, and .15mm. Length of prothoracic femora varying from 1.42-1.65mm. Metathoracic femora varying from 1.95-1.975mm. Metathoracic tibiae varying from 3.18-3.30mm. Length of metathoracic tarsal segments .15 and .43mm. Hair on femora numerous, fine, upstanding, distributed over entire surface, about .045mm. in length on metathoracic femora. Hair on tibiae fine, sharp-pointed, numerous, much shorter than width of segment, varying in length from .05-0.75mm. in length. The hair on the outer margin are slightly longer, and more upstanding, than the hair on the inner margin. The hairs near the apex of the tibiae are more numerous, and less upstanding than the hairs closer to the base. Hairs on ventral surface of the first tarsal segment very difficult to count, probably about twenty. Hairs on ventral surface of the second segment more numerous, and

shorter than the hairs on the dorsal surface. Mesosternal tubercle absent.

Abdomen.—Hairs on dorsal and ventral surface of the abdomen similar, the hairs are numerous on both surfaces, and similar to the hairs on the cornicles. Lateral dorsal surface of abdomen with two rows of small wax pore plates. Transverse pigmented areas anterior to cauda with very irregular inner margins, surface covered with short fine setulae, arranged in transverse rows. Posterior margin of pigmented areas with two to three rows of long coarse hairs, similar hairs are located between the pigmented areas. Cornicles with width through outer margin varying from 3.25-.375mm. Outer margin quite regular, except for a very slight forward extension. Genital plate narrow, broadly excavated posteriorly, free from hairs except for lateral portions. Setulae well developed. Cauda and anal plate with numerous hairs, both structures with well developed setulae.

This species is closely allied to *Cinara gentneri* differing in smaller size, color of legs and antennae, cornicles with fewer rows of hairs, forward extension of cornicles less and different lengths of antennal segments. The two species may be differentiated at once by observing the genital plates. The genital plate of *gentneri* is very deep, is indented on both the anterior and posterior margins, and has many more hairs. The genital plate of *kiusa* is narrow, has the hairs limited to the lateral posterior portions of the plate.

Holotype, apterous viviparous female, deposited in the United States National Museum. Host, *Abies Concolor*. Coll. M. J. Buckhorn, August 15, 1930.

Cinara schuhi n. sp.

Alate viviparous female.

Length from vertex to end of anal plate varying from 2.10-3.25mm. Color in life not recorded, remembered by Mr. Schuh as, "light brown." Color of cleared specimens as follows: Antennal segments brown, quite uniform in color, except for the extreme base of the third segment which is pale. Head and thorax dark brown. All femora with basal area pale, remainder deep brown. Pro and metathoracic tibiae uniform brownish black, or almost so, mesothoracic tibiae not quite so dark, dusky brown with ends of segment darker. Tarsal segments concolorous with ends of tibiae. Cornicles brown. Dorsum of abdomen free from pigmented spots, except for transverse pigmented areas anterior to cauda.

Head and thorax.—Length of antennal segments as follows: III .22-.24mm., IV .255-.285mm., VI .13-.15 + .03-.05mm. Sensoria distributed as follows: III eight-ten plus primary. The secondary sensoria are very large, and arranged in a straight row, all sensoria on this segment have wide rims. IV one-three secondary sensoria, plus primary, the secondary sensoria are arranged in a straight row, have wide rims, but are not as large as those on the third segment. V one secondary sensorium plus primary. Fourth, fifth and sixth antennal segments lightly imbricated, the imbrications being best developed on the sixth. Antennal hair moderately numerous, fine, sharp-pointed, about .08mm. in length, longer than width of segment, the ratio of length to width

being 5-3. The hairs are more numerous on the anterior margin, than on posterior margin, and are set at an angle of forty-five degrees or more, no hairs upstanding. Hairs on sixth segment extending to primary sensorium. Marginal sensoria close to primary sensorium, more or less in a row. Second antennal segment with ends free from hairs, the hairs on this segment being limited to the mid region. First antennal segment with few hairs, the hairs being in one or two rows beyond middle. Rostrum extending to cornicles, last three segments with the following lengths: .19, .15, .08mm. Median transverse suture narrow, dark. Hairs on anterior margin of head about .08mm. in length. Eyes small, round, ocular tubercles difficult to differentiate. Media twice forked, second fork closer to margin than to first fork. Lateral lobes of thorax with hairs covering all but extreme lateral portions. Median posterior lobe of thorax with few hairs. Metathoracic femora varying in length from 1.52-1.77mm. provided with fine sharp-pointed hairs, which are slightly more numerous on the anterior margin than on the posterior margin, also slightly longer, being about .09mm. in length. Metathoracic tibiae varying from 2.55-3.07mm. Hairs on tibiae numerous, fine, sharp-pointed, set at an angle of about forty-five degrees, or less, varying in length from .105-.11mm. longer than width of segment, the ratio of length to width being 7-6 or 8-6. Hair on inner margin of hind tibiae slightly shorter than hair on outer, also more numerous. First tarsal segment with about 18 hairs on ventral surface, the union of this segment with the second segment is no wider than the width of the second segment. Hair on dorsal surface of second tarsal segment, longer and fewer than the hairs on the ventral surface. Length of first metatarsal segment .13mm. length of second tarsal segment .30mm.

Abdomen.—Hairs on ventral surface of abdomen much more numerous than the hairs on dorsum, only one half as long. Hairs on dorsum of abdomen fine, about .10mm. in length. Dorsum of abdomen with exceedingly short and fine setulae. The setulae are arranged in transverse rows, the rows are very close together. Cornicles with outer margins quite regular in outline, width of cornicles varying from .30-.35mm. Hairs on cornicles covering entire surface, similar to those on dorsum of abdomen. Transverse pigmented spots anterior to cauda very narrow, far apart, provided with two rows of hairs on posterior margin. Cauda and anal plate with setulae. Hair on cauda for most part limited to posterior margin. Genital plate slightly excavated posteriorly, provided with few hairs, confined largely to ends.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.55-2.85mm. Color most likely brown. Legs and antennae not quite so dark as in the alate. Length of antennal segments as follows: III .48-.50mm., IV .20-.21mm., V .225-.27mm., VI .12-.13 + .04. Sensoria distributed as follows: III 1-5 plus primary, IV 1 secondary plus primary, V similar to fourth. The secondary sensoria are large, round, with wide rims, and on the third segment confined to apical portion of segment. Primary sensoria large, with wire rims. Hairs on antennae similar to those on antennae of alate, but slightly longer. Sixth antennal segment weakly imbricated. Median transverse suture distinctly brown. Ocular tubercles small. Mesosternal tubercle small. Metathoracic femora vary-

ing in length from 1.275-1.50mm. Metathoracic tibiae varying in length from 2.25-2.40mm. Metatarsal segments .105 and .225mm. Hairs on metathoracic tibiae varying from .09-105mm. in length on outer margin, slightly less on inner margin, numerous on both surfaces.

Cornicles varying from .30-.375mm. Outer margin of cornicles uneven. Hairs on cornicles on entire surface, similar to the hairs on the dorsum. Hairs on dorsum of abdomen, much more numerous than the hairs on the dorsum of the abdomen in the alate, about .105mm. in length. Hairs on ventral surface of the abdomen very numerous. Transverse pigmented spots anterior to cauda very narrow provided with an irregular row of long hairs on the posterior margin. Hairs on cauda confined largely to posterior margin. Holotype, alate viviparous female, Morphotype apterous viviparous female. Both mounted on the same slide, which has been deposited in the United States National Museum. Host *Abies concolor*. August 12, 1956, Bly, Oregon. Coll. Joe Schuh.

This species keys to couplet 29 in Palmer's key to the genus *Cinara*, in Aphids of the Rocky Mountain Region. The fourth segment of the rostrum is not longer than .25mm. but hind tarsal two is more than .28mm. The species is not *C. murrayanae*. The sensoria on third antennal segment suggest *C. curtihirsuta* H & E but the hairs on the antennae and tibiae are too long, and much too numerous. The hairs on the dorsum of the abdomen are too long, and there are more numerous hairs on the cornicles.

Cinara moketa n. sp.

Apterous viviparous female.

Length from vertex to end of anal plate 3.60mm. Color in life not recorded. Cleared specimens with head, pro and mesothorax very dark dusky brown. Anterior portion of metathorax with four mid dorsal patches of brown, which are in turn surrounded by small irregular shaped dusky spots. Mid dorsal region of abdomen posterior to cornicles with four irregular shaped spots of brown. Lateral regions of dorsum of abdomen with two rows of small wax pore plates. Transverse pigmented spots anterior to cauda with ends irregular, far apart. First two antennal segments concolorous with head, third and fourth antennal segments pale with ends brown, sixth segment uniform brown. Femora with basal portions pale, shading to brown at the apex. Pro and mesothoracic tibiae with short distance near base brown, this is followed by a yellowish region which shades gradually to brown at the apex. Metathoracic tibiae with brown at apex more extensive, and the pale region much shorter. Tarsal segments concolorous with ends of tibiae. Cornicles brown. Cauda and anal plate brown with outer margins almost black.

Head and thorax.—Width of head through the eyes .75mm. Hairs on anterior margin of head .11mm. in length. Antennal segments with the following lengths: III .45mm., IV .16mm., V .23mm., VI .10 + .04mm. Third and fourth antennal segments with only primary sensoria. Fifth antennal segment with one secondary and primary sensoria. Sixth antennal segment and a portion of the fifth weakly imbricated. Hair on antennae fairly numerous, those on anterior margin more numerous

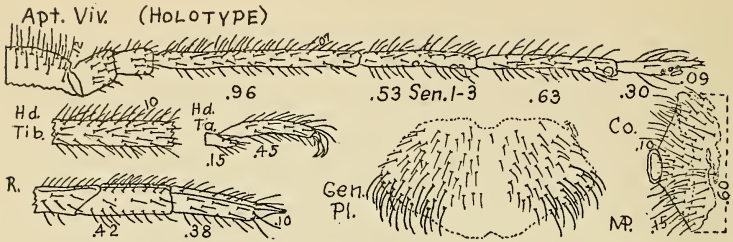
than those on posterior margin, about .10-.12mm. in length. Eyes large with well developed ocular tubercles. Both margins of femora with numerous long fine sharp pointed hairs. Length of prothoracic femora .84mm. Length of mesothoracic femora .755mm. Length of metathoracic femora 1.305mm. Lengths of pro, meso and metathoracic tibiae 1.245, 1.425, and 2.25mm. Hairs on metathoracic tibiae numerous, hairs on basal third almost upstanding, remaining hairs about sixty degrees at middle of segment to about forty-five degrees near apex. Hairs on outer margin longer and slightly more coarse than the hairs on the inner margin, also slightly more numerous. Hairs on outer margin not all of the same length, the distinctly shorter hairs are slightly more droopy than the long hairs, the two lengths of hair are intermixed. Length of first metatarsal segment .13mm. ventral surface of this segment with about twelve hairs. Length of second metatarsal segment .27mm. hairs on ventral surface of this segment shorter than those on the dorsal surface, where the hairs are slightly less than two times the width of the segment in length. Union of first and second tarsal segments not wider than width of second segment at point of union. Mesosternal tubercle absent.

Abdomen.—Hairs on dorsum of abdomen distinctly finer and longer and fewer than hairs on ventral surface. Length of hairs on the dorsum .15mm. Length of hairs on the venter .105mm. The hairs on the dorsum arise from small pigmented tubercles. Cornicles with outer margin quite regular. Width of cornicles .48mm. Constricted portion of cornicles with numerous hairs, region near margin with distinctly fewer hairs.

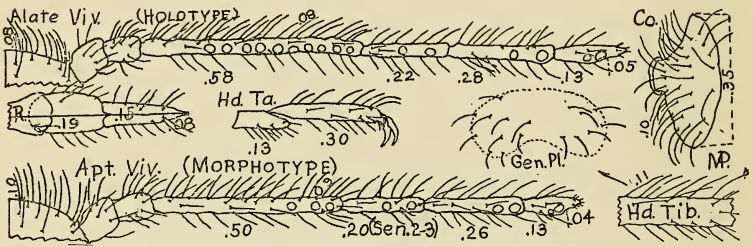
Transverse pigmented spots with two rows of hairs on the posterior margin. Dorsum of abdomen very finely reticulated, but without setulae. Cauda and anal plate with blackish setulae, cauda with median posterior tubercle, not always distinct. Hair on cauda and anal plate confined largely to posterior margin. Genital plate somewhat bent in the form of a crescent with the ends blunt and irregular. Hairs on genital plate confined to ends of crescent.

This species is allied to *C. hirsuta* H & E, and may be quickly differentiated from that species by the absence of the almost square mesosternal tubercle. The antennal segments are shorter, as are the tibiae, and the hair on the tibiae, the hair on the cornicles are not as extensive, and distinctly fewer hairs on the transverse pigmented spots. In Palmer's key to the genus *Cinara* in Aphids of the Rocky Mountain Region this species keys to *C. pinea* (Mord.), but not without difficulty because of couplet 27 which makes no allowance for hairs of two lengths and different angles. This species differs from *pinea* in many ways, the antennae are shorter, as are the tarsal segments, the hair on the tibiae are not of the same quality, and the cornicles are larger.

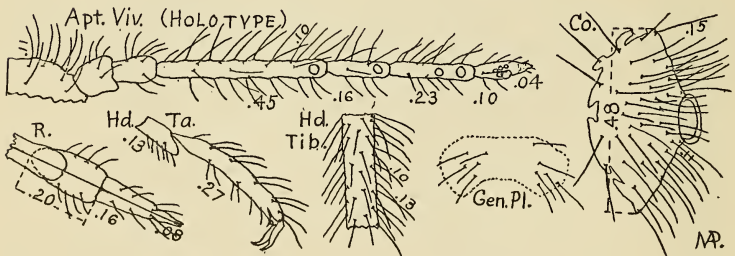
Holotype, apterous viviparous female, deposited in the United States National Museum. Host, *Pinus lambertiana*, Placerville, California March 16, 1939. Coll. J. S. Yuill.



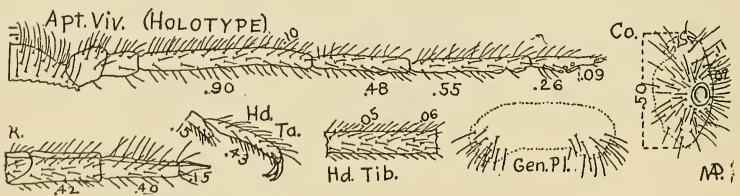
Cinara gentneri n. sp.



Cinara schuhi n. sp.



Cinara moketa n. sp.



Cinara kiusa n. sp.

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DESCRIPTIONS AND FIGURES OF THE
MORPHOTYPES OF SOME CONIFER FEEDING
APHIDS

BY F. C. HOTTES

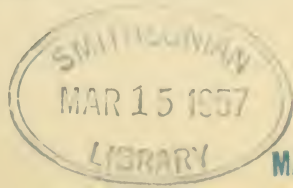
It is a pleasure to acknowledge the assistance of Dr. Louis G. Gentner and Mr. Joe Schuh who collected some of the forms described herewith.

Cinara sonata H.

Alate viviparous female.

Length from vertex to end of anal plate 6.60mm. Color in life not recorded, but cleared specimen is similar to cleared apterous viviparous forms. Length of antennal segments as follows: III 1.10mm., IV .50mm., V .50mm., VI .28 + .05mm. Sensoria distributed as follows: III 4-5 plus primary, confined to end of segment and arranged in a row, IV 1-2 secondary, plus primary, V 2 secondary, plus primary. Hair on third antennal segment fine, upstanding varying from .15-.18mm. in length, and quite numerous. Region of sixth antennal segment beyond middle weakly imbricated. One marginal sensorium much larger than the others and with a distinctly open center. Compound eyes very much rounded, comparatively small, with area next to head, equal to about half of eye free from ommatidia. Ocular tubercles present, but so small that they are apt to be overlooked. Rostrum not extended. Length of pro meso and metathoracic femora as follows: 2.20, 2.02, and 2.775mm. Length of metathoracic tibiae 5.40mm. Length of first metatarsal segment .12mm. Length of second tarsal segment .495mm. Wings poorly mounted, media very faint, twice branched, media 3 and 4 hardly visible. Cornicles with base much longer from the front to rear, than from side to side, longest width of base .90mm. Base of cornicles with numerous long rather coarse hairs, more constricted area of cornicles with finer, and somewhat shorter hair. Inner margin of cornicles with a deep cleft, similar to that which is present in the apterous viviparous female. Waxpore plates small, but the individual facets are very large. Pigmented areas are absent on the dorsum of the abdomen anterior to the cornicles, and almost lacking posterior to them, where present very small, very irregular and without arrangement. Pigmented spots anterior to cauda with from two to three rows of hairs. Other features of the alate similar to those of the apterous viviparous female.

Morphotype alate viviparous female deposited in the United States



National Museum. *Abies grandis*, Kootenai, Idaho July 18, 1949.
Coll. A. L. Gibson.

This form differs from the alate form of *C. abieticola* (Chol.) in having the secondary sensoria confined to the end of the segment on the third segment, in longer antennal segments, in having the genital plate wider and different in shape, in the shape and size of the cornicles, and in having the long hairs on the sixth antennal segment more numerous, and covering a greater extent of the segment.

Alate male.

Length from vertex to end of anal plate 3.375mm. Width of head through the eyes .78mm. Length of antennal segments as follows: III .75mm., IV .36mm., V .33mm., VI .20 + .05mm. Secondary sensoria distributed as follows: III 55, covering most of segment, IV 12, confined for the most part to the posterior surface and irregularly arranged, V, 3 arranged in a row on the posterior surface. Primary sensoria if present on third and fourth segments, like secondary, primary sensorium on fifth antennal segment large and quite tuberculate. Hair on antennae about .18mm. in length, fine, upstanding, much more numerous on anterior margin than on posterior margin. Median transverse suture on head very narrow, and not much darker than the head. Eyes small, round, without ocular tubercles. Media of fore wings with two forks, the second fork closer to the margin of the wing, but far removed from the edge. All femora with fine long hairs, which are rather numerous. Metathoracic femora 1.42mm. in length. Metathoracic tibiae 2.40mm. in length. First metatarsal segment .135mm. long, second metatarsal segment .36mm. in length. Hairs on metathoracic tibiae longer on outer margin than on inner margin, on this surface some hairs are more upstanding than others, these hairs are as a rule longer than the hairs which are not so upstanding. Hairs on dorsum of abdomen more numerous and longer than the hairs on the ventral surface. Ventral surface of abdomen with a distinct pigmented spot anterior to the genital plate, and about the same in size. Pigment spots on the dorsum of the abdomen indistinct. Cornicles longer than wide, length about .375mm. Inner margin of cornicles with a distinct furrow, similar to that found in the apterous and alate viviparous females. Surface of cornicles with numerous fine, long hairs, except for the restricted area where the hairs are much shorter. Anterior to the cauda there are two pigmented spots, these are very narrow, with their more median portions more or less fragmented. Cauda and anal plate with numerous hairs. Harpes rather blunt with moderately long hairs over the apex surface.

Allotype alate male, deposited in the United States National Museum. Collected on *Abies magnifica* var. *shastensis*, Mt. Ashland, Oregon Sept. 27, 1956 by L. G. Gentner.

Apterous oviparous female.

Length from vertex to end of anal plate 4.27mm. distinctly smaller than the viviparous female. Color of mounted specimens similar to that of viviparous females. Length of antennal segments as follows: III .97mm., IV .375mm., V .435mm., VII .225 + .075mm. Length of hind tibiae 3.60mm. provided with numerous small, tuberculate sensoria which cover all of the surface except the extreme base and a short

space near the apex. The hind tibiae are hardly swollen. Other features similar to those found on apterous viviparous female. Morphotype apterous oviparous female, deposited in the United States National Museum. Collected at the same time, and on the same host as the male by L. G. Gentner.

This species is apparently quite common on *Abies* sp. in our North Western States. Specimens of this species are so large that it is common to have immature specimens taken for mature ones. Immature specimens of *C. sonata*, always have the cornicles, smaller, much rounded, and lack the furrow on the inner margin.

Dr. L. G. Gentner to whom I am indebted for the male and oviparous females described herewith has taken it several times in Southern Oregon. He has sent me the following color and habitat notes, which are the first such taken from life known to me.

"Taken by beating the lower branches of Shasta red fir, *Abies magnifica shastensis*. Specimens were observed on the under sides of the lower branchlets among the bases of the needles. Apterous forms rather broadly oval, piceous, with bronze aenescens, very dark gray, dull patches of waxy powder on the pronotum and several narrow, transverse bands of same on dorsum of abdomen; underside covered with somewhat lighter grayish powder; legs pale brownish with dark areas at the joints and towards the middle of the segments giving them a banded appearance, antennae pale brownish with a piceous blotch at each joint."

Cinara setulosa H & E

Alate male.

Length from vertex to end of anal plate approximately 2.155mm. Dr. L. G. Gentner who collected the material from which this form is described recorded the color as follows: "Head and thorax black. Abdomen rather bright green." Antennae dusky except for the extreme base of third segment which is pale. All femora dusky with area at extreme base yellowish. Pro and mesothoracic femora much darker than the metathoracic femora. Tibiae and tarsal segments very dark brownish black, uniform throughout.

Length of antennal segments as follows: III .60mm., IV .23mm., V .22mm., VI .18 + .04mm. Sensoria distributed as follows: III 53-70 as a rule more than 57, covering most of segment, IV 16 covering all sides of segment, V 3-4 arranged irregularly, V 0-2. All sensoria are tuberculate, and variable in size. Media of fore wings twice forked, the second fork closer to the margin of the wing. Length of metathoracic femora 1.15mm. Length of metathoracic tibiae 1.725mm. Hair on outer margin of methathoracic tibiae fine, upstanding, varying in length from .10-.15mm. On this margin the hairs which are shorter are less upstanding than the longer hairs. Hairs on the inner margin of the hind tibiae are shorter, more numerous, and less upstanding than the hairs on the outer margin.

Cornicles with base measuring about .18mm. not much wider than height. Cornicles provided with two lengths of hairs, the shorter out numbering the long, the long hairs are fine, distinctly not spine-like as are those of the females. Dorsum of abdomen without setulae, in sharp contrast to the condition present in the apterous females.

Hair on dorsum of abdomen long and fine, approximately .11mm. in length. Harpes with numerous hairs which are shorter than those on the cauda.

This form differs greatly from what one would expect, knowing the structure of the apterous viviparous females. The cornicles lack the distinctly spine-like hairs found on the cornicles of the females and the dorsum of the abdomen not only lacks hairs of this type, but is without setulae. The hairs on the outer margin of the tibiae are much longer and finer than one would expect.

Oviparous female.

Length from vertex to end of anal plate varying from 4.05-4.38mm. Dr. L. G. Gentner who collected this form together with apterous viviparous females has sent me the following information which probably applies to both forms, but since the viviparous females outnumbered the oviparous females, and since no mention is made of the presence of powder, which may be expected on oviparous females, the notes may apply only to viviparous females. "Deep green, with a broad, pale greenish yellow, median longitudinal band, bordered on each side by a narrow dark green line. Smaller apterous forms which may be oviparous somewhat paler, more greenish in color, with the median band not so much in evidence."

Length of antennal segments as follows: III .57mm., IV .215mm., V .215mm., VI .18 + .045mm. Third and fourth antennal segments without sensoria, fifth segment with only primary. Hairs on antennae almost spine-like, those on anterior margin longer than those on the posterior margin. Metathoracic femora varying from 1.50-1.68mm. in length. Metathoracic tibiae varying from 2.10-2.47mm. in length. Length of metathoracic tarsal segments .15mm. and .55mm. Metathoracic tibiae with numerous small, very tuberculate sensoria that cover all of the surface except for the extreme base and apical fourth. The hairs on the outer margin of the hind tibiae are distinctly spine-like, quite upstanding and measure .10-.12mm. in length. The hairs on the inner margin are less upstanding, shorter, and less spine-like, as well as paler in color, than those on the outer margin, they are also more numerous. The hairs on both margins increase slightly in length towards the apex, the outer may also become less upstanding.

Cornicles not sharply differentiated from rest of abdomen in color, like those of apterous viviparous female, in being rather flat and with similar hairs, of two types. Dorsum of abdomen with setulose surface. Other features similar to those of apterous viviparous female.

Allotype, alate male. Morphotype, apterous oviparous female. Both types deposited in the United States National Museum. Collected by L. G. Gentner. Mt. Ashland, Jackson Co., Oregon, September 27, 1956. Taken on the lower branches of Shasta fir, *Abies magnifica* var *shastensis*.

Cinara chinookiana H.

Apterous male.

Length and general color.—Length from vertex to end of anal plate varying from 2.13-2.40mm. Dr. Gentner who collected the material from which this form is described records the color as follows: "Head and appendages black, black markings on thorax, abdomen greenish."

Descriptions of Morphotypes of Conifer Feeding Aphids 13

Cleared specimens indicate the antennae as brownish-black with the basal third of third segment paler. The dorsum of the abdomen has four rows of small wax pore plates, just median to the cornicles, just lateral to the outer row of wax pore plates there is a row of small pigmented spots, these are in line with the wax pore plates and the spiracles, which lie within pigmented areas. Pigmented spots anterior to the cauda, small, very irregular, provided with long hairs similar to those on the dorsum of the abdomen. Anterior to these pigmented areas and extending anteriorly as far as the cornicles, some of the hairs on the dorsum of the abdomen originate within small pigmented areas, which vary in size and shape. Cornicles with outer margins very irregular, with the anterior posterior axis much longer than the width. Harpes dark brown.

Head and thorax.—Length of antennal segments as follows: III .38-.405mm., IV .165-.17mm., V .21-.22mm., VI .17-.195 + .03mm. Sensoria distributed as follows: III 22-28, small, tuberculate, confined largely to posterior surface of segment, primary sensorium small. IV nine-fourteen, similar to those on third segment in size and position, primary sensorium likewise small. V nine-ten, primary sensorium large. VI seven-ten, two or more sensoria often more or less combined. Hair on anterior margin of antennae more numerous and longer than the hair on the posterior margin, varying in length from .06-.12mm. Marginal sensoria far removed from primary. Length of metathoracic femora varying from .825-.90mm. Length of metathoracic tibiae varying from 1.20-1.27mm. Hairs on these segments quite similar to those on the femora and tibiae of the viviparous female. Length of metatarsal segments .105 and .30mm.

Abdomen.—Cornicles with two lengths of hairs, the longer much longer than the shorter. Harpes suggestive of a mitten in shape, the thumb of which is rather long and thin, covered with moderately long hairs. Cauda and anal plate with setulae, both with two lengths of hair.

Oviparous female.

Length from vertex to end of anal plate varying from 3.75-3.38mm. Dr. Gentner has sent me the following color notes, which most likely also apply to the apterous viviparous female, since both forms were included in the same vial, "Shining reddish-brown, with yellowish-brown appendages, head dark, cornicles black." Antennal segments with the following lengths: III .375-.395mm., IV .18mm., V .225mm., VI .18 + .03mm. Third antennal segment without sensoria, fourth as a rule without secondary sensoria, sometimes with one, primary sensorium present. Fifth antennal segment with one or two secondary sensoria, and large primary. Sixth antennal segment weakly imbricated. Metathoracic femora varying in length from 1.02-1.125mm. Metathoracic tibiae varying in length from 1.38-1.50mm. Hind tibiae with a moderate number of small tuberculate sensoria, which are not very distinct. Other features similar to those of apterous viviparous female.

Allotype, apterous male. Morphotype oviparous female. Both types deposited in the United States National Museum. Collected by Dr. Louis G. Gentner. Crater Lake, Oregon, October 2, 1956. Host, *Abies lasiocarpa*.

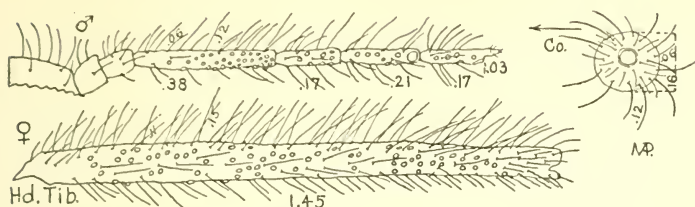
Cinara rustica H.*Alate viviparous female.*

Length from vertex to end of anal plate varying from 2.45-3.225mm. Color not closely observed, but dark dusky. Length of antennal segments as follows: III .42mm., IV .19mm., V .21mm., VI .10 + .03mm. Sensoria distributed as follows: III 2-4 plus primary, the secondary sensoria are arranged in a row, and show considerable variation in size. IV with only primary sensorium. V with one secondary and primary sensorium. All primary sensoria with wide rims. Hair on antennae sparse, upstanding, and about .07mm. in length. Third, fourth and fifth antennal segments pale with apical portions dusky. Ocular tubercles present and normal in size. Lateral lobes of thorax with hairs limited to the median portions of lobes. Media either once or twice forked. Posterior margin of stigma with a number of hairs. Stigma outlined with a fuscous border. Cornicles with outer margin quite regular. Width of cornicles .42mm. Metathoracic femora 1.05-1.20mm. in length, hairs fine upstanding, shorter than width of femora. Metathoracic tibiae 1.90-1.95mm. in length, hair similar to that of apterous viviparous female. Dorsal surface of abdomen with comparatively few hairs, ventral surface of abdomen with numerous hair. Ventral and dorsal surfaces of abdomen clothed with extremely fine, short, very closely spaced setulae. Pigmented spots anterior to the cauda widely separated, broad, provided with hairs along the posterior margin, the hairs being arranged in one to three rows. Cauda and anal plate clothed with numerous fine, short, dusky setulae. Hairs on cauda confined largely to the posterior margin.

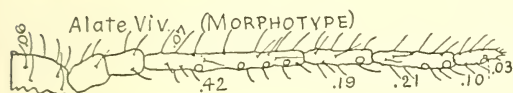
Specimens of this species feed on the needle free bark of more mature twigs of *Pinus edulis*. Morphotype, alate viviparous female, collected in type locality, deposited in the United States National Museum. Host, *Pinus edulis*. Springerville, Arizona, August 25, 1956.

Schizolachnus curvispinosus H. E. K.*Alate male.*

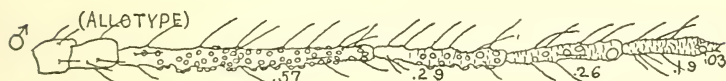
Length 2.13mm. Color of living specimen not recorded, mounted specimen dark brown, color most likely quite similar to that of females. Antennal segments with the following lengths: III .57mm., IV .29mm., V .26mm., VI .19 + .03mm. Sensoria on antennal segments as follows: III about 70, IV about 16, V about 8. Primary sensoria not distinctly different from secondary. Antennal hair not numerous, fine, sharp-pointed, slightly curved but not distinctly bent. Hair on femora fine, sharp-pointed curved. Hairs on tibiae only moderately coarse, curved but not distinctly bent, about .09mm. in length. Hairs on outer margin of metathoracic tibiae more upstanding and slightly longer than hairs on inner margin. All hairs on tibiae arising from distinct tubercles, making the tibiae look warty. It should be noted that the hairs on the antennae, femora and tibiae are distinctly unlike the hairs on similar parts of the females. Media simple. Hairs on dorsal surface of second tarsal segment coarser and longer than the hairs on the ventral surface. Length of metathoracic femora 1.05mm. Length of metathoracic tibiae 1.65mm. Length of metatarsal segments .075 and .30mm. Hairs on dorsum of abdomen finer, and longer than hairs on the females. Harpes with one posterior corner almost square, the other with a long finger.



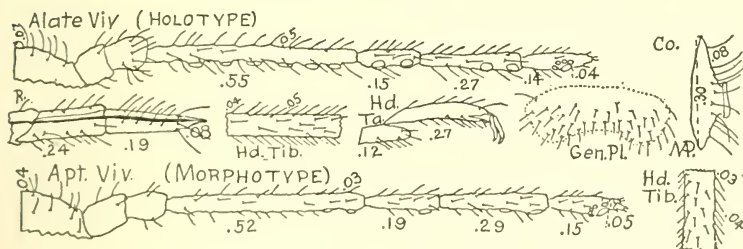
CINARA chinookiana H.



Cinara rustica H.



Schizolachnus curvispinosus HEK



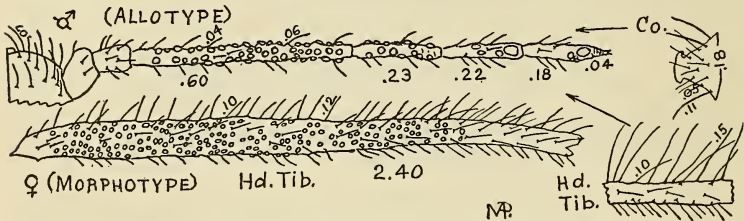
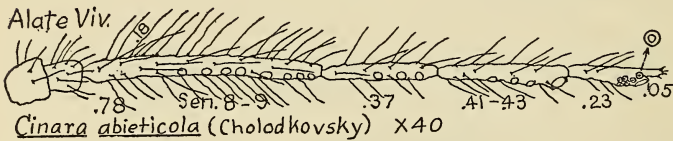
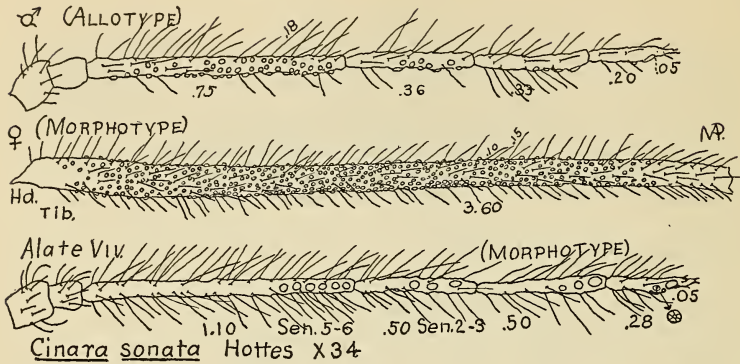
CINARA curtihirsuta H&E

Allotype, alate male, deposited in the United States National Museum. Butte Falls, Oregon, October 5, 1956. Coll. L. G. Gentner. Host, *Pinus ponderosa*.

Cinara curtihirsuta H & E

Apterous viviparous female.

Length from vertex to end of anal plate 3.67mm. Color not recorded from living specimens. As cleared and mounted yellowish-brown, with apical portions of third, fourth and fifth and all of sixth antennal segments dusky. Apical portions of femora distinctly darker than the base. Tibiae with distal portions dusky brown, the brown much more extensive on the metathoracic tibiae. Cornicles brown. Length of antennal segments as follows: III .52 mm., IV .19 mm., V .29mm., VI .15 + .05mm. One secondary sensorium either present or absent on third antennal segment, fourth antennal segment with one secondary



sensorium present. All other antennal segments with primary sensoria. Antennal hair not numerous, fine, sharp pointed, shorter than width of segment, varying in length from less than .03mm. to .03mm. Vertex of head with few hairs, which are similar to those on third antennal segment. Length of metathoracic femora 1.50mm. Length of metathoracic tibiae 2.70mm. Metatarsal segments .07 and .27mm. Hair on metathoracic tibiae varying in length from .03-.04mm. hair on the same segment of the alate viviparous female reaching a length of .05mm. but sometimes shorter. Mesosternal tubercle absent. Opening of cornicle distinctly acentric, much closer to posterior margin than to anterior margin. Hair on cornicles sparse, outer margin almost free from hairs. Transverse pigmented spots very narrow, with a row of coarse brown hairs along the posterior margin. Cauda and anal plate with setulae very well developed. Hairs on cauda confined largely to posterior surface. Morphotype, apterous viviparous female, deposited in the United States National Museum. Host, *Abies concolor*. Bly, Oregon Aug. 8, 1956 Coll. Joe Schuh.

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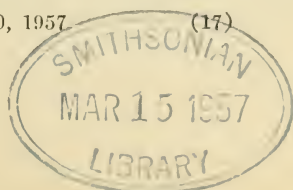
THE SYSTEMATIC POSITION OF THE MARMOSET,
SIMIA LEONINA HUMBOLDT (PRIMATES)

BY PHILIP HERSHKOVITZ

Curator of Mammals, Chicago Natural History Museum

It had been generally supposed by most authors, including the writer (1949:424), that *Simia leonina* Humboldt was a golden-maned marmoset related to, if not identical with, *Simia rosalia* Linnaeus. As Humboldt's marmoset is type of *Leontocebus* Wagner (1840:ix, 248), this generic name was used for the golden-maned, or little lion, monkeys. Cabrera (1956:49) has now shown conclusively that *Simia leonina* is really a member of the group of hairy-faced marmosets, better known as tamarins, characterized by a white circumlabial band. He therefore replaced *Tamarin* Gray with *Leontocebus* as the generic name for the hairy-faced forms. Because of priority, *Leontocebus* was also used to embrace the bare-faced marmosets of the recognized subgenera *Marikina* Lesson and *Oedipomidas* Reichenbach. In the absence of another available generic name Cabrera proposed *Leontideus*, with type *Simia rosalia* Linnaeus, for the true little lion monkeys. Except for the changes in technical names, the classification of marmosets adopted by Cabrera follows my arrangement of 1949 (pp. 409 et seq.). The exact characters of *Simia leonina* Humboldt and its relationship to other hairy-faced marmosets, however, still requires elucidation.

At hand is a series of 16 specimens of hairy-faced tamarins collected by the writer in 1952 between the Ríos Caquetá and Putumayo, South-eastern Colombia. This is the type region of *Simia leonina* Humboldt. Except for the very different pygmy marmoset, *Cebuella pygmaea*, no other member of the family *Callitrichidae* occurs in the area. Discounting vagaries of the original description of *Simia leonina* and liberties taken by the artist in depicting an animal he never saw, the present series exhibits all positive diagnostic characters of Humboldt's monkey. The head of the type of *Simia leonina* is described as "*nigrescens*" (Humboldt, 1805:31). In the 16 specimens at hand, the head, including



face and crown, is black. The mantle and hind limbs of the series are buffy finely ticked with black in conformity with the original description and colored plate of the type (op. cit., pl. 5). In the colored figure, however, the head is also buff, in contradiction to the text. The tail of the figure is likewise uniformly pale brown but the text describes it as "*superne atra, inferne badia.*" In the series, the tail agrees with the text in being blackish above and brownish beneath for from one-third to two-thirds its length. The back, in Humboldt's description, in the stylized figure, and in the series, is striated, or marbled, blackish and pale buff ("*dorsum maculis et striis albo-flavescentibus variegatum*"). The underparts of the series are brown as in the figure. In the text the underparts are understood as included in the "*corpus ex badio olivaceum.*" Head and body length of *Simia leonina*, estimated from the living animal, no doubt an immature, is given as 7 or 8 French inches, i.e., from 190 to 217 centimeters. Means and extremes of the external measurements of the 16 specimens at hand are: head and body combined, 225(212-234); tail, 348(296-383); hind foot, with claw, 71(64-77), ear, from notch, 28(26-31).

Thus, the status of *Simia leonina* Humboldt as a tamarin of the black headed, red-mantled group (cf. Hershkovitz, 1949:412-413, II-D) is confirmed by present topotypes, the first to be recorded since the original description. Humboldt's marmoset, therefore, is most nearly related to *Leontocebus illigeri* Pucheran from the Amazon in extreme south-eastern Colombia. In the latter, however, the mantle is dark reddish with the individual hairs uniformly colored except for their dark bases. This tonal color difference between *illigeri* and *Simia leonina* may be of less than specific grade, but pending a revision of the marmosets, the two are kept apart.

It is of interest to note that in his analysis, Cabrera (1956:51) compared Humboldt's description of *Simia leonina* with the colored figure of a marmoset identified by Cruz Lima (1945: pl. 38, fig. 1) as "*Tamarin nigrifrons nigrifrons.*" Actually, the figure appears to have been depicted from a specimen of *Leontocebus illigeri* with the reddish haired skin of the nape pulled up over the crown.¹ The figure of *Tamarin* [= *Leontocebus*] *lagonotus*² in the same work (pl. 36, fig. 2) shows the black head with the reddish mantle, arms and thighs characteristic of the *Simia leonina*—*illigeri* group.

The name *Simia leonina* Humboldt dates from the first edition of the *Reueuil d'Observations de Zoologie et d'Anatomie comparée*, published in 1805. The same name was used by Shaw in 1800, for a species of macaque. The next available binomial for Humboldt's marmoset is *Leontopithecus fuscus* Lesson (1842:9). This then becomes *Leontocebus* (*Leontocebus*) *fuscus* Lesson, with type, the original description and figure of *Simia leonina* Humboldt. *Leontopithecus* Lesson, falls in the synonymy of *Leontocebus* Wagner.

¹The type of *nigrifrons* I. Geoffroy, is a black mantled, brown crowned tamarin of unknown locality. It is probably identical with *Leontocebus fuscicollis* Spix. Unfortunately, the marmoset figured by Cruz Lima (1945:pl. 38, fig. 3b) as "*Tamarin fuscicollis*" should have been labelled *Tamarin* [= *Leontocebus*] *weddelli*. The characters of true *fuscicollis* Spix are shown in the figure identified by Cruz Lima (1945:pl. 36, fig. 1) as "*Tamarin nigricollis.*"

²A synonym of *illigeri* but possibly valid as a subspecies.

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PROCEEDINGS
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GEOPHILOID CHILOPODS TAKEN IN THE
NORTHERN ANDES IN 1954-1955

BY RALPH V. CHAMBERLIN

This paper is a report upon the centipeds of the Order Geophilida collected on the California Academy of Sciences Expedition of 1954-55 which covered an area in the Andes Mountains extending from Peru through Ecuador and into Colombia. All specimens herein described or referred to as part of the chilopod collection were taken by Dr. Edward S. Ross and E. I. Schlinger. I feel much obligated to Dr. Ross for the privilege of studying this material which is of no little importance in amplifying our knowledge of the myriopod fauna of the Andean region.

Order GEOPHILIDA
Schendylidae

Schendylurus andesicola new species

Color dull yellow. Length, about 28 mm. Pairs of legs, 47.

Head of form shown in Fig. 1, without frontal suture, overlapping the basal plate which is broadly trapeziform and short. Clypeal area relatively large, bearing two setae. In front of this area two stouter setae and at some distance caudoectad of it on each side a series of four stout setae.

Prehensors when closed a little exceeding the anterior margin of the head, all joints unarmed.

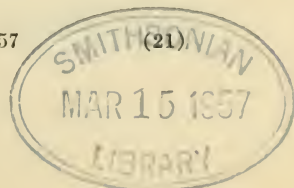
Embayment of the labrum somewhat wider and proportionately shallower than that of *dentifer* but of the same general structure otherwise.

First sternites with a shallow recess beneath a chitinous anterior margin, an obtuse angle of preceding sternite fitting into this recess. Ventral pores in a circular area, beginning on second sternite.

Last sternite broad, its caudal margin convex, the plate bearing a number of long setae and across the caudal border a band of dense, short fine hairs as shown in Fig. 2.

Praetarsus of anal leg represented by a finely acute, straight chitinous point as shown in Fig. 3.

Locality.—Ecuador: 30 mi. S. of Alausi, Chimborazo. Holotype taken February 20, 1955.

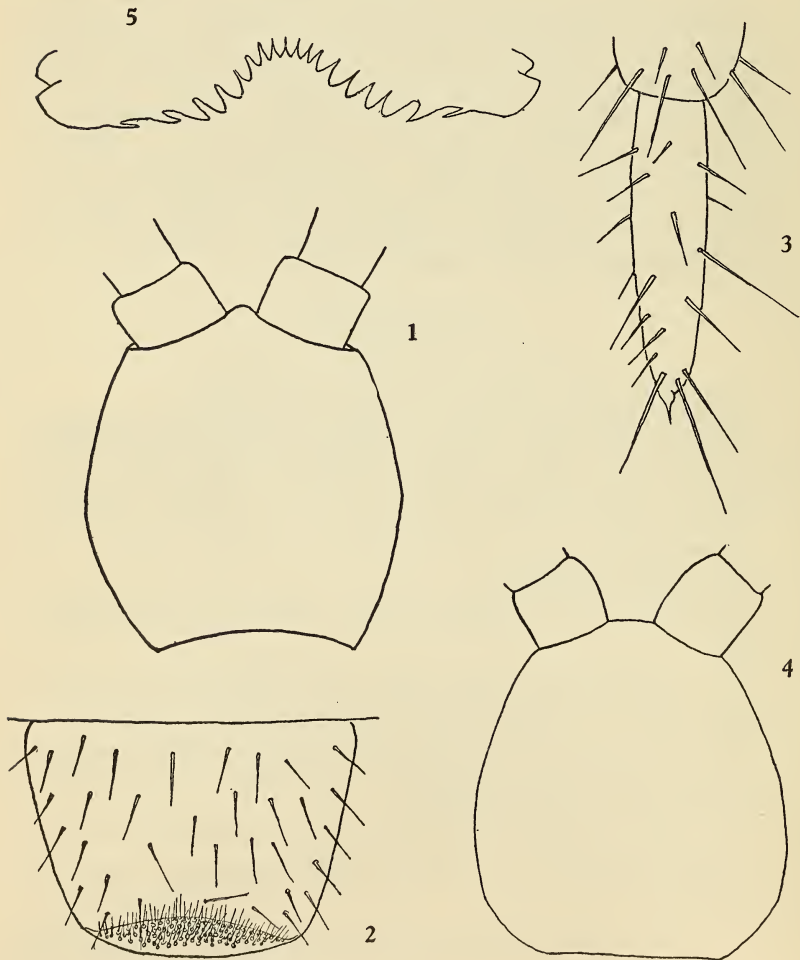


Schendylurus dentifer new species

General color, pale yellow. Length, about 26mm. Pairs of legs, 45.

Form of the head shown in Fig. 4. A spot of reduced polygonal areoles near middle of clypeus. Reentrant angle of labrum deep; teeth stout and conical with exception of two at each lateral end of the series which end in slender tips. (Fig. 5). Claw of second maxillae closely pectinate on both margins. First maxillae bearing a lappet from the syncoxite on each side. Dental plate of mandible divided into three blocks.

Claws of prehensors when closed attaining or slightly exceeding anterior margin of head; each claw with a small but distinct conical tooth at base; other joints unarmed.



No ventral pores on first sternite, a few on second; pores on other sternites in an undivided circular area, numerous.

Last sternite wide, its lateral borders covering the pores on each side.

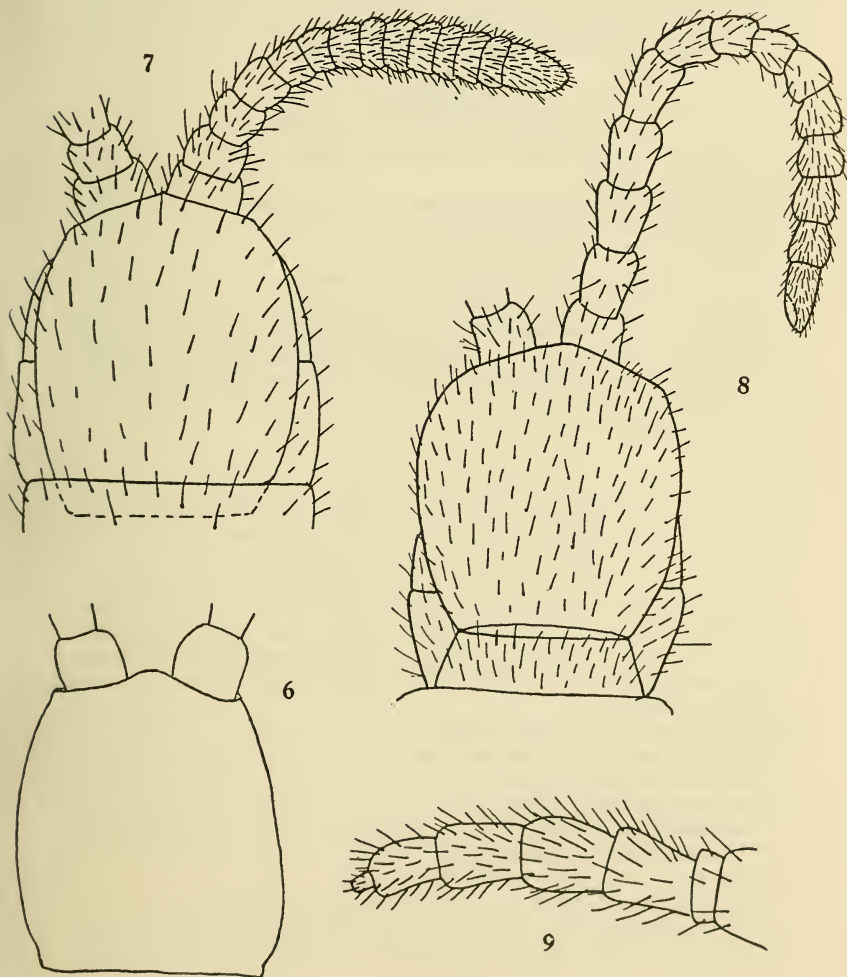
Locality.—30 mi. N. of Latocunga, Cotopaxi. Holotype taken February 21, 1955.

Distinguishable from *andesicola* in the presence of the tooth on claw of prehensors and in having the coxal pores covered, etc.

***Schendylurus pallidus lomanus* new subspecies**

Color plate yellow. Length, 17mm. Pairs of legs, 43.

Clypeal area bearing two setae. In front of this area a second pair of setae.



The head as a whole proportionately broader than in *pallidus* (Fig. 6). First maxillae without external lappets.

Claws of prehensors unarmed and prefemur without tooth or nodular prominence.

Last sternite with caudal and lateral margins convex covering the pores on each side. (Fig. 10.)

Tarsal joints of anal legs slender, without trace of a praetarsus at the tip.

Locality.—Peru: 16 mi. NW Chancay, Loma Lachay. Holotype taken January 12, 1955.

Dr. Kraus gives the number of pairs of legs of his *pallidus* as 53, probably the number in the holotype, without indicating any variation of this number in the paratypes. This contrasts with 43 pairs in the present species which seems also to differ in the form of the last sternite as well as in that of the head. (Cf. fig. 10).

Ballophilidae

Diplethmus ribauti Chamberlin

Locality.—Colombia: 2 mi. W. of Alban, Condin Amarea. One specimen, March 14, 1955.

This species was previously known from Colombia at Camelia, near Angelopolis in the Central Cordilleras.

Genus *Zygethmus*, new

A genus agreeing with *Diplethmus* in having the ventral pores of the sternites in two well separated areas which, however, are not elevated as they are in that genus. It also differs importantly in having only one, instead of two, coxal pore on each side. The nearly vestigial form of the second tarsal article of the anal legs would seem also to be of generic importance.

Generotype.—*Zygethmus pantenus* new species

This new genus may be placed with reference to the other known genera of the family by means of the following key.

Key to Genera of the Ballophilidae

- | | |
|---|-------------------------------|
| 1. Ventral pores diffuse, in an indistinctly limited band on caudal border of sternite; antennae short, with joints broader than long | <i>Taeniolinum</i> Pocock |
| -- Ventral pores in one or two mostly sharply defined submedian areas; antennae longer | 2 |
| 2. Ventral pores in a single area | 3 |
| -- Ventral pores in two circular areas | 9 |
| 3. Antennae decidedly clavate | 4 |
| -- Antennae not truly clavate | 8 |
| 4. Prehensors lacking distinct sclerotic lines | <i>Ballophilus</i> Cook |
| -- Prehensors with definite sclerotic lines | 5 |
| 5. Each anal coxa with a single pore | 6 |
| -- Each anal coxa with two pores | 7 |
| 6. Coxal pore composite | <i>Clavophilus</i> Chamberlin |
| -- Coxal pore simple | <i>Tanophilus</i> Chamberlin |

7. Ventral pore area transversely elliptic *Thalthisius* Attems
 -- Ventral pore area strictly circular *Ityphilus* Cook
 8. Antennae short, attenuated distad *Leptyniphilus* Chamberlin
 -- Antennae longer, geniculate, the last six articles set off in form
 and size from the others *Cerethmus* Chamberlin
 9. Coxal pores two on each side; second article of tarsus of anal legs
 of normal size *Diplethmus* Cook
 -- One coxal pore on each side; second tarsal article of anal legs
 greatly reduced, nearly vestigial *Zygethmus* gen. nov.

***Zygethmus pantenus* new species**

Length, 21mm. Pairs of legs, 47.

Head longer than broad in about the ratio of 25:23; anterior margin as a whole convex, the caudal margin wide and straight, the sides gently convex; no frontal suture. Antennae filiform, of uniform thickness throughout, typically curved at middle but not geniculate. (Cf. fig. 8.)

Prebasal plate exposed at middle. Basal plate broadly trapeziform.

Claws of prehensors when closed not attaining the front margin of head. All joints of prehensors unarmed. Prosternum also without teeth, with chitinous lines.

Ventral pores in two well separated areas near middle of sternite; beginning on second sternite; the poriferous areas not at all elevated.

Last ventral plate subtrapeziform but not more than moderately narrowed caudad. A single coxal pore on each side, the gland apparently composite.

Anal legs in the male with all joints crassate except the second tarsal which is abruptly reduced. (Cf. fig. 9.)

Locality.—Ecuador: 8 mi. W. of Pante, Azuay. February 17, 1955.

***Ityphilus calinus* new species**

Length, about 19mm. Pairs of legs, 43.

Antennae curved at middle but not truly geniculate, moderately clavate beyond middle. (Fig. 7.) Claws of prehensors when closed extending a little beyond anterior margin of head. All joints of prehensors unarmed. Prosternum with sclerotic lines, unarmed anteriorly.

Dorsal plates bisulcate.

Ventral pores in the usual single, circular area.

Anal legs in the male conspicuously crassate, its distal article conical.

Last ventral plate broad, moderately narrowed caudad, the sides convex and the caudal corners rounded. Two large coxal pores on each side.

Locality.—Colombia: 13 mi. W. of Cali, Valle. Male holotype taken March 20, 1955.

This species differs from *I. guianensis* in having the antennae much less strongly crassate and less geniculate; also differing in the number of pairs of legs—43 as against 49–55.

Oryidae

***Notiphilides maximiliana* (Humbert and Saussure)**

Locality.—Peru: Monson Valley, Tingo Maria. A male and a female taken October 26, 1954.

Orphnaeus brevilabiatus (Newport)

Localities: Ecuador: 6 mi. S. of Santa Rosa, El Oro; four, January 23, 1955; 27 mi. SW. of Quevado, Los Rios; one, February 5, 1955; Pichilingue, two, February 2, 1955.

Colombia: 15 mi. S. of Corinto, Cauca, one, March 6, 1955; 17 mi. W. of Sevilla, Valle, one, March 8, 1955; 27 mi. W. of Cali, Valle, March 21, 1955.

Peru: Monson Valley, Tingo Maria, December 18, 1954, and a variant specimen from the same locality taken October 10, 1954.

Chilenophilidae

Ribautia rossi new species

Body yellow, the head and prehensors chestnut.

Length, about 22mm. Pairs of legs, in all three specimens, 47.

Head about two thirds as wide as long; widest at middle; strongly rounded about the corners; caudal margin short and straight; no frontal suture. (Fig. 15). A distinct, small clypeal area toward anterior border of clypeus, its areoles very small, bearing three setae.

Median piece of labrum transversely oblong, the caudal face roughened but not dentate; lateral pieces moderately pectinate along inner half. (Fig. 11.) Maxillae presenting the usual general features. Prehensors much exposed from above laterally and anteriorly; claws when closed reaching distal end of the second antennal article; claw armed at base with an acute, conical black tooth, the prefemur with a similar but smaller tooth at distal end. Prosternum on anterior margin with a prominent rounded tooth each side of the median incision.

Ventral pores in a circular area beginning on second sternite and present on others of anterior half of body only. On each typical sternite two long sublateral setae on each side, these setae equal in length; sparsely arranged over the surface are fine and short hairs, those of two rows between the posterior major setae appearing especially conspicuous.

Last ventral plate wide, narrowing caudad, the caudal margin convex. Coxal glands opening through three well defined, large pores on each side, the posterior two of these pores free, the anterior one about half covered by the sternite. (Cf. fig. 12.)

Anal pores present.

Locality.—Ecuador: Pichilingue. Three taken February 1955.

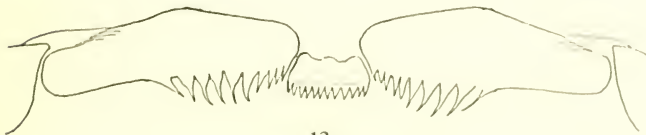
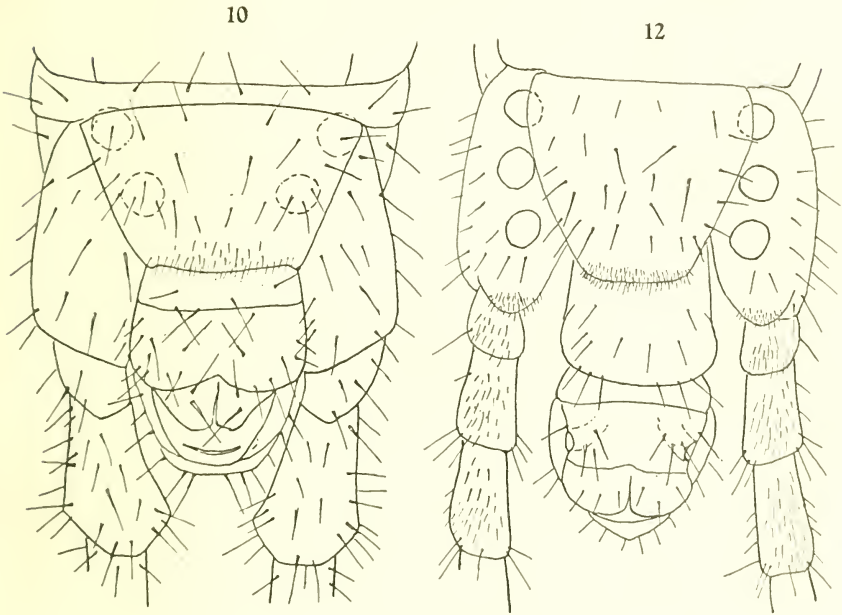
This species much resembles the Colombian *R. fuhrmanni* but has ventral pores only on sternites of the anterior half of the body instead of on all from the second to the penult. It also differs in having only three coxal pores on each side instead of from 5 to 7 in having the median piece of the labrum free and edentate, and in having the teeth of the comb of the lateral pieces finely tipped rather than frayed distally. Pairs of legs 47 as against a normal 53.

Genus *Schizoribautia* Brolemann

The known American species regarded as pertaining to this genus in the restricted sense may be separated by means of the following key.

Key to Species of *Schizoribautia*

1. Ventral pores present on sternites from second or third to the penult 2
- Ventral pores present only on anterior half of body 4
2. Coxal glands in two groups on each side; ventral pore areas all undivided *S. centralis* (Silv.)
- Coxal glands in three groups; some ventral pore areas divided 3
3. Middle piece of labrum oblong, bearing numerous fine teeth *S. peruana* Verhoeff
- Middle piece narrowly triangular, margin simply fimbriate *S. titieacae* Turk



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4. Median piece of labrum nearly as wide as lateral pieces; sternites lacking the usual two large sublateral setae *S. seydi* (Ribaut)
- Median piece not this large; sternites with the long sublateral setae present 5
5. Prefemur of prehensors with no median tooth and prosternum also lacking true teeth *S. phana* (Chamb.)
- Prefemur with a well chitinized tooth or tubercle at middle; prosternum with distinct teeth or chitinous tubercles 6
6. Ventral pore areas increasing in size on posterior sternites of the series and becoming subelliptic; two setae on median line of clypeus but none caudoectad of clypeal area *S. carpisha* n. sp.
- Ventral pore area not thus changing in size and form; clypeus with two setae caudad of clypeal area but none on the median line
..... *S. junina* n.sp.

Schizoribautia carpisha new species

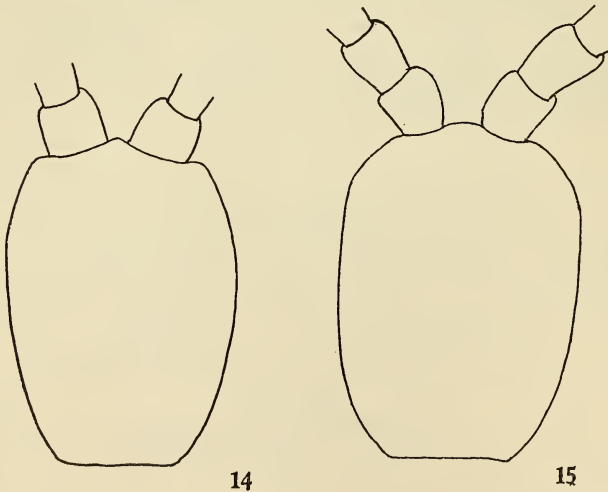
Length, 34mm. Pairs of legs, 51.

Head of the form shown in Fig. 14.

A clypeal area on the anterior border, composed of minute polygonal areoles and clearly set off. The area bears a pair of setae on its caudal portion and two on the median line in front of these. Back of the clypeal area on the median line are two setae.

Labrum with median piece transverse, bearing about twelve conical teeth; lateral pieces strongly pectinate on inner half (Fig. 13). Processes of first maxillae about equal in length; the inner process with six long setae on ventral face; the outer process with twelve similar setae. Coxae of second maxillae bearing at mesodistal corner the usual stout process; palpus on distal joints bearing numerous long setae which exceed the claw in length.

Prehensors much exposed laterally and anteriorly, the claws when



closed attaining the distal end of the second antennal article; basal plate proportionately short, overlapped by the cephalic plate; prefemur bearing within at distal and an acute black tooth, a similar one at base of claw; prosternum bearing a distinct dentiform and well chitinized nodulae each side of the median incision.

Of the two large sublateral setae on each side of the typical sternite the anterior is moderately longer than the posterior; minute hairs sparsely distributed over the sternite. Ventral pores in a median circular area beginning on second and present on others of anterior half of body. Last sternite broad. Coxal glands in three clusters, their pores free.

Locality.—Peru: Carpish Mountains, 40 mi. SW. of Tingo Maria.

Schizoribautia junina new species

Light brownish, the head and prehensors chestnut.

Length, 43mm. Pairs of legs, 51.

Head oblong, nearly two-thirds as wide as long, a little widest at level of labrum, narrowing in conspicuously toward ends.

A clypeal area on anterior border, its areolation fine; the area bearing four setae, two at middle and two near caudal edge; on each side of clypeus caudoectad of the area two setae, one much longer than the other.

Median piece of labrum, subtrapeziform, bearing on caudal side about ten close-set conical teeth which decrease in size from the middle ectad. Lateral pieces of labrum strongly pectinate as in *carpisha*. First maxillae with inner processes each bearing eleven stout setae on its ventral face, the four process or palpus bearing six similar setae toward distal end. Coxae of the second maxillae separated, each bearing the usual process at distomesal corner; distal article of palpus bearing numerous long setae, the adjacent joint bearing fewer similar setae.

Prehensors much exposed from above as usual; claws when closed attaining distal end of second antennal article; femuroid with a black conical tooth at distal end and a smaller tooth near middle; claws also with a stout tooth at base; prosternum anteriorly with two dark teeth.

Sternites not sulcate. Ventral pores in a circular area beginning on the second sternite and present only on other sternites of anterior half of body. Each sternite bearing two submarginal major setae on each side, of which the anterior is much the larger.

First spiracle largest, vertically elliptic, the others circular.

Last ventral plate broad, narrowing caudad, the caudal margin convex.

Coxal glands in three clusters on each side, the three pores covered by the sternite.

Anal pores present.

Locality.—Peru: 37 km. E. of Cashuamayo, Junin. Two specimens taken October 15, 1954.

- Schendylurus andesicola* n. sp. Fig. 1. Head in outline. Fig. 2. Last sternite. Fig. 3. Second tarsal joint of anal leg.
- Schendylurus dentifer* n. sp. Fig. 4. Head in outline. Fig. 5. Labrum.
- Schendylurus pallidus lomanus* n. subsp. Fig. 6. Head in outline. *Ityphilus calinus* n. sp. Fig. 7. Head. *Zygethmus pantinuss* n. sp. Fig. 8. Head. Fig. 9. Anal leg.
- Schendylurus pallidus lomanus* subsp. n. Fig. 10. Caudal end of body, ventral view. *Ribautia rossi* n. sp. Fig. 11. Labrum. Fig. 12. Caudal end of body, ventral view. *Schizoribautia carpisha* n. sp. Fig. 13. Labrum.
- Schizoribautia carpisha* n. sp. Fig. 14. Head in outline. *Ribautia rossi* n. sp. Fig. 15. Head in outline.

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THE TYPE LOCALITY OF *BISON BISON* LINNAEUS

BY PHILIP HERSHKOVITZ

Curator of Mammals, Chicago Natural History Museum

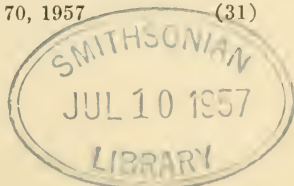
The basis for the name *Bison bison* Linnaeus (1758:72) was restricted by Thomas (1911:154) to the "'*Taurus mexicanus*' of Hernandez, Mexico, p. 587." Accordingly, he declared "'Mexico,'" with the reservations implied by his quotation marks, the type locality of the species.

Designation of México as type locality has met with valid objections. Bison do not live now within the present confines of México and there is no positive evidence that they ever did in historic time. The question of their distribution has been examined recently by Reed (1952:390) and by Baker (1956:325). The first rejected México and substituted southern or southeastern United States as type locality. The second demurred and held for northeastern México as a proper restriction. Each authority cited a number of documents in support of his opinion but neither applied to the primary Linnaean source for the description of the bison and the details of its habitat.

The full title of the work cited by Linnacus is *Rerum Medicarum Novae Hispaniae Thesaurus sui Plantarum Animalium Mineralium Mexicanorum Historia*, by Francisco Hernández, published 1651, in Rome. The page reference is 587.

At the head of the page cited appears a woodcut of a bison under the Latin title *Taurus Mexicanus*. The first paragraph of the account that follows is a description of the animal by Ionnes Faber, one of the editors of the Hernández manuscript. His opening sentence explains that the original from which the figure was copied bore no name either Latin or Mexican. After 10 pages devoted to a review of wild and domestic cattle in general, the author declares that bison like the one described and figured are to be found in the New World province of Quivira. Inasmuch as the publication is devoted primarily to a description of Mexican plants, animals and minerals, the bison, in Faber's opinion, should also be called Mexican rather than by the more general denomination, American. This explains the controversial title *Taurus Mexicanus*. Faber also informs that bison were reported from Florida where they are called *butrol*.

The elaborate dissertation on cattle by editor Faber was inspired by the brief account of bison written by Hernández himself and included in the first treatise of the addendum to the same volume. This section



of the published parts of the original manuscript by *Hernández* bears the title *Historiae Animalium et Mineralium Novae Hispaniae*. The bison is described in chapter 30, page 10, as follows, translated from Latin.

“The Cattle of the Quivira Region

“(Concerning one of them, see page 587 above, by Io. Faber).

“When the Spaniards entered in these regions [i.e. the Coronado expedition to the Quivira], they encountered, among other marvelous things, herds of wild cattle of moderate size with humped back, thick mane and long dewlap. The color of the whole body is dark; the meat is not inferior in taste or less wholesome than that of our own cattle. The natives first drink the blood then eat the meat raw and they use the hides for protecting their bodies against the cold. I have heard that one of these cattle was brought to Philip the Great [the one figured and described by Faber] and that a race of hump backed men are also to be found beyond the river Acunchis.”

The Quivira Region has been identified as the site of villages of Wichita Indians in central Kansas. According to Indian tales, these settlements contained fabulous wealth in precious metals. Francisco Vázquez de Coronado, who sought them in 1541, found only rich soil, primitive Indians and wild cattle. Indeed, Coronado and his men were the first Europeans to see the immense herds of American bison (cf. Bolton, 1949:282). *Hernández* who lived in México during the last half of the 16th century may have learned about bison directly from members of Coronado's party.

The exact locality of the “type” of *Bison bison Linnaeus*, therefore, is the ancient “Quivira Region,” then “Mexico,” now central Kansas. This may be regarded as the precise *type locality*.

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AN UNRECOGNIZED POCKET GOPHER FROM
WISCONSIN

BY HARTLEY H. T. JACKSON

The taxonomic relationships of Wisconsin members of the pocket gopher genus *Geomys* have been problematic. In recent studies I have had available 112 specimens that represent fairly well the known distribution of the genus in the state. These specimens are in the following collections: U. S. Biological Survey, 21; Milwaukee Public Museum, 14; University of Wisconsin Zoological Collection, 8; University of Illinois Museum of Natural History, 69. For their courtesy, aid, and the loan of specimens for this study I am indebted to Dr. W. C. McKern, Milwaukee; Dr. John T. Emlen, Jr., Madison; and Dr. Donald F. Hoffmeister, Urbana.

The exact type-locality of *Geomys bursarius bursarius* (Shaw) is unknown, but is now usually considered as near Elk River, Sherburne County, Minnesota. In the original description the specimen is said to have come from the fur trade of the Northwest Territories and to be unavailable at the time and in the possession of "Governor Prescott" (George Shaw, Trans. Linnaean Soc. London, vol. 5, p. 227, 1800). It could conceivably have come from northwestern Wisconsin which probably pocket gophers and certainly fur traders inhabited at that early day. As a basis of comparison of *Geomys b. bursarius*, however, I have used a series of 40 specimens from Elk River, Minnesota, in the U. S. Biological Survey and U. S. National Museum collections. The Wisconsin range of the subspecies *bursarius* as determined by the present studies is confined to the east side of the Saint Croix River drainage, and to the headwater drainages of the Brule and Iron rivers, which flow into Lake Superior. It ranges northward to within about 12 miles of Lake Superior. The Mississippi River watershed from the Chippewa River drainage south of latitude 45° 30' N to the north bank of the lower Wisconsin River, west of longitude 90° W, is inhabited by a race heretofore unrecognized.

Geomys bursarius wisconsinensis, subsp. nov.
Wisconsin Pocket Gopher

Type-specimen.—No. 243,055, U. S. National Museum, Biological Survey collection; adult ♀, skin and skull; collected September 13, 1922, by Hartley H. T. Jackson. Original number 1604.

Type-locality.—Lone Rock, Richland County, Wisconsin.

Diagnostic characters.—Similar in size, color, and superficial appearance to *Geomys bursarius bursarius*. Clearly separable by certain cranial characters. The premaxilla in *wisconsinensis* in superior view is narrower and somewhat concave posteriorly, whereas in the subspecies *bursarius* it is nearly flat or slightly convex posteriorly. The rostrum is somewhat narrower than in *G. b. bursarius*. Premaxilla distinctly and evenly incurved laterally anterior to premaxillary root of zygoma, whereas in *G. b. bursarius* the edge of premaxilla is nearly straight anterior to root of zygoma. Inner borders of premaxillae diverging posteriorly and thus widening the distance between their posterior tips. The most conspicuous difference between the two subspecies results from this wider space between the posterior ends of the premaxillae and is reflected in the broader anterior lobe of the frontal, which is about as broad as long in *wisconsinensis*, whereas in *G. b. bursarius* it is only about one-half as broad as long.

Measurements.—Type-specimen (adult ♀): Total length, 246 mm; tail vertebrae, 73; hind foot, 32. Skull: Type-specimen (adult ♀): Greatest skull length, 44.5 mm.; zygomatic breadth, 25.5; interorbital breadth, 6.9; maxillary tooth row, 8.0.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW APTEROUS ARADIDAE (HEMIPTERA)

BY CARL J. DRAKE*

The present paper comprises the descriptions of one new genus and seven new species of apterous aradids. The types have been deposited as stated under the description of the various new species. In the measurements, 80 units equal one millimeter.

Acaricoris floridus, new sp.

Small, obovate, dark reddish ferrugineous, slightly shiny, without lateral lobes or projections on thorax or abdomen, widest behind middle of pronotum. Length (male), 3.00 mm., and (female) 3.15; width, (male) 1.12 mm. and (female) 1.52 mm.

Head 0.52 mm. long and 0.52 mm. wide across eyes, subquadrate, with low and narrow longitudinal ridges; juga narrow, flattened laterally, slightly surpassing tylus in the form of short, rounded, divergent, finger-like processes with rounded apices; tylus wide, with a median longitudinal row of tiny tubercles; each lateral shelf on practically same level and nearly as wide as median part of head on vertex, longitudinally ridged, moderately narrowed to neck back of eyes, with a small tubercle on lateral side behind each eye; eyes small, reddish; labial sulcus very wide, shallow, extending to neck; labium short, reaching to end of sulcus. Neck short, constricted. Antenniferous tubercles stout, divergent, narrowed apically, each with a blunt apex. Antennae 0.84 mm. long, with pale inconspicuous pubescence, rather short, with first segment stout, granulate, measurements—I, 0.26 mm.; II 0.15 mm.; III, 0.20 mm.; IV, 0.23 mm. Legs short, finely granulate.

Spiracles II, III and IV sublateral, scarcely visible from above unless connexiva are slightly turned up or abdomen a little tilted upward on one side; V, VI and VII lateral and thus visible dorsally or ventrally; VIII placed on end of a short, posteriorly-directed tubercle. Thoracic divisions and first two abdominal tergites all fused together in one piece, with transverse suture in front of and behind mesonotum (save on median ridge) distinctly indicated; median longitudinal ridge becoming wider posteriorly, with two to three small, longitudinal ridges up on median ridge, all ridges with smooth and shining surfaces; surface on each side of median ridge with small raised areas and longitudinal ridges. Abdomen with tergites III to VI (inclusive) fused together into one solid piece; connexival segments, also segmentation of body

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beneath, as in other members of the genus. Collar very short, narrow, exerted.

Holotype (male) and *allotype* (female), Highlands Hammock Park, Highlands County, Fla., taken from forest litter on the ground by means of a Berlese funnel, June 15, 1955, by H. S. Dybas, in Chicago Museum of Natural History. *Paratypes*, 4 adults (and numerous nymphs of various sizes) same data as type.

Differs from *A. austeris* Drake of Guadeloupe by not having a small lateral projection on each side of abdominal tergite VII and more pronounced median longitudinal ridge of thorax. *A. ignotus* Harris and Drake of the Gulf states has a lower and more rugulose median longitudinal ridge, wider anterior part of thorax and the dorsal abdominal gland of the fused tergites is black.

Eretmocoris insularis, new sp.

Small, obovate, slightly shiny, without lateral lobes or projections, widest behind middle of abdomen. Stigmata II, III and IV ventral, latter very near exterior margin, each of the other two slightly farther removed anteriorly; IV to VII (inclusive) lateral, visible from above, VIII (genital) placed on apical end of small posteriorly-directed process. Length, 3.80 mm.; width, 2.12 mm.

Head subquadrate, width across eyes (0.75 mm.) and median length subequal, rugulose, each lateral shelf a little narrower on vertex than median longitudinal part; eyes scarcely inserted at base, small, with a fairly prominent tubercle (extending laterally to middle of eye) just back of each eye, then with lateral shelf quickly narrowed to neck and granulate on surface of lateral side; neck narrow, short; juga surpassing apex of tylus, there stout, divergent, rounded with blunt apex, the tylus roundly declivent anteriorly; antenniferous tubercles large, divergent, narrowed to a blunt point. Labial sulcus deep, very wide, narrowed apically, the labium testaceous and extending to apex of sulcus. Antennae finely granulate, 1.15 mm. long, with basal segment stout and exceeding apices of juga by nearly half of its length, measurements—I, 25; II, 17; III, 28; IV, 22.

Thorax and abdominal segments I and II all fused together, with sutures in front of and behind mesonotum plainly indicated, with wide median part polished; median longitudinal ridge glossy, widened posteriorly, arising just behind pronotum, with two interrupted, rounded, testaceous ridges (one on each side of dorsal surface: interruptions indicating divisions of metanotum and abdominal tergites I and II); pronotum with median longitudinal furrow, with lateral sides concavely narrowed anteriorly and then anterolateral angles produced bluntly forward; anterior margin deeply widely excavated for reception of collar; collar short, smooth, wide, encircled by a deep furrow; mesonotum wider but not longer than pronotum back of collar, the lateral margins of all thoracic divisions granulate. Abdominal tergites III to VI (inclusive) united into a solid plate, sculptured, with the large dorsal gland blackish fuscous; ventral tergites IV and VII separated by usual sutures, the basal segments fused with sterna. Connexival segments marked off as in other members of the genus.

Type (male), Guadeloupe (Three Rivers), in Drake Collection (U.S.N.M.)

Separated from its congeners by the larger tubercle behind each eye, slightly longer antennae, thicker juga, absence of lateral lobes on abdominal segment VII and especially by the broken pair of carinae (one on each side of dorsal surface) up on top of large median ridge. The interruption of these carinae probably indicate the original divisions between metanotum and tergite I as well as between tergites I and II.

Tananarivea, new gen.

Large, thick, obovate, without lateral lobes or projections, with areas or linear markings of tomentose hairs. Head wide, thick, only slightly narrowed behind eyes, with neck short and little constricted; juga only slightly surpassing tylus; eyes small, exerted; lateral shelves thick, poorly defined. Labial sulcus rather long, wide, open behind; labium slightly longer than sulcus, not reaching to anterior margin of pronotum. Antennae moderately long, finely granulate; segment I swollen, not surpassing apex of juga, II shortest, III longer than IV. Legs short, slightly roughened.

Thorax and abdominal tergites raised, pro- and metanotum rather craggy, the abdominal scent gland prominent. Pronotum sloping downward anteriorly, not excavated for reception of short collar; mesonotum set off from both pro- and metanotum by usual transverse furrows; metanotum fused with first two abdominal tergites; abdominal tergites III to VI (inclusive) fused into one solid plate; connexival segments I and II fused, the others separated from one another by usual sutures. Abdomen beneath with segments IV, V and VI distinguishable by the usual sutures. Spiracles II to VI (inclusive) ventral, remotely removed from outer edge of segments; VII placed only slightly beneath the upper edge of the connexiva, scarcely visible from above; VIII placed on the posterior edge of the genital segment.

The color, thickness of body and general aspect are similar to the genus *Emydocoris* Usinger from South America. However, the thick head, much smaller eyes, much wider neck, poorly defined, thick, lateral shelves, and the position of spiracle VII readily separate the two genera. It should also be noted that the orificial canal and opening are rather similar in both genera, also the position of stigmata except VII.

The type species is

Tananarivea tiptoni, new sp.

Large, thick, broadly obovate, widest behind middle of abdomen, black with matted tomentose hairs sordid brown. Length, 10.00 mm.; width, 5.00 mm.

Head wide, thick, pretty much covered with matted tomentose hairs, moderately convex longitudinally, with longitudinal furrows on median part, slowly narrowed behind eyes, there with a rounded tubercle just behind each eye, width across eyes and median length subequal (2.10 mm.); eyes small, exerted; juga slightly exceeding tylus, bifid in front; tylus with dorsal surface on higher level than that of juga, longitudinally convex; vertex with each lateral shelf about half as wide as median longitudinal part, the shelves thick and not thin as in *Emydocoris* Usinger; neck very short, thick, very little constricted. Labium fairly long, extending slightly beyond apex of sulcus but not reaching to front margin of prosternum. Antennae moderately long, setose, with segment

I swollen and scarcely reaching to tips of juga, measurements—I, 70; II, 46; III, 60; IV, 50.

Thorax above inflated, with sides slowly rounded to collar; pronotum raised posteriorly, narrower in front than vertex, impressed and excavated at middle behind, more than twice as long as mesonotum; mesonotum narrow, impressed and ridged at middle, with narrow sutures separating it from pro- and metanotum; metanotum and first two abdominal tergites completely fused, inflated, with the front pair of protuberances more widely separated than posterior pair. Abdominal tergites III to VI (inclusive) completely fused, smooth, inflated, with impressed areas but without raised ridges, not sculptured, with dorsal scent gland raised and prominent. Connexival segment I and II fused, the others separated by the usual sutures. Sterna fused, without impression or ridges. Abdominal ventrites I, II and III fused together with metasternum, the rest separated by transverse sutures.

Type (female), Andrambovato, Madagascar, Jan. 8, 1952, collected by Capt. V. J. Tipton, U.S. National Museum. The species is named in honor of the collector. The rostrum is 1.25 mm. long in *tipтони* and only 0.80 mm. long in *E. testudinatus* Usinger.

***Aglaocoris vicinus*, sp. new**

Large, broad, subquadrate, widest just back of the middle of abdomen. Length 6.25 mm. (male) and 6.70 mm. (female); width, 3.30 mm. (male) and 4.00 mm. (female).

Head rugulose, with longitudinal carinae, slightly wider across eyes (1.50 mm.) than median length (1.35 mm.), without tubercle or protuberance just back of each eye, strongly narrowed behind eyes to neck; eyes moderately large, each placed on outer end of a short, thick stalk; lateral shelves on practically same horizontal level as median, longitudinal part of head, width of latter on vertex nearly same as that of one shelf; antenniferous tubercles large, subconical, divergent; tylus fairly wide, tumid subapically; juga thin, with dorsal edge on lower level than that of tylus, surpassing tylus, there short, subcylindrical and divergent; neck short, rounded. Labial sulcus broad, fairly deep, barely reaching to neck; labium testaceous, just reaching to end of sulcus. Antennae finely granulate, 2.50 mm. long; segment I stout, feebly bent, exceeding juga by two-thirds of its length; IV subclavate, beset with pale hairs on apex; measurements—I, 56; II, 32; III, 4; IV, 35.

Thorax densely, deeply, rugulose pitted; collar short, not inserted, with the transverse furrow just in front of anterior margin of pronotum; median longitudinal ridge widened posteriorly, with dorsal surface rugulose and similarly sculptured as rest of thoracic surface, arising at base of pronotum and then extending posteriorly on second abdominal tergite; pronotum distinctly narrower than mesonotum, with outer edge on each side bifid, slightly projecting in front at anterolateral angles, more than three times as wide as median length; mesonotum wider and slightly longer than pronotum, fused with pro- and mesonotum separating sutures plainly indicated; mesonotum fused also with first three abdominal tergites. Orificial canal nearly upright, sinuate. Abdomen with dorsal tergites III, IV, V and VI fused into one solid plate, sculptured with the usual narrow ridges and impressions; connexival segment I and II fused, others distinctly differentiated from one another and also from

dorsal tergites. Body beneath with all sterna and first three ventrites fused together, other ventrites distinguishable from one another by transverse furrows.

Spiracles II, III and IV ventral, each progressively anteriorly slightly farther removed from outer edge of connexiva; V subventral, VI, VII and VIII lateral, plainly visible from dorsal aspect, VIII (genital) situated on apical end of small, rounded, posterior process. Legs rather short, with tibiae tending to be rather pale. Male ventrite VII beneath (one on each side) with a fairly large, smooth, rounded, bottle-like, process with constricted neck and directed downward. This process is found only in the male and is present in the two species described herein as well as in the three other known species in the genus. As the processes vary in size and shape in different species, the structures are of generic and specific importance in identification.

Type (male), *allotype* (female) and 1 *paratype*, Guadeloupe, W. I., Drake Collection (U.S.N.M.).

Separated from its congeners by antennal measurements, lack of tubercle on lateral side back of each eye, lateral projection of pro- and mesonotum and the very large process on the inferior side of ventrite VII (one on each side) which is pointed almost directly downward.

Aglaoocoris clarkei, new sp.

Large, rectangular, body very little narrowed anteriorly, reddish ferruginous, with rather small lobes on sides of pro- and mesonotum and very small lobes on abdominal tergites V, VI and VII. Head, antennae and legs with numerous, long, pale, stiff, setalike hairs; eyes small, prominently stalked. Spiracles II, III and IV ventral, not visible from above, each anteriorly farther removed from outer edge of segment; V, VI and lateral and VIII (genital) placed on apical end of small projection, all visible dorsally. Length, 6.50 mm.; width, 3.00 mm.

Head subtriangular, shining, nearly smooth, with little sculpturing in the form of ridges. Width across eyes (1.40 mm.) and median length subequal; juga narrow, slightly surpassing tylus in the form of divergent, fingerlike projections; tylus rather narrow, blunt at apex, longitudinally convex, higher than juga; eyes small, placed on outer end of moderately long, slender, rounded stalks; median longitudinal part of head scarcely more elevated than and as wide as a shelf (not including eye-stalks); neck narrow, smooth, with a small tubercle back of each eye. Labial sulcus very wide, deep, barely reaching to neck; labium barely attaining apex of sulcus. Antennae 2.02 mm. long; segment I stout, extending about one-half its length beyond apices of juga; measurements—I, 60; II, 30; III, 34; IV, 28. Antenniferous tubercles stout, divergent, terminating in a fingerlike projection.

Thorax with divisions and first two abdominal tergites all fused together, rather finely closely sculptured, with broad median ridge extending from base of pronotum to fused tergites, with sutures in front of and behind metasternum plainly visible, width across pronotal lobes 2.00 mm. Abdominal tergites III to VI (inclusive) fused into a single plate, sculptured, with dorsal scent gland present, concolorous with tergites. Connexival segments and segmentation on underside of body as in other members of the genus.

Type (female), Fresh Water Lake, Dominica, B. W. I., March 26,

1956, J. F. G. Clarke, U.S. National Museum. Named in honor of Dr. Clarke, who has netted a large number of rare and interesting insects in many areas of the world.

Aglaocoris invisus, new sp.

Large, wide, rectangular, dark ferruginous. Length 5.40 mm. (male) and 5.75 mm. (female); width 2.76 mm. (male) and 3.15 mm. (female).

Head 1.25 mm. wide across eyes, median length subequal to width across eyes, moderately rugulose; juga thin, feebly surpassing tylus, bluntly rounded in front; tylus more elevated than juga, with a small rounded tubercle up on top of subapical elevation; antenniferous tubercles large, subconical, divergent; eyes rather small, placed on outer end of rather small, rounded stalks; lateral shelves (not including eye-stalks) about as wide as and on a slightly lower level than median longitudinal part of head, transversely rugulose, with a very low tubercle on each lateral side behind eye-stalk, rapidly narrowed behind eyes to neck; neck with a small tubercle on each lateral side, narrow, rounded. Labial sulcus rather deep, wide, barely extending to neck; labium extending to end of sulcus. Antennae 1.70 mm. long, finely granulate; segment I moderately incrassate, feebly bent; IV subelavate, with tip hairy; measurements—I, 52; II, 22; III, 31; IV, 30.

Thorax above closely finely rugulose, the median ridge low, broad and widened posteriorly; metanotum without indication of sutures between it and fused abdominal tergites; pronotum distinctly narrower than mesonotum, more than three times as wide at base as median length, with outer margin slightly rounded, slightly produced anteriorly at anterolateral angles; mesonotum fused with pro- and metanotum but with separating suture plainly indicated, with outer margins moderately lobately produced. Abdomen with dorsal tergites III, IV, V and VI fused into one solid plate, with the usual sculptured areas. Body beneath with sterna and first three ventrites fused, the rest of the ventrites with transverse sutures present. Dorsal connexival segments I and II fused together, the rest of the segments clearly distinguished. Spiracles II, III and IV ventral, each progressively anteriorly farther removed from outer edge of connexiva; V submarginal (ventral); VI, VII and VIII marginal, visible from above, the latter situated on apical end of a small, fingerlike, posteriorly-directed projection. Male ventral processes (one on each side of ventrite VII) rather small, directed almost posteriorly, with apex subglobose, without bottlelike neck.

Type (male) and *allotype* (female), Guadeloupe Island, West Indies. *Paratype*: 1 female, same data as type; Drake Collection (U.S.N.M.).

Allied to *A. vicinus*, n. sp. but readily separated from it by its slightly smaller size, measurements of antennal segments, rounded outer margins of pronotum. The male processes on the underside of abdominal tergite VII are also very much smaller, without constricted neck and pointed almost directly posteriorly.

PROCEEDINGS
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A TRIO OF NEW BIRDS FROM TROPICAL ASIA

BY H. G. DEIGNAN*

An owl, a bulbul, and a spider-hunter from southeastern Asia have proved to require subspecific separation. For the loan of material essential to this study I am indebted to the authorities of the Sarawak Museum (Kuching) and of the British Museum (Nat. Hist.), and for comments on specimens not personally examined to Mrs. B. P. Hall of the British Museum.

I.

In a review of the races of the collared scops owl (Auk, vol. 67, 1950, p. 197), the author left the population of Borneo nameless, with the suggestion that it might eventually be shown to represent a valid subspecies. Through the interest of the authorities of the Sarawak Museum, I have before me 17 new specimens of this population, to add to two already in the U. S. National Museum, and it now becomes possible to give nomenclatorial recognition to the Bornean bird.

Since the new race needs comparison primarily with the well-known *Otus asio lempiji* of Java, it will be necessary to review the characters of that form, which occurs in three color phases: 1) a "gray" one, with the upper parts gray-brown, marked with grayish white or buffy gray, and the under parts gray or buffy gray; 2) an "intermediate" one, with the upper parts similar but more nigrescent, and the under parts grayish buff; 3) a "red" one, with the upper parts dull rufescent brown, marked with pale buff, and the under parts dull ferruginous buff.

The new race may be called

Otus asio lemurum, subsp. nov.

Type: U. S. Nat. Mus. No. 461686, adult male, collected at Kanowit, Sarawak, on April 29, 1952, by Alastair Morrison; original number 1/52; presented by the Sarawak Museum.

Diagnosis: In its "red" (and apparently most frequent) phase, nearest Phase 3 of *lempiji*, but differing by having the upper parts ferruginous brown, marked with ferruginous buff, and the under parts ferruginous; in its "intermediate" phase, with the upper parts similar to those of the "red" phase, but more nigrescent, and marked with less vivid buff, the under parts similar to those of the "red" phase, but slightly duller in tone; in its "gray" phase (apparently the least frequent), variably intermediate between the Phases 2 and 3 of *lempiji*.

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Range: Borneo, and probably the Northern Natuna Islands.

Remarks: As type specimen I have selected an average example of the "red" phase.

II.

The race of the bulbul, *Microscelis flavala*, inhabiting southern Annam, while strikingly different from the gray-backed, black-capped race *bourdellei* of regions just to the North, is outwardly so similar to *davisoni* of central Tenasserim as to have long been confused with it. The Annamese bird is, however, separable, and I name it

Microscelis flavala remotum, subsp. nov.

Type: U. S. Nat. Mus. No. 360982, adult female, collected at the Lang Bian Peaks, southern Annam, in December 1939, by Joseph F. C. Rock; original number 1133.

Diagnosis: Nearest *M. fl. davisoni*, but differing in freshly moulted adults by having the upper tail coverts much more strongly washed with olive green, and by having the outer edges of the inner primaries, the secondaries, and their coverts, and also of the rectrices, slightly more broadly margined with an outwardly more golden olive-yellow.

Range: Southern Annam (Lang Bian Plateau) and probably southern Laos (Boloven Plateau).

III.

Arachnothera chrysogenys harrissoni, subsp. nov.

Type: U. S. Nat. Mus. No. 182609, adult male, collected at Labuan Kelambu [lat. 1°15' N., long. 118°39' E.], Borneo, on June 24, 1913, by Harry C. Raven; original number 869.

Diagnosis: Separable from *A. chr. chrysogenys* of Java, Sumatra, the Malay Peninsula, and probably western Borneo, by having the mantle almost devoid of golden suffusion, so that it is nearly concolorous with the crown, and the exposed portions of the closed wings similarly much less strongly suffused with golden bronze; thus, in its upper aspect, the new form is generally lighter and duller than the nominate race.

Range: Known only from the type locality (11 adult specimens).

PROCEEDINGS
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AMERICAN BATS OF THE GENUS *MIMON*

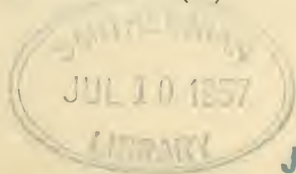
WALTER W. DALQUEST

Midwestern University, Wichita Falls, Texas

The large, leaf-nosed bat, *Mimon bennetti*, was described from South America in 1836. The species was erroneously included in the list of North American mammals by True (1885), and Miller (1907) gave its range as "South America north to southern Mexico." Subsequent check-lists retained this concept of the range of the species, although specimens of *Mimon* from Cozumel Island, Yucatan, Mexico, were described as a new species, *M. cozumelae*, in 1914. Other than the six specimens upon which the name *cozumelae* was based, no specimens of *Mimon* were reported from North America until 1941 when Sanborn recorded two specimens from the mainland of Yucatan, under the name *bennettii*.

Another *Mimon* was recorded from Yucatan by Hatt and Villa (1950). These authors pointed out that, on the basis of geographic probability, the Yucatan specimens recorded by Sanborn, as well as their own specimen, should be referable to *cozumelae* rather than *bennetti*. They compared the mainland specimens with four topotypes of *cozumelae* and found only minor differences.

Between 1946 and 1949 I obtained ten specimens of *Mimon* from central and southern Veracruz, Mexico. These specimens and four topotypes of *cozumelae* were kindly made available to me by Rollin H. Baker, of the University of Kansas Museum of Natural History. No essential differences were found between the two series. David H. Johnson, of the United States National Museum, generously loaned me what appears to be the only specimen of true *M. bennetti* in any North American museum. This bat, from Ypanema, Sao Paulo, Brazil (fixed as the type locality of *bennetti* by Hershkovitz, 1951) differs markedly from the Mexican specimens in a number of ways. The differences are not of such magnitude, however, as to preclude the possibility of intergradation should the range of *Mimon* be continuous from South America to Mexico. Nevertheless, there is now a gap in the known range of the genus that extends from Brazil to Mexico (George G. Goodwin, of the American Museum of Natural History, informs me that the alleged *Mimon* from Venezuela, in the American Museum, is actually a *Chrotopterus*). Until intergradation between the two forms is actually established, the most conservative treatment seems to be retention of both *M. bennetti* and *M. cozumelae* at full specific rank.



Mimon bennetti (Gray)

Phyllostoma bennetti Gray, Mag. Zool., Bot., 2, 1838:488.

Type locality.—South America. Fixed at Ypanema, Sao Paulo, Brazil, by Hershkovitz (1951).

Range.—Apparently known certainly only from Brazil.

Description.—A relatively small, very dark *Mimon*, with a distinct swelling, and posterior extension, of the occipital region of the skull. Large whitish areas are lacking at the bases of the ears. Measurements of a specimen from Ypanema are: total length, 79 mm.; length of tail, 14; length of hind foot, 15; height of ear from notch, 35; length of forearm, 52.6; greatest length of skull, 24.9; condylobasal length of skull, 22.2; length of upper tooth row (complete), 9.8; braincase breadth, 9.1; interorbital breadth, 4.8; mastoid breadth, 10.4; breadth across third upper molars, 9.4.

Mimon cozumelae Goldman

Mimon cozumelae Goldman, Proc. Biol. Soc. Washington, 27, 1914: 75.

Type locality.—Cozumel Island, Yucatan, Mexico.

Range.—Known only from the states of Yucatan and Veracruz, Mexico. Almost certainly present in Guatemala also, for specimens have been taken near the border of that country, in Veracruz.

Description.—Larger and paler in color than *Mimon bennetti*, with whitish areas at the bases of ears, and skull with much smaller swelling in occipital region. Mean measurements of ten adults from Veracruz, Mexico, are: total length, 90 mm.; length of tail, 20; length of hind foot, 16; height of ear from notch, 35; length of forearm, 54.9; greatest length of skull, 26.2; condylobasal length, 23.0; length of upper tooth row (complete), 10.2; braincase breadth, 10.1; interorbital breadth, 4.6; mastoid breadth, 11.9; breadth across third upper molars, 9.4.

The apparent gap between the ranges of *M. bennetti* and *M. cozumelae* includes all of northern South American and Central America. Specimens from this area are needed before the true relationships of the present nominal species can be understood. The following observations, based on ten of the twenty specimens known from North America, may be helpful to collectors working in areas where critical specimens might occur.

Museum specimens of *Chrotopterus* have been confused with *Mimon* but *Chrotopterus* is so much larger (total length about 120 mm., rather than 90 mm.) that it can scarcely be mistaken for *Mimon* in the field. *Mimon* is, however, so similar to *Phyllostomus discolor* in size, color and general appearance, that close scrutiny is required for identification. The two may most rapidly be separated by the shape of the tips of the ears: pointed in *Mimon* but rounded in *Phyllostomus*. *Phyllostomus discolor* and *Mimon* may be found side-by-side, in the same cave. *Mimon* is rarely seen in flight, but when seen can be identified by its silent, swooping flight and extremely long interfemoral membrane. The only specimen I shot in flight was at a grove of orange trees where the half-spoiled fruit hung on the trees. Several bats, presumably all *Mimon*, were seen about the oranges. They may have been eating the fruit, fermented juice, or insects stupified by the juice.

Mimon seems to be only moderately social. The smallest number ever seen in a cave was two; the greatest number four. Caves inhabited were all similar: deep, dark, damp holes in limestone cliffs where the

rock was everywhere covered with a film of moisture. Only *Mimon* and *Phyllostomus* were ever taken in such habitat. The feces of *Mimon* are a white liquid that leaves calcareous smears similar to the droppings of owls and other predacious birds. No traces of food were ever found in caves inhabited by *Mimon*, but the bats are presumably carnivorous.

In their caves the bats are alert and eye the light as a collector enters their retreat. Unless actually molested, however, they are not apt to take flight. On one occasion four bats clinging close together to the roof of a cave were all knocked down with a stick, one at a time, without the others taking flight. One of those knocked down escaped by swimming into a narrow crevice in the water-filled floor of the cave. The three taken included two *Mimon* and one *Phyllostomus*. When individuals of *Mimon* do fly, however, they remain extremely shy, retreating ahead of the collector as he approaches without permitting a shot.

The caves inhabited by *Mimon* were almost always below the level of the surface of the ground and often had small entrances. No traces of the bats were found until the actual chamber in which they were living was entered. It was sometimes necessary to persist in exploring all chambers of caves that appeared too damp to be suitable for bats, in order to discover *Mimon*.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FIFTEEN NEW THYSANOPTERA FROM THE
UNITED STATES

By J. DOUGLAS HOOD

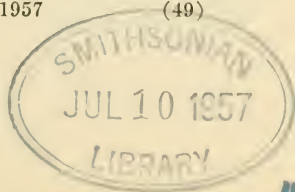
The great majority of the species described in this paper were taken during the summer of 1955, in the region of the Southwestern Research Station of the American Museum of Natural History, near Portal, Arizona, in the Chiricahua Mountains. Even in a preliminary paper as brief as this, space must be taken to mention and thank Dr. Mont A. Cazier and Dr. Willis J. Gertsch, of the American Museum staff, and Mr. John Gordon Anderson, Foreman at the station, who were primarily responsible for the success of the undertaking; and I must acknowledge, too, the hospitality of the William C. Miller family of ranchers in the Peloncillo Mountains, close by in New Mexico, whose home became a sort of subsidiary headquarters in the work of collecting. The types of the new species are in my collection.

*Scirtothrips*¹ *clivicola*, sp. nov.

Very similar to *brevipennis* and *taxodii* in that the abdominal terga and sterna are without dark cross-lines and the wings very short; differing from both in the paler and less orange-colored body and in having three instead of (normally) four setae along the front margin of anal lobe of fore wings; differing from the former in the narrower head and from the latter most conspicuously in the less protruding eyes, which are proportionately closer to the base of head.

♀ (macropterous).—Length about 0.8 mm. (distended, 0.9 mm.). Color pale yellow, rather than orange-yellow, prothorax not shaded; antennae with segment I nearly colorless, II without orange pigment, it and III-VIII pale yellowish gray, III-V shaded apically, IV and V with pedicels dark; ocellar pigmentation orange-red; legs concolorous with body, very lightly shaded with gray; fore wings nearly colorless, except for the orange-pigmented veins. Head 86 μ long, 120 across eyes, 114 across cheeks, 102 across base; eyes not noticeably protruding, dorsally 51 long, 34 wide, interval 53, distance from base of head 22; pronotum 80 long, 140 wide, sculpture normal, setae pale gray, seta at

¹*Scirtothrips longipennis* (Bagnall) was mistakenly placed by Morison (Lond. Nat., 1947, No. 27, Suppl., p. 49) in the genus *Sericothrips*. Hood's placement in 1914 of this species in *Scirtothrips* (Proc. Ent. Soc. Wash., 16(1):37,40) has been accepted by all later workers. The species is hereby returned to *Scirtothrips*.



posterior angles 31; mesothorax 145 across anterior angles, greatest width 167; fore wings 497, chaetotaxy normal; abdomen 206 wide at segment IV, setae on IX and X darker than integument, 40-45. Antennal segments: I 16 (21), II 34 (24), III 39 (17), IV 34 (17), V 36 (17), VI 37 (15), VII 7 (8), VIII 10 (5).

ARIZONA: Chiricahua Mts., August 31, 1955, J.D.H., 3 ♀♀ (including holotype), swept from low grasses and herbs.

*Sericothrips*² *pubescens*, sp. nov.

Very similar to *cingulatus* in having the first eight abdominal terga clothed with fine microtrichia (even medially) and in the nearly yellow fourth and fifth segments; but with the metanotum completely covered with minute microtrichia, pronotum subreticulate (rather than transversely striate) in front of blotch, pronotal setae pale and shorter (those at posterior angles respectively 15 and 23 μ long, instead of about 20 and 41), wing-pads shorter (92 μ , rather than about 130) and with fewer and shorter setae, median pair of setae on abdominal tergum I about as far apart as the homologous pair on II (instead of much closer together than that pair) and situated external to the inner of two pairs of pores (instead of internal to a single pair), and with the legs wholly yellow save for a slight shading on the hind femora (instead of all femora largely dark brown).

♀ (brachypterous).—Length about 1.1 mm. (distended, 1.2 mm.). Color dark brown, with abdominal segments IV and V nearly white, VI and VIII-X pale brown, VI pale basally; metathorax yellowish in posterior half; pronotal blotch scarcely darkened except marginally; antennal segments I-III yellow, III shaded lightly in about apical half, IV-VIII dark gray brown, IV and V briefly paler just beyond pedicel; legs yellow, hind femora lightly shaded with brown on outer surface near tip; wing-pads colorless. Head 113 μ long, 174 across eyes, 156 across cheeks, the latter slightly concave, surface of head striate as usual; mouth-cone short and rounded, extending about 105 μ beyond posterior dorsal margin of head; eyes 72 μ long, 51 wide, 72 apart; pronotum 133 long, 238 wide, front margin of blotch indicated by a brown, broadly V-shaped line whose point is only very slightly in advance of middle of pronotum, sculpture in front of blotch subreticulate, with the lines 6-7 μ apart, those within the blotch area much closer together; mesothorax 225 across anterior angles, greatest width 238; fore wings 92, their longest setae 23; abdomen 332 wide at segment IV, IX with setae I-III 50-57, X with seta I 54, II 60. Antennal segments: I 30 (32), II 44 (29), III 73 (19), IV 59-63 (19), V 48 (19), VI 57 (16), VII 13 (7), VIII 18 (5).

NEW YORK: Apulia Station, October 11, 1940, Dr. F. Reese Nevins and J.D.H., 1 ♀ (holotype), from grass.

²It might be well to point out, in connection with Hartwig's key to the known species of this genus (Ent. Mem., Dept. Agr., Pretoria, 2(11):402, 1952) that the genus *Sericothrips* Haliday was described in 1836, rather than in 1835; that the species which he calls *Sericothrips apteris* Daniel was referred to *Anaphothrips* in 1926 by Moulton (Pan-Pac. Ent., 3(1):23) and assigned as a synonym of *A. seticornis* (Trybom) in 1927 by Hood (Pan-Pac. Ent., 3(4):173); and that the species which Hartwig calls *Sericothrips reticulatus* Moulton was placed in a new subgenus of *Anaphothrips*—now recognized as a distinct genus—in 1926 by Moulton (Pan-Pac. Ent., 3(1):22), who referred to it as *Anaphothrips* (*Prosoponaphothrips*) *reticulatus*.

Sericothrips ephedrae, sp. nov.

Allied to *moultoni* and *chrysothamni*, but differing from both in having abdominal segments VII-X largely yellow, IX and X wholly so.

♀ (macropterous).—Length about 1.1 mm. (distended, 1.2 mm.). Head brown in ocellar area, in front, and along occipital apodeme, remainder yellow; pronotum with front margin of blotch brown and unbroken, and with three or four coalescing foveal dark spots; pterothorax with bright orange internal pigmentation, marked with gray-brown; abdomen bright yellow in segments IX and X, yellowish elsewhere, with prominent, complete, blackish brown antecostal lines on terga II-VII, that on VIII confined to median third or more, shaded with gray behind these lines, more broadly and darkly so near sides of body; antennae with segment I nearly colorless, II dark yellowish brown, III-V pale brownish gray, III with narrow dark ring at tip of pedicel, its narrowed basal portion beyond, as well as apex, dark gray, IV and V with pedicels and apical two-fifths dark, VI-VIII concolorous with tip of V; legs yellow, but with all femora and tibiae heavily shaded with brown in middle third or more; fore wings pale, slightly darkened in scale and adjoining part of membrane, with a dark band occupying apical half of second fifth.

Head 113 μ long, 162 across eyes, 153 across cheeks, striate in occipital area; mouth-cone short, extending about 73 μ beyond posterior dorsal margin of head; eyes about 71 long, 47 wide, and 77 apart; pronotum 116 long, 181 wide, striae in front of blotch about twice as far apart as those within it, outer seta at posterior angles 10, inner 42 and light brown, all others colorless; mesothorax 185 across anterior angles, greatest width 225; fore wings 714, midcostal setae 39, one accessory seta near tip behind vein, the latter with 3 + 15-18; abdomen 258 wide at segment IV, terga II-V not pubescent medially, comb on VI interrupted at middle, IX with seta I 56, II 47, III 50, X with I and II 63. Antennal segments: I 22 (27), II 40 (27), III 50 (20), IV 49 (18), V 40 (16-17), VI 45 (16), VII 9 (6-7), VIII 13-14 (5).

♂ (macropterous).—Length about 0.8 mm. (distended, 0.9 mm.). Color and general structure much as in female.

NEW MEXICO: Rodeo, August 8, 1955, J.D.H., 12 ♀♀ (including holotype).—ARIZONA: about 8 mi. S.W. of Rodeo, N.M., August 9, 1955, J.D.H., 10 ♀♀ and 1 ♂ (allotype). All specimens were taken from *Ephedra trifurca*.

Sericothrips catenatus, sp. nov.

Resembling *desertorum* in having abdominal terga II-V not pilose medially in the vicinity of the antecostal lines, the fore wings with one accessory seta near tip behind the vein, and the distinctly striate meso- and metanota; but differing in the pale yellow color of the body and legs, shaded pronotal foveae, paired gray spots at lateral fourths of terga II-VII, colorless antecostal lines between these spots, color of the fore wings, slenderer antennae, and the very long mouth-cone; resembling *albus* in this last character, but that species apparently lacks shading in the pronotal foveae and abdominal markings.

♀ (macropterous).—Length about 0.9 mm. (distended, 1.04 mm.). Color pale yellow (distinctly whitish) in body and legs; pronotum

without blotch but with four pairs of foveal gray spots, mesonotum with a pair of well-separated similar spots, metanotum with a pair of larger touching spots, abdomen spotted as noted above; antennae concolorous with head in segments I and II, the latter segment very slightly darker, III-V similarly pale, III with narrow dark ring at tip of pedicel, the narrowed basal portion of the part beyond pedicel, as well as apex, gray, IV and V with pedicels darkened, IV shading in apical two-fifths to dark gray at tip, V abruptly gray in apical two-fifths and darker at tip, VI-VIII dark gray; fore wings lightly shaded in scale and adjoining area of membrane of wing, and with a more distinct gray spot occupying about basal half of second fourth.

Head 73 μ long, 127 across eyes, 117 across cheeks, striate in occipital area; mouth-cone very long, extending 146 μ beyond posterior dorsal margin of head, well onto mesosternum; maxillary palpi long, their three segments 26, 13, and 26-27 μ long, respectively; eyes about 56 μ long, 36 wide, and 56 apart; pronotum 96 long, 139 wide, striae in front of blotch area transverse, about twice as far apart as those at middle of pronotum, outer seta at posterior angles 11, inner 45 and light brown, all others colorless; mesothorax 152 across anterior angles, greatest width 186; fore wings 609, midcostal setae 38, one accessory seta near tip behind vein, the latter with 3 + 18; abdomen 237 wide at segment IV, comb on VI broadly interrupted at middle, IX with seta I 47, II 40, III 43, X with I and II 50. Antennal segments: I 20 (23), II 34 (23), III 50 (17), IV 45 (16), V 40 (15), VI 49 (13), VII 10 (6), VIII 13-14 (4).

ARIZONA: Chiricahua Mts., July 22, 1955, J.D.H., 13 ♀♀ (including holotype) and 1 ♂ (allotype); Pajarita Mts. (near Nogales), August 31, 1927, J.D.H., 8 ♀♀. All specimens were taken from desert shrubs.

Sericothrips desertorum, sp. nov.

Resembling *setosus* in having the antecostal lines on abdominal terga II-VII dark and complete, the more basal terga not pilose medially in the vicinity of these lines, the fore wings with one accessory seta near tip behind the vein, and the mouth-cone short; but differing in the orange-pigmented pterothorax, the distinctly striate meso- and metanota, and the shorter setae on pronotum and fore wings.

♀ (macropterous).—Length about 1.0 mm. (distended, 1.1 mm.). Yellow, excepting the heavily orange-pigmented pterothorax, pronotum without darkened blotch; abdomen with brown antecostal lines on terga II-VII; antennae concolorous with head in segments I and II, III-V grayish yellow, III with narrow dark ring at tip of pedicel, the narrowed basal portion of the part beyond pedicel, as well as apex, gray, IV and V with pedicels darkened, IV shading in apical two-fifths to dark gray at tip, V abruptly dark gray in apical two-fifths and darker at tip, VI-VIII dark gray; legs yellow; fore wings nearly uniform pale yellowish.

Head 94 μ long, 147 across eyes, 138 across cheeks, striate in occipital area; mouth-cone short, extending about to middle of prosternum; eyes about 61 μ long, approximately 40 wide, and 66 apart; pronotum 102 long, 172 wide, striae in front of blotch area close and transverse, though farther apart than those at middle of pronotum, outer seta at posterior angles about 14, inner 38 and light brown, all others colorless; meso-

thorax 172 across anterior angles, greatest width 217; fore wings 650, midcostal setae 33, one accessory seta near tip behind vein, the latter with 3 + 19; abdomen 263 wide at segment IV, terga II-V not pubescent medially in the vicinity of antecostal line, comb on VI broadly interrupted at middle, IX with seta I 50, II 46, III 44, X with I and II 53-55. Antennal segments: I 20 (24), II 40 (26), III 49 (19), IV 41 (18), V 36 (17), VI 40 (16), VII 10 (6-7), VIII 13 (5).

NEW MEXICO: Peloncillo Mts., June 30, 1955, J.D.H., 1 ♀ from a desert shrub.

Sericothrips baileyi, sp. nov.

Resembling *trifasciatus*³ in having the pale distal half of fore wings with a darker band occupying approximately its middle third, tergum VI of abdomen without comb medially, and the occipital apodeme much closer to eyes than to base of head; but with antennal segments I and II scarcely darker than III, abdominal terga II-III and VII-VIII not darkened, and fore wings with only one accessory seta near tip, behind the vein.

♀ (macropterous).—Length about 1.2 mm. (distended, 1.4 mm.). Head brown in ocellar area, along occipital apodeme, remainder yellow with slight shading; pronotum with front margin of blotch brown and unbroken, and with three or four coalescing foveal dark spots, remainder yellow; pterothorax yellow, with brown spots; abdomen yellow, with prominent dark antecostal lines on terga II-VII, shaded behind these lines, more broadly so in lateral thirds and in median third of VII, VIII clouded in basal half, pleurae dark; antennae with segment I nearly colorless, II pale brown but nearly colorless in pedicel and subapically, III and IV pale brownish gray, III with narrow dark ring at tip of pedicel, its narrowed basal portion beyond, as well as apex, dark gray, IV and V with pedicel and apical half darkened, V darker throughout than IV, VI-VIII dark gray; legs yellow, shaded with brown or gray, fore coxae darker than the others, fore femora clouded at middle of outer surface, hind femora darkened in apical third except for extreme tip, middle femora and all tibiae darkened in middle half or third, tarsi yellow; fore wings clouded in scale, gray in second fourth, this band followed by a somewhat paler band midway between it and tip of wing.

Head 115 μ long, 156 across eyes, 150 across cheeks, striate in occipital area; mouth-cone short, extending about to middle of prosternum; eyes about 67 μ long, 43 wide, and 67 apart; pronotum 125 long, 195 wide, striae in front of blotch about twice as far apart as those within it, outer seta at posterior angles about 10, inner 46 and light brown, all others colorless; mesothorax 185 across anterior angles, greatest width 245; fore wings 742, midcostal setae 45, one accessory seta near tip behind vein, the latter with 3 + 16-19; abdomen 318 wide at segment IV, terga II-V pubescent medially in the vicinity of antecostal line, comb on VI interrupted at middle, IX with seta I 57, II 52, III 51, X with I 64, II 58. Antennal segments: I 21 (26), II 40 (28), III 57 (21), IV 51 (19), V 46 (16), VI 50 (16), VII 10 (7), VIII 13 (5).

³*Sericothrips trifasciatus* (Ashmead), comb. nov. (*Thrips trifasciatus* Ashmead, Ins. Life, 7(1):27, 1894.) Watson suggested (Bull. 168, Fla. Agr. Exp. Sta., p. 44, 1923) that this might be *Franklinothrips vespiiformis*, but scarcely a word or phrase of Ashmead's description could be applied to that species.

♂ (macropterous).—Length about 0.9 mm. (distended, 1.04 mm.). Color and general structure much as in female.

CALIFORNIA: Westley, September 6, 1935, Dr. S. F. Bailey, 5 ♀♀ (including holotype) and 1 ♂ (allotype), from leaves of milkweed.

Plesiothrips pallidipennis, sp. nov.

Closely allied to *perplexus*⁴, but with abdomen never largely yellow; legs darker, with femora brown; wings pale, with slight cloud at basal third; segment IV of antennae with distinct ring-joint at base in ♀, IV much shorter than V in ♂.

♀ (macropterous).—Length about 1.3 mm. (distended, 1.6mm.). Color blackish brown, with bright red internal pigmentation in thorax; head and tip of abdomen darkest, intermediate abdominal segments paler; antennae with segments I, II, and V-VII about concolorous with head, III and IV grayish yellow, III shaded apically, IV darker and sometimes nearly concolorous with V; femora brown, yellowish basally, tibiae and tarsi yellow, or the former shaded with brown, especially basally; fore wings nearly colorless, somewhat yellowish, sometimes with a slight brownish cloud at basal third. Head 141 μ long, 126 across eyes, 114 just behind eyes, 122 across cheeks, and 104 across base, thoroughly typical in sculpture and chaetotaxy; eyes 61 long, 34 wide, and 58 apart; pronotum 135 long, 152 wide, smooth except for faint striae near front and hind margins, setae at posterior angles pale brown, each 50 μ ; mesothorax 174 across anterior angles, greatest width 190; fore wings slender, nearly straight, about 19 times as long as wide; abdomen 237 at segment IV, setae on IX respectively 96, 136, and 133, on X 128. Antennal segments: I 26 (32), II 32 (24), III 42 (21), IV 52 (19), V 36 (16), VI 54 (17), VII 27 (7).

♂ (macropterous).—Length about 0.9 mm. (distended, 1.1 mm.). Typical in structure and like female in color and structure, except for the dimorphic antennae; antennal segments IV and V with ring-joints; I 23 (31), II 30 (24), III 35 (22), IV 50 (21), V 82 (18), VI 91 (19), VII 15 (4).

ARIZONA: Chiricahua Mts., July 12-August 14, 1955, J.D.H., 5 ♀♀ (including holotype taken August 4) and 36 ♂♂ (including allotype taken August 4), from grasses.

NEW MEXICO: Peloncillo Mts., August 5, 1955, J.D.H., 1 ♂, from *Lepidium Thurberi*.

Eurythrips genarum, sp. nov.

Closely related to *ampliventralis* and *conjunctus*, but with two sense-cones on outer surface of segment III of antennae, posterior facet of eyes largely or wholly behind notch in cheeks at eyes, wing-pads of brachypterous form small and with only one seta, and glandular area on sternum VIII of ♂ occupying less than one-third the length of segment, traversing it just behind middle, ends curved backwards.

♀ (brachypterous).—Length about 1.4 mm. (fully distended, 1.72 mm.). Color of head bright yellow, slightly shaded with brown along cheeks and in ocellar area; thorax yellowish brown, pterothorax darker,

⁴*Plesiothrips perplexus* (Beach); synonym: *Thrips panicus* Moulton, Fla. Ent., 13:61, 1929. New synonymy.

abdomen shading to blackish brown apically, tube paler at base and apically; legs yellow; antennae yellow in segments I and II and base of III, remainder brown, darker apically. Head 180 μ long, 118 across eyes, 118 across cheeks just behind notch, 140 across cheeks, 131 in front of basal collar, across head-process 74, dorsal surface faintly reticulate just in front of occipital line; postocular setae 54, interval 84, dilated at tip. Eyes 43, width 36, interval 47. Antennal segments: I 40 (36), II 51 (31), III 56 (30), IV 50 (29), V 50 (28), VI 50 (27), VII 37 (22), VIII 26 (13); sense-cones on IV 1 (2); pedicel of VII short, not at all comparable with that of VI, broadened at base, not quite twice as wide as latter. Prothorax normal, major setae dilated like postoculars, antero-angulars and midlaterals 44 46, epimerals 55, postero-marginals 51, coxals 33; fore wings 37, wing setae 37; fore tarsal tooth minute. Abdomen normal to group, most setae dilated, setae I and II on segment IX 95-100 μ , tapering rapidly at tip to a sharp point; tube 115, across base 67, at tip 33, terminal setae 90.

♂ (brachypterous).—Length about 1.1 mm. (fully distended, 1.3 mm.). Color and structure almost identical with that of ♀.

VIRGINIA: Fairfax Co., January 5, 1941, Lincoln C. Pettit, 6 ♀♀ (including holotype) and 1 ♂ (allotype); Falls Church, March 4, 1941, L. C. P., 2 ♀♀. Both lots were from *Andropogon*.

*Karnyothrips*⁵ *medialis*, sp. nov.

♀ (brachypterous).—Bicolorous, chestnut-brown and yellow; legs (including all coxae), pterothorax, and first abdominal segment, bright yellow; second abdominal segment yellow laterally, remainder of body brown, with head darker than prothorax, abdomen somewhat darker apically; antennae with segment I darkest and concolorous with head, II yellow but shaded along sides and in pedicel, III and IV yellow but tinged with brown, V-VIII successively slightly darker. Length about 1.4 mm. (distended, 1.7 mm.). Head, total length 0.177, width across eyes 0.120, just behind eyes 0.116, across cheeks 0.123, near base 0.114; eyes, dorsal length 0.050, width 0.029, interval 0.059; postocular setae slightly dilated apically, 26 μ long, 105 apart, and about 18 from eyes; prothorax smooth, 117 μ long, 197 across coxae, epimera not fused with notum, antero-marginal and midlateral setae minute and pointed, the others slightly dilated, antero-angulars 20, epimerals 48, postero-marginals 34, coxals 20; mesothorax 192 across anterior angles, abdomen 231 at segment V; tube, length 80, subbasal width 54, apical width 26, terminal setae 160; seta I on abdominal segment IX 45, dilated at tip, II 89, pointed, III 85. Antennal segments: I 27 (32), II 40 (25), III 34 (21), IV 33 (23), V 38 (23), VI 39 (22), VII 34 (18), VIII 30 (10); III without sense cones, IV with one on either surface.

ARIZONA: Chiricahua Mts., September 5, 1955, J.D.H., 5 ♀♀ (including holotype), from dead vegetation.

Karnyothrips *piceus*, sp. nov.

Much like *prolatus* in color and in that the major setae on the ninth abdominal segment are pointed; but with head little more than 1.3

⁵*Karnyothrips americanus* (Hood) 1908; synonym: *Cephalothrips elegans* Moulton, Bull. Brooklyn Ent. Soc., 24:236, 1929. New synonymy.

times as long as wide, antennal segment VIII narrowed at base and nearly three times as long as wide, and male with glandular area on eighth abdominal sternum in the form of a transverse band traversing the segment just behind middle.

♀ (apterous).—Body, legs, and antennae nearly uniform blackish brown, with tarsi and apices of tibiae pale yellow. Length about 1.3 mm. (distended, 1.7 mm.). Head, total length 0.164, width across eyes 0.116, just behind eyes 0.114, across cheeks 0.122, near base 0.108; eyes, dorsal length 0.050, width 0.032, interval 0.053; postocular setae pointed, 33 μ long, 95 apart, and 16 from eyes; prothorax smooth, 100 μ long, 193 across coxae, epimera not fused with notum, antero-marginal setae minute, epimerals 46 μ and very slightly dilated, other major setae pointed, antero-angulars 20, midlaterals 10, postero-marginals 37, coxals 23; mesothorax 183 across anterior angles, abdomen 255 across segment IV; tube, length 83, subbasal width 53, apical width 29, terminal setae 172; setae on abdominal segment IX pointed, 167, II 93, III 106. Antennal segments: I 24 (30), II 41 (24), III 34 (22), IV 39 (24), V 43 (23), VI 44 (21), VII 39 (19), VIII 32 (11); III normally without sense-cones, IV with one on either surface.

♂ (apterous).—Essentially like female.

ARIZONA: Chiricahua Mts., June 14-August 4, 1955, J.D.H., 9 ♀♀ (including holotype taken July 15) and 4 ♂♂ (including allotype taken July 24), from dead vegetation.

Karnyothrips prolatus, sp. nov.

Readily known by the long head (fully 1.5 times as long as wide), nearly uniform dark coloration of body and antennae, conical eighth antennal segment (not narrowed at base and less than twice as long as wide), pointed major setae on ninth abdominal segment, and, in the male, by the small and nearly circular glandular area on the eighth abdominal sternum.

♀ (apterous).—Body, legs, and antennae nearly uniform blackish brown, with tarsi and apices of tibiae pale yellow and second antennal segment paler in median apical portion. Length about 1.2 mm. (distended, about 1.6 mm.). Head, total length 0.165, width across eyes 0.103, just behind eyes 0.100, across cheeks 0.107, near base 0.093; eyes, dorsal length 0.044, width 0.025, interval 0.053; postocular setae pointed, 22 μ long, 71 apart, and 19 from eyes; prothorax smooth, 110 μ long, 207 across coxae, epimera not fused with notum, antero-marginal setae minute, epimerals 35 μ and slightly dilated, other major setae 20-23 μ and pointed; mesothorax 178 μ across anterior angles, abdomen 267 at segment IV; tube, length 83, subbasal width 57, apical width 30, terminal setae 140; setae on abdominal segment IX pointed, I 93 μ , II 123, III 105. Antennal segments: I 27 (29), II 46 (26), III 30 (22), IV 40 (26), V 43 (23), VI 39 (23), VII 35 (19), VIII 23 (14); III without sense-cones, IV with one on either surface.

♂ (apterous).—Essentially like female.

ARIZONA: Chiricahua Mts. July 2-23, 1955, J.D.H., 5 ♀♀ (including holotype taken July 16) and 1 ♂ (allotype, July 16), from dead vegetation.

Hoplandrothrips nasutus, sp. nov.

Readily known from all other North American species by the long head and extremely long mouth-cone, the head 1.5 times as long as greatest width, the mouth-cone 1.1 times the length of head; antennae nearly black, with only the pedicel of III, and a small spot on its outer surface, yellow.

♀ (macropterous).—Length about 2.4 mm. (distended, 3.0 mm.). Body dark blackish brown, with crimson internal pigmentation; legs about concolorous with body, with all tarsi, both ends of all tibiae, and base of fore femora, paler and more yellowish; fore wings light brown, darker in anal lobe, with a pale streak paralleling posterior margin in middle half. Head 307 μ long, 192 across eyes, 203 across cheeks, 174 in front of the slight basal collar, surface with heavy anastomosing dark lines of sculpture except narrowly along median line, cheeks with minute spiniferous tubercles; postocular setae brown, knobbed, 80 long, 160 apart, and 25 from eyes. Eyes about 110 long, 67 wide, and 58 apart, not protruding. Mouth-cone 336, extending nearly to metasternum. Antennae typical, III fully twice as long as wide, inner surface sigmoid in the usual manner, VIII narrowed in about basal fourth and slightly widened at extreme base, sense-cones large, III 1 (2), IV 2 (2); lengths (and widths) of segments: I 51 (44), II 69 (37), III 100 (47), IV 96 (46), V 80 (37), VI 67 (30), VII 65 (27), VIII 41 (13). Prothorax 374 across coxae, pronotum 178 long medially, the latter smooth except for a few striae along posterior margin; major setae brown, knobbed, antero-marginals 28, antero-angulars 52, midlaterals 30, epimerals 81, postero-marginals 79, coxals 45, the coxae with about 5 additional short, stout, brown, pointed setae; mesothorax 399 across anterior angles, 409 wide posteriorly; fore tarsi with a stout curved tooth; fore wings with the usual pocket at middle, with 15-16 accessory setae on posterior margin, 1.12 mm. long. Abdomen 491 wide at segment IV; tube 196 long, 81 wide near base, 46 at apex, terminal setae 294; seta I on IX 192, II 215, III 176, all three pointed.

ARIZONA: Chiricahua Mts., June 19, 1955, J.D.H., 1 ♀ (holotype), from oak.

*Acanthothrips*⁶ *perileucus*, sp. nov.

Very closely allied to *albivittatus*, the antennae being nearly uniform dark blackish brown and the white markings consisting in part of a prominent dorso-lateral vitta on each side, extending from eye to base of pronotum; but differing in that the prothoracic white vittae are narrowed posteriorly and do not involve the inner sides of the epimera and thus do not enroach upon the pronotum at those points, their inner margins diverging, metathorax without white markings, mesonotum with a transverse white dash paralleling posterior margin, abdomen with the white restricted to a pair of small rounded spots at sides of segments II-VII, dorsum of prothorax, pterothorax, and median tergite of segment I of abdomen reticulate with fine dark lines, on which and between which are disposed stipple-like granules.

♀ (macropterous).—Length about 3.0 mm. (fully distended, about

⁶*Acanthothrips nodicornis* (Reuter), 1880; synonym: *Acanthothrips doaneii* Moulton, Bull 12, Tech. Ser., Bur. Ent., U. S. Dept. Agr., Pt. III: 64; 1907. New synonymy.

3.6 mm.). Head, total length 0.392, width across eyes 0.244, across cheeks 0.267 near base 0.217, across basal collar 0.023; eyes, dorsal length about 0.154, distance from posterior margin of head about 0.200 (in paratype treated with KOH: head, total length 0.354; eyes, dorsal length 0.143, width 0.088, interval 0.063, distance from base of head 0.189; mouth-cone, length 0.333); postocular setae, length about 0.053, interval 0.093, distance from eyes 0.029; prothorax, median length of pronotum 0.253, width (inclusive of coxae) 0.475; mesothorax, across anterior angles 0.484; abdomen, greatest width (at segment II) 0.518; tube, length 0.266, width across basal collar 0.102, least apical width 0.059; terminal setae 0.581. Antennal segments (μ): I 65 (52), II 80 (42), III 113 (51), IV 115 (51), V 115 (44), VI 80 (30), VII 67 (28), VIII 39 (16).

♂ (macropterous).—Not essentially different from female in color and structure; sternum VIII with narrow, transverse, glandular area at posterior third.

ARIZONA: Chiricahua Mts., June 18, 1955, J.D.H., 4 ♀♀ and 1 ♂ (this last the allotype), and June 19, 1955, J.D.H., 1 ♀ (holotype) and 1 ♂, all from oak.

Neurothrips apache, sp. nov.

Allied to *magnafemorialis* through lack of dorsal furrow and lack of wing-retaining setae on abdominal tergum VIII, absence of accessory setae on posterior margin of fore wings, bicolored tube, and toothed fore femora; but differing in having the cheeks nearly straight and parallel in anterior two-thirds (instead of strongly arched), dorsal length of eyes decidedly less than their distance from posterior margin of head (instead of about equal to that distance), general color paler, with antennal segments I and II golden yellow (instead of blackish brown), and the tube dark blackish brown in about apical seventh (instead of in apical half or more).

♀ (macropterous).—Length about 2.3 mm. (fully distended, about 2.6 mm.). Color (by reflected light) very pale, by naked eye with only head, pterothorax, and median portion of abdomen dark; head, anterior part of pronotum, all of abdominal segment IX, and posterior half of VIII, orange or brownish yellow; remainder of pronotum and of abdominal segment VIII, lateral thirds of abdominal segments I-V, and most of tube, chalky white, the basal third of tube yellow and without white internal pigment, its apical seventh nearly black; abdominal segments II-VII each with a small dark lateral spot, I-VII dark gray medially, these latter dark areas darkest at their sides and, on VI and VII, consisting usually of two separated diverging dashes; antennae largely dusky yellow, or golden yellow, IV shaded with brown and V with blackish brown in swollen portion, VI not shaded, VII and VIII dark blackish brown except for yellow pedicel of VII; legs white, with nearly black tarsal cups and with all tibiae and the middle and hind femora with a black mark or ring around middle; pterothorax variegated with light and dark markings, of which the most conspicuous is a large metanotal light area in the form of a deeply incised arrow-head or (perhaps better) an olla. Head, total length 0.293, width across eyes 0.203, across cheeks (exclusive of tubercles) 0.238, near base 0.210; eyes, dorsal length 0.112, width 0.060, interval 0.075 distance from posterior margin of head 0.143; postocular setae 0.023, interval 0.066,

distance from eyes 0.017; mouth-cone, length beyond posterior dorsal margin of head 0.154; prothorax, median length of pronotum 0.168, width (inclusive of coxae) 0.398, antero-marginal setae 0.017, antero-angular 0.030, midlateral 0.021, epimeral 0.033, postero-marginal 0.024, coxal 0.030; mesothorax, width across anterior angles 0.399; abdomen, width at segments II and III 0.423; tube, length 0.245, subbasal width 0.067, apical width 0.062, terminal setae 0.756. Antennal segments (μ): I 53 (36), II 65 (36), III 87 (36), IV 83 (35), V 78 (34), VI 58 (27), VII 56 (25), VIII 26 (16).

♂ (macropterous).—Not essentially different from female in color and structure; sternum VIII with a pair of longitudinally elliptical, glandular areas at lateral thirds.

NEW MEXICO: Peloncillo Mts., June 25-September 1, 1955 (holotype and allotype taken July 5), 56 ♀♀ and 24 ♂♂, J.D.H., Robert J. Miller, and William C. Miller, Jr.; Rodeo, July 28, 1955, J.D.H., 3 ♀♀.

ARIZONA: Chiricahua Mts., near Portal, July 11, 1955, J.D.H., 2 ♀♀ and 2 ♂♂; ca. 8 mi. S.W. of Rodeo, N.M., August 9, 1955, J.D.H., 1 ♀.

This species lives exposed on the bark of desert shrubs. From sun-burned head to dark-tipped tube, it is an intricate symphony of the soft colors of the arid desert in which it lives, and is certainly one of the most beautiful thrips known. No other specific name would seem wholly appropriate to a species which inhabits the last stronghold of the Apaches and which bears on its back a typical Indian water-jug.

Glyptothrips arkansanus, sp. nov.

Differing most conspicuously from the type species (*flavescens*) in having the pronotum, metanotum, and median tergite of first abdominal segment reticulate instead of minutely tuberculate, the antennae with a more or less evident suture separating the morphological seventh and eighth segments, and the antero-angular pronotal setae much farther apart than figured for *flavescens*.

♀ (macropterous).—Length about 1.6 mm (fully distended, 1.9 mm). Color brown, with head and prothorax usually paler and somewhat yellowish; abdomen with two longitudinal pale lines dividing terga II-VIII approximately into thirds, the median third of the terga II-VII pale posteriorly, tube yellowish apically and tipped with gray; legs dull yellow; fore wings pale yellowish brown in basal half, dusky in apical half, with a slight dark median line in middle third; antennae nearly uniform grayish yellow but darkened in apical half of terminal segment. Head formed as in type species, about 193 long, 149 across eyes, 138 just behind eyes, 165 across cheeks, 155 at base, 91 across head-process; surface reticulate in the usual manner; postocular setae 40, interval 142, distance from eyes 29, their tips dull; eyes 50, width 35, interval 80; mouth-cone normal, extending about 60 beyond posterior dorsal margin of head. Antennae normal in form of segments, but with an obsolete partial suture marking the union of the morphological seventh and eighth segments; I 47 (42), II 54 (36), III 64 (41), IV 52 (43), V 51 (36), VI 48 (30), VII + VIII 72 (25); sense-cones and setae normal. Prothorax 120, across coxae 284, its anterior margin with a slight median lobe, its surface largely reticulate but without tubercles; antero-marginal setae wanting, antero-angulans 31, arising in the angles themselves and

thus much farther apart than in *flavescens*, epimerals 57 and dull at tip, coxals minute, midlaterals and posteromarginals 30-33; mesothorax 301 across anterior angles; metanotum reticulate, the lines pale and distinct, the reticles not elevated at their middle into a low tubercle; fore wings 714, without accessory setae on posterior margin, distal subbasal seta much longer than the others and about as long as epimerals. Abdomen 346 at segment III; median tergite of I with anterior portion subretangular and reticulate, without low tubercles; posterior pair of wing-retaining setae on terga III-VII sigmoid; tube 197, across basal collar 83, at tip 33, sides straight and evenly tapering to tip from about basal sixth, terminal setae 78; most setae rounded at tip (not dilated), I on IX 83 and dull, II more tapering and nearly pointed.

♂ (brachypterous).—Smaller than female, but like it in all essentials; glandular area on sternum VIII in the form of a narrow transverse band just behind middle.

ARKANSAS: Stillwater, March 16, 1957, Dr. Willard H. Whitecomb, 29 ♀♀ (including holotype) and 2 ♂♂ (including allotype) from *Andropogon virginicus*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

STUDIES ON SPIROBOLOID MILLIPEDS. IV. THE
CHARACTERS AND RELATIONSHIPS OF THE
GENERA *NARCEUS* RAFINESQUE 1820 AND
SPIROBOLUS BRANDT 1833*

BY RICHARD L. HOFFMAN

One of the primary reasons for the present unsatisfactory condition of systematics in the Diplopoda is that much of the groundwork was laid by investigators who had little knowledge of, or interest in, certain principles of zoological nomenclature which are now generally regarded as axiomatic. For the most part, the successors of these men have not challenged their authority, and have thus perpetuated the errors. The practice of consulting original literature references has become increasingly neglected.

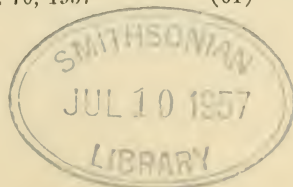
Of the various workers who have, in one way or another, dealt with the family Spirobolidae during the past century, only a few were guided by the basic tenets of nomenclatorial procedure, the majority seeming to follow the courses of their own concern for convenience. As one of the results, the general conception of the Spirobolidae has become founded upon a species not even congeneric with the true type species of *Spirobolus*! By sheer good luck, it happens that this "generotype by usurpation" does belong to the same family as *Spirobolus*, otherwise the ensuing confusion would have been far greater than is actually the case.

For almost 100 years, the name *Spirobolus* has been applied to the genus of spiroboloid millipeds occurring in eastern North America, although Cook pointed out the error of such an association in 1904. With the recent discovery of a valid generic name—13 years older than *Spirobolus*—for the Nearctic species, it became obvious that finally something would have to be done about clearing up the Chaos. I believe that it is now possible to do so, and offer the following resolution of the matter.

HISTORICAL SUMMARY

Spirobolus was proposed in 1833 by J. F. Brandt for two new species, *S. Olfersii* from Brasil and *S. Bungii* from China. No type was design-

*Previous papers under this general heading have appeared in these *Proceedings*, as follows: I. vol. 66, pp. 179-183, 1953; II. vol. 68, pp. 31-36, 1955; III. vol. 68, pp. 151-154.



nated, and although no specifically diagnostic characters (such as male genitalia) were stipulated for either species, enough information was given that, with a consideration of the localities cited, it should have been possible for later workers to identify the genus.

Brandt's immediate successors (such as Gervais) copied his descriptions in their own works, but did not add to our knowledge of either the genus or its two included species. In 1865 the generic name was brought to the North American fauna by Wood, who referred Say's *Julus marginatus* (1821) to the genus. And as *Spirobolus marginatus* this creature eventually became one of the best known of all millipeds. Simultaneously, *bungii* and *olfersii* gradually slipped into obscurity as workers automatically came to think of *Spirobolus* in terms of *marginatus*, its only well-known (*ergo* typical!) species.

Pocock endeavored to bring the matter into its correct perspective in 1894, when he designated *bungii* as the type species of *Spirobolus*. This action, of course, was entirely justifiable, as *bungii* was one of the species originally included in the genus. Pocock described another new spiroboloid, *S. walkeri*, from eastern China, and discussed its relationships to the known Chinese species (*bungii* Brandt and *exquisitus* Karsch). Two years later, in 1896, Brolemann added another name, *S. joannisi*, to the roster of species from southeast Asia, so that by 1900 it was known that species considered to belong to *Spirobolus* occurred in both China and North America. That they were regarded as closely related is demonstrated by the opinion of Attems in 1910 that *joannisi* is a synonym of *marginatus*.

The situation was summarized in 1914, in Brolemann's useful *Études sur la Spirobolides*. Brolemann admitted that Pocock had made a valid type designation in selecting *bungii*, but he observed that Brandt's species was still poorly known, and that the American form taken to be *marginatus* might for the sake of convenience be regarded as the entity from which the characters of the genus *Spirobolus* could be inferred. His contemporaries and successors readily embraced this proposal, and *bungii* has not, to the best of my knowledge, been mentioned in the literature for the past forty years.

Shortly after I began the study of diplopods, my colleague H. F. Loomis called my attention to the fact that *Spirobolus* was based on exotic species, and that Cook in 1904 had proposed the name *Arctobolus* for the American forms. But for various reasons no action was taken in this connection until 1953, when, with the discovery of Rafinesque's name *Narceus*, it became apparent that the continued use of *marginatus* as the type of *Spirobolus* would result in the loss of Brandt's generic name as a junior synonym. An investigation was then undertaken regarding the status of the animals involved as well as of the nomenclature affecting them. The decision offered here has been made upon both nomenclatorial and morphological information, and the latter phase will be presented first.

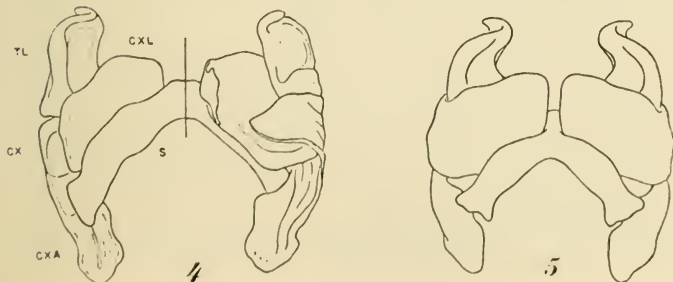
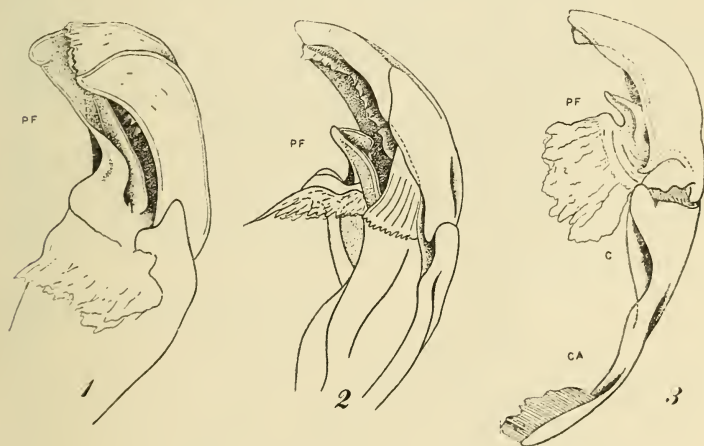
THE IDENTITIES OF THE GENERA *SPIROBOLUS* AND *NARCEUS*

I.

By very good fortune, the United States National Museum contains material of a spiroboloid taken 65 miles north of Peking, China (the

type locality of *bungii*), and these virtual topotypes agree in all important respects with the original description. So far only four large spiroboloid species are known from eastern China, and these are all congeneric. I believe there can be no doubt that the Peking material, if not identical with Brandt's species, is at least very closely related and represents the genus in its strict sense. Until information to the contrary is forthcoming, I shall regard the specimens as belonging to the species *bungii*.

It may be observed from the accompanying figures that the genitalia of this form are very similar to those of the American species. No generic differences whatever can be found in the anterior gonopods, nor have I been able to discover any notable external differences affecting the bodies of the species examined. There is, however, one apparently constant difference involving the posterior gonopods, namely the relative length of the prefemoral process. In *Spirobolus bungii* and its geographically associated relatives, this process is about half the length of the distal joint of the gonopod itself (fig. 3). On the other hand, this process in the American forms is much longer, and equals or exceeds the tip of the telopodite (fig. 1). This distinction, although not par-



ticularly outstanding, is constant in the material I have seen (as well as in literature illustrations) and its utilization as a generic character would seem to be fully justified. In addition to the drawings of the genitalia, I append at this point a brief description of the specimens which I take to represent *bungii*.

Spirobolus bungii Brandt

Figs. 3, 5

Described from a male specimen [USNM] from Tsin Lung Shan, 65 miles north of Peking, China, collected by A. deC. Sowerby.

♂, ca. 80mm. long, 6.0mm. wide, with 55 segments.

Color mostly faded, but enough pigment remains to indicate that in life the animal was dark gray or blackish, with the caudal edge of the segments, the legs, tip of telson, and entire margin of collum yellowish or reddish.

Body stout, about 13 times as long as broad.

Head smooth and evenly convex; epipharyngeal groove distinct as far up as lower edge of antennal sockets; genae slightly swollen, entirely smooth, not margined. Labral setae 8-8, clypeal foveolae 4-4. Antennae rather short, not reaching to middle of 2nd segment when extended back; antennal articles smooth, somewhat compressed, the basal four mostly glabrous, the last three becoming increasingly setose; 2nd article largest; 4 terminal sensory cones. Eyes subtriangular, small, the interocular space about a third greater than largest diameter of an eye patch. Ocelli irregular in size and shape, about 40 in each cluster.

Collum of the usual spiroboloid form, the front edge set off by a marginal groove which extends up to the level of base of mandible. Entire surface smooth, sprinkled with very minute, widely separated punctures.

Pleurotergites of 2nd segment produced cephaloventrad into a conspicuous, strongly striate lobe projecting below and in front of the ends of the collum on each side.

Dorsal surface of segments with very shallow transversely oblong depressions on the midbelt, which is otherwise smooth and impunctate. Hindbelt slightly raised, smooth and shining, with a few tiny widely separated punctations. Transverse suture distinct across dorsum and down sides, passing behind the pores.

Preanal segment produced at the midline, forming a blunt subtriangular telson, much exceeded by the valves. Latter smooth, and polished, considerably swollen, meeting at a re-entrant angle, the free edges not set off by a submarginal groove. Preanal scale very broadly transverse, the width several times as great as the length.

Legs smooth, compressed, vestiture reduced to a single seta at the ventral end of each joint, except that the tarsal joints usually have from 3 to 6 macrosetae on the ventral side and another just above the insertion of the tarsal claw. Tarsal joints without velutinous pads. 1st and 2nd pairs of legs conspicuously smaller than those following. Prefemora of legs 4-7 compressed ventrad to form a rather acute edge but not excavated or otherwise modified. Coxal lobes of legs 3-7 not enlarged, consisting only of rudimentary blunt points.

Anterior gonopods very similar to those of *Narceus*, consisting of a V-shaped sternite, the coxites with mesially directed endite lobes, and

concave telopodites which partially envelop the posterior gonopods. Latter robust and hoodlike distally, their basal prefemoral process short and becoming terminally truncated and enlarged, less than half as long as telopodite. Coxae of posterior gonopods slender, fused with the spatulate coxal apodemes, connected only by the connective tissue surrounding the genitalia.

II.

The first description of a North American spiroboloid seems to be that of *Julus americanus* by Palisot Beauvois in 1805-1820, based upon a specimen doubtless taken along the eastern seaboard and probably at either Philadelphia or Charleston. This name was considered *inquirendum* by H. C. Wood in 1865, and was not rescued from oblivion until 1893, in a posthumously published paper by Charles H. Bollman.

Even more curious is the neglect of Rafinesque's 1820 names, which included the new genera and species *Narceus tinctorius* and *Rhexenor annularis*, both combinations being founded upon specimens of the composite "species" long known as *Spirobolus marginatus*. Rafinesque's descriptions mention size, color, segment number, minor structural details, and even an observation about the animal's defensive secretions. Although Rafinesque's contemporaries knew his work, and parts of it were cited by later workers, all apparently thought his only myriapod species was *Selista forceps*. In 1952 I accidentally discovered that Rafinesque had actually described six centipeds and four millipeds in *The Annals of Nature*, and the probable identity of these Rafinesquean species was considered by Dr. Crabill and me in 1953. *Rhexenor* and *Narceus* are generic synonyms, the latter having page priority, and *Narceus* is thus the oldest generic name proposed in what is now the order Spirobolida. Its type species, by monotypy, is *N. tinctorius*, based upon specimens from Kentucky. Since another of Rafinesque's diplopods was specified to have been found in the "knobby hills of Estill county, in Kentucky," I consider the same area suitable to serve as the restricted type locality. Specimens were obtained there in May 1954, and form the basis for the following redescription of the species.

Narceus tinctorius Rafinesque

Described from two male topotypes, RLH 6074, collected in the "Knobs" along State Hy. 80, about 5 miles southeast of Irvine, Estill Co., Kentucky, on May 9, 1954.

♂, 125mm long, 9.5mm wide, with 51 segments.

♂, 90mm long, 7.2mm wide, with 51 segments.

Color very dark slate gray, almost black, the caudal edges of the segments slightly tan, edges of the collum almost orange, antennae and legs reddish brown.

Body very stout, only about 13 times as long as wide.

Head convex, polished; epipharyngeal groove distinct as far up as lower edge of antennal sockets; genae not laterally margined, but with numerous fine ventrolaterally directed grooves. Labral setae 10-11 and 7-7, clypeal foveolae large and conspicuous, 5-5 and 6-5. Interantennal space with several fine transverse striae. Antennae moderately short, not reaching caudal margin of 2nd segment when extended back; articles smooth, compressed, the basal four glabrous, last three becoming increasingly pilose; 2nd article the largest, others except last slightly smaller

and subequal in size; 4 terminal sensory cones. Eyes suboval to reniform, large, interocular space about equal to greatest diameter of an eye patch. Ocelli very irregular in size and shape as well as number, 53-48 in one specimen and 38-42 in the other.

Collum of the usual spiroboloid form, its front edge with a distinct margining groove running from the tip up to about the middle of the eye patch. Entire surface, except marginal areas, finely and densely punctate, the punctures of the middorsal area tending to be joined by a network of fine grooves.

Pleurotergite of 2nd segment produced cephaloventrad into a conspicuous, strongly striate lobe projecting below and in front of the end of the collum.

Dorsal surface of segments densely punctate, the punctures finer on the midbelt and much coarser on the slightly raised and polished hind-belt. Transverse suture distinct across dorsum and down sides, passing behind the pores. Lower sides sculptured with about 20-25 striae of a flattened V shape, becoming more prominent ventrad.

Preal anal tergite forming a blunt subtriangular telson, much exceeded by the valves. Latter slightly convex basally, the swollen free margins set off by a shallow crescentic depression. Preal anal scale of the usual subtriangular shape.

Legs smooth and shining, vestiture reduced to a single seta at the ventral end of each joint (these missing entirely in the larger specimen) and usually two setae on the ventral side of the last joint. Ventral setae of the first pair of legs: 0-5-3-2-4-6; of the second: 0-1-3-2-4-(3)-5; of 3rd through 7th: 0-0-0-0-0-2. These formulas are constant in both specimens. Tarsal joints without pads. 1st leg pair not strongly reduced. Prefemora of legs 4-7 strongly compressed and excavated on the caudoventral surfaces. Coxal lobes of 3rd pair roughly pentagonal in shape, with the laterobasal side longest; coxal lobes of 4th-7th pairs slender, elongate cones, those of the 7th pair abruptly tapering distad from a swollen base.

Pleurites of 7th segment small, slender, mesially produced lobes which touch at a visible and distinct midventral suture. Anterior gonopods (fig. 4) of the usual spiroboloid type, composed of narrow transverse sternite (ST), coxites (CX) with mesially produced endite lobes (CXL), and strongly concave telopodites (TL), all three elements being connected by distal ramification of the coxal apodemes (CXA). Posterior gonopod (fig. 1) robust, with an elongated, lamellate prefemoral process which exceeds the end of the tibiotarsal portion.

III.

Numerous species, clearly congeneric with *tinctorius*, have been described from eastern United States. The existing literature descriptions are entirely inadequate for evaluation of these names, and a satisfactory settlement must await a thorough revision of the genus. On the basis of material already assembled toward this end, I am inclined to believe that most of the named forms will prove to be but geographic races, whose definition will have to depend upon more subtle characters than hitherto employed. For the purposes of this paper, it will be sufficient merely to point out the distinction between the Chinese and American genera which have previously shared the name *Spirobolus*.

Selecting the structural peculiarities, which, when taken in combination, appear to warrant the recognition of two distinct genera, we can arrive at the following brief differentiating couplet. Of Chinese forms I have seen material of what appears to be Pocock's *S. walkeri*, in addition to the series of *bungii*, and include here an illustration of the posterior gonopod in this species.

1. Prefemoral process of posterior gonopods short, less than half as long as telopodite; anal valves swollen and meeting at a moderate re-entrant angle, completely lacking margins on the free edges; tergites smooth with very tiny, scattered punctuations; anterior coxae of males without modified lobes..... *Spirobolus* Brandt
 Prefemoral process of posterior gonopods extending distad as far as end of telopodite; anal valves less swollen and with definite raised mesial margins; tergites coriaceous or slightly rugose, usually with very pronounced punctuation; anterior coxae of males with variously modified coxal lobes..... *Narceus* Rafinesque

NOMENCLATORIAL CONSIDERATIONS

The two genera under discussion may be summarized with respect to their nomenclatorial status, as follows:

Spirobolus Brandt

Spirobolus Brandt, 1833, Bull. soc. nat. Moscou, vol. 6, p. 203.—Pocock, 1893, Journ. Linnean Soc. London, Zool., vol. 24, p. 484.—Brolemann, 1914, Ann. soc. ent. France, vol. 83, p. 31.

Prospirobolus Attems, 1910, in: Voeltzkow's Reise Ostafrika, vol. 3, p. 90 (type, *Spirobolus joannisi* Brolemann, 1896).

Sinobolus Chamberlin and Wang, 1953, Amer. Mus. Nov., no. 1621, p. 12 (type, *Spirobolus joannisi* Brolemann 1896).

Type species.—*Spirobolus bungii* Brandt 1833, by subsequent designation of Pocock, 1894.

Synonymy.—The authors of *Sinobolus* erected the genus with the following characterization:

“Posterior gonopods lacking the free inner piece present, e.g., in the American *Narceus* Raf. (= *Spirobolus* as restricted by Brolemann). This perhaps represented by a transverse arm projecting mesad from base of gonopod proper. This arm with short angle or process projecting distad from its free end, while from its basal end a spine or curved finger-like process projects, lying against the base of the gonopod proper. Median plate of anterior gonopods absent or abortive.

“Generotype: *Spirobolus joannisi* [sic] Brolemann.”

It will be noted that Chamberlin and Wang detected the outstanding difference between *joannisi* and the American species, although I fail to understand why comparison was made only with *Narceus* while the legitimate claims of Brandt's *Spirobolus* to be considered were quite disregarded. Nor do I entirely understand the statement that the sternite of the anterior gonopods is absent or abortive. Brolemann's figure shows a well-developed sternite.

However, since *joannisi* is pretty clearly congeneric with *bungii*, consideration of *Sinobolus* is not necessary. Even if Brandt's type should be found, and *bungii* shown to be generically different from my present concept of it, there remains the much older name *Prospirobolus* Attems for *joannisi* and its close relatives.

Narceus Rafinesque

Narceus Rafinesque, 1820, *Annals of Nature*, vol. 1, p. 9.—Hoffman and Crabill, 1953, *Florida Entom.*, vol. 36, p. 80.

Rhexenor Rafinesque, 1820, *Annals of Nature*, vol. 1, p. 9 (type: *R. annularis* Rafinesque [= *Narceus annularis* (Rafinesque)], by monotypy).—Hoffman and Crabill, 1953, *Florida Entom.*, vol. 36, p. 81.

Spirobolus (*nec* Brandt) Wood, 1865, *Trans. American Philos. Soc.*, vol. 13, p. 207.—Bollman, 1893, *Bull. U. S. Nat. Mus.* No. 46, p. 145.—Chamberlin, 1947, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 99, p. 44.

Arctobolus Cook, 1904, *Harriman Alaska Exped.*, vol. 8, p. 64 (type: *A. onandaga* Cook [= *Narceus annularis* Rafinesque], by original designation).

Type species.—*Narceus tinctorius* Rafinesque, by monotypy.

Synonymy.—Both *Rhexenor* and *Arctobolus* are junior subjective synonyms of *Narceus*, based upon specimens from New York State which are apparently conspecific. Had the Rafinesque names not been available, *Arctobolus* would be the correct generic name for the American forms, as maintained by Cook, and following him, by Loomis in numerous papers.

The status of the species of *Narceus* remains badly confused, and final resolution of the problem will depend upon a careful monographic study of the genus.

ACKNOWLEDGEMENTS

I wish to indicate my indebtedness to Drs. Howard E. Evans and John G. Franclemont of the Department of Entomology, Cornell University, who kindly read the manuscript of this paper in its early stages and made several valuable suggestions for its improvement. Dr. Edward A. Chapin, former curator of the Division of Insects, United States National Museum, generously loaned the Chinese specimens which made the project possible.

EXPLANATION OF FIGURES

Fig. 1. *Narceus tinctorius* Rafinesque, caudomesial aspect of left posterior gonopod, from topotype, 5 miles east of Irvine, Estill County, Kentucky.

Fig. 2. *Spirobolus walkeri* Pocock, caudomesial aspect of left posterior gonopod, specimen from Hangkow, China (O. F. Cook and H. F. Loomis, colls.).

Fig. 3. *Spirobolus bungii* Brandt, caudomesial aspect of left posterior gonopod, specimen from 65 miles north of Peking, China (A. deC. Sowerby, coll.).

Fig. 4. *Narceus tinctorius*, anterior gonopods, anterior aspect on the left, posterior on the right. Drawn from a cleared mount, the coxal sutures distinct.

Fig. 5. *Spirobolus bungii*, anterior gonopods, anterior aspect. Coxae and coxal apodemes slightly separated from sternite during dissection of the specimen, normally much as in *Narceus*.

Abbreviations: CX: coxite; CXA: coxal apodeme; CXL: coxal endite lobe; S: Sternite; TL: telopodite; PF: prefemoral process of posterior gonopod.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A SYNOPSIS OF THE GENUS *ESSIGELLA* (APHIDAE)

F. C. HOTTES

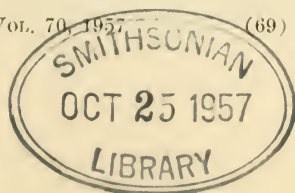
I deeply appreciate the loan of type material and named and unnamed slides from E. O. Essig. I am indebted to M. A. Palmer for the loan of type material from the Colorado Collection, for making the drawings and for her valued opinions on all species, particularly on the species described as new, but for which I take sole responsibility. A. A. Granovsky made available the type of *E. pini* Wilson which is now in his collection. G. W. Simpson sent me the material studied by Edith Patch. G. F. Knowlton sent his named and unnamed species. The United States National Museum, through Louise M. Russell made available types, and named and unnamed material. To all of these I would express my thanks.

The genus *Essigella* was erected by Del Guercio in 1909 for *Lachnus californicus* Essig, which had been described earlier that same year. *Revista di Patologia Vegetale*, Pavia, Anno III, n. 20-21, 1909. C. F. Baker, Editor of *Pomona Journal of Entomology*, Vol. 1, No. III 1909 gives a free translation of the original description. The genus was again characterized in 1920 by A. C. Baker in his *Generic Classification of the Hemipterous Family Aphididae*, at which time only two species were known to belong to the genus.

The genus *Essigella* belongs to the Subtribe *Eulachnina* Baker, which belongs to the Tribe *Lachnini* Wilson. There are three genera in the Subtribe *Eulachnina*, all of which have the rostrum obtuse, the fifth segment much reduced. The cornicles are shallow, with the base not much wider than the rim, with few or no hairs, or with the cornicles reduced to a rim. All live on the needles or leaves of *Coniferac*.

KEY TO GENERA OF EULACHNINA

1. First tarsal segment with dorsal hairs; cornicles free from hairs . . . 2
 First tarsal segment without dorsal hairs; cornicles with some hairs . . . *Schizolachnus* Mordvilko
2. Antennae of five segments; apex of claws modified . . . *Essigella* Del Guercio
 Antennae of six segments; apex of claws simple . . . *Eulachnus* Del Guercio



Genus *Essigella* Del Guercio

Characters.—Body elongate and narrow; head much broader than long; ocular tubercles absent. Antennae five segmented, bearing minute hairs or bristles; unguis with primary sensorium; rostrum broadly obtuse at apex. Fore wing with media simple or once branched, hind wing with both media and cubitus present. Cornicles free from hairs, reduced to mere ring, or with base only slightly larger than ring, and little raised. First tarsal segment elongate, dorsum with two or more hairs. Claws bifurcate or with only one fork developed. Cauda rounded or with median posterior tubercle. Living on the needles or leaves of *Coniferae*. Type (monotypical), *Lachnus californicus* Essig.

Baker, A. C.

1920. Generic Classification of the Hemipterous Family *Aphididae*. U. S. Dept. of Agr. Bul. 826; pp. 13-14

Baker, C. F.

1909. Concerning Two New Genera and Three New Species of Aphids of California G. Del Guercio. Pomona Jour. Ent. Vol. I No. 3, pp. 73-74

Essig, E. O.

1909. Aphididae of Southern California I. Pomona Jour. Ent. Vol. I, No. I pp. 1-4, figs. 1-2. (fig. 2 is a plate)

Guercio, (Del Guercio G.)

1909. Intorno a due nuovi generi e a tre specie nuove di afidi di California. Rivista di Patologia Vegetale Anno III. Num. 20-21 pp. 328-329. Genus *Essigella* described p. 329.

In the past, species of *Essigella* have been thought to be confined to species of *Pinus* for their host. This is no longer true; at least one species is known from *Pseudotsuga*, and one species has been taken on *Abies*.

In the descriptions I make use of two terms which I define as follows: Cape, the pigmented area on the dorsum of the body, which may extend laterally on to the venter. It is not present in all species, Brush, that area on the inner margin of the tibiae near the apex thickly clothed with fine short hairs.

All drawings, except those of *E. hoernerii* Gillette and Palmer which were drawn from paratype specimens, were drawn from either holotype, lectotype, morphotype or allotype specimens, and the measurements indicated are from those specimens. Where other measurements are given they are within brackets.

Collection of material. Collectors in the past have collected individual specimens of *Essigella* by closely observing the needles of pines for them. That this method is productive is witnessed by the species described herewith, but it is extremely time consuming, first because many trees are without specimens, and second the individual specimens in most cases are widely spaced, once located on a given tree. The writer prefers to collect specimens of *Essigella* as well as *Cinara* by beating, jarring the specimens from the needles, by means of a club, the handle of a prospectors pick, being ideal as to length and weight for this purpose. The specimens are then collected with forceps from the surface of a Turkish towel which has been tightly stretched over a twenty-four inch hoop to which a short handle has been attached.

Not only does the rough surface of the towel give the specimens something to hold to, but it holds them up, so that they may be easily lifted without injury. Furthermore the rough surface of the towel cuts down the movement of air, so that specimens are not easily blown away. As to color of towel, I prefer yellow, but any color that contrasts sharply with the color of most species to be collected should work.

Rearing. Specimens of *Essigella* may be reared on branches of the host tree placed in water, or upon young potted trees of the host species. Transfers of specimens from branches of one tree to branches of another are not always successfully made. It is best to make use of branches of the original host tree. When it is thought necessary, specimens on small twigs may be caged by placing a lamp or lantern chimney over the twig and its container, the top of the chimney being covered with cloth fastened to it by scotch tape. In special cases it is well to surround the container and chimney by a moat. The moat serving the double purpose of preventing the escape of specimens possessed of wanderlust, from the bottom, should they fall or wander from the twig, and at the same time it prevents their desiccation until discovered.

Small twigs intended for rearing specimens should always be examined for spiders and other predacious forms. As a preliminary to examination, it is well to wash off such twigs with a hose.

This past summer I was intrigued by a method used by D. Hille Ris Lambers for rearing aphids. He made use of small plastic bags as containers for the aphids and portions of their host plants. Use of this method does away with water and cage.

Essigella agilis n. sp.

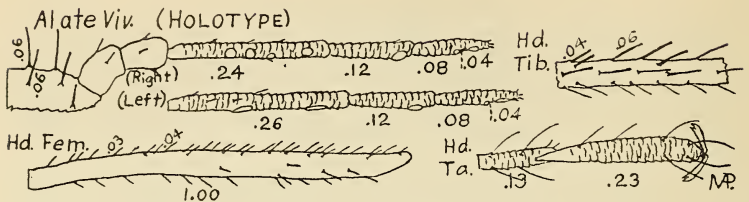
Plate I

Essigella fusca Gillette and Palmer, (in part) Gillette and Palmer Annals Entomological Society of America Vol. XVII 1924, pp. 6-9.

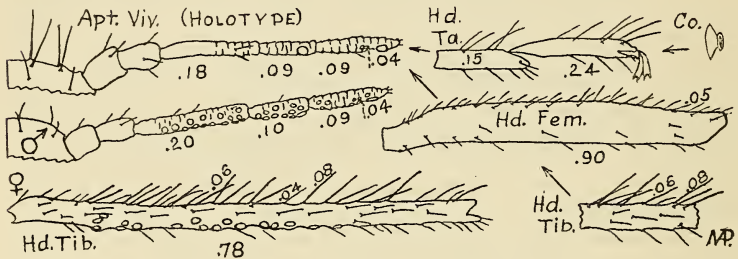
Essigella fusca Gillette and Palmer, (in part) Palmer Aphids of the Rocky Mountain Region pp. 14-15 1952.

Apterous viviparous female.

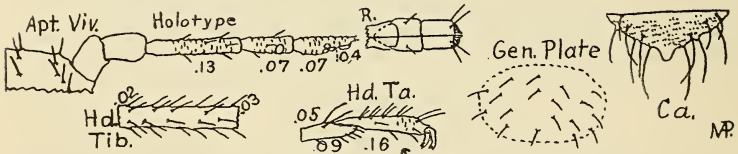
Length from vertex to end of anal plate varying from 2.62-2.75 mm. Color subject to considerable variation, some specimens pale green, others with head, thorax and cape very pale yellowish brown with some green. Apical half of fourth antennal segment and all of fifth segment dusky. Femora pale yellowish with dorsal margins brownish. Tibiae and tarsal segments brownish, but not dark. Antennal segments with the following lengths: III .18 mm., IV .09 mm., V .09 + .04 mm. There are no secondary sensoria, the third segment has no sensoria, fourth and fifth segments with primary sensoria. Prothoracic femora and tibiae about equal in length, varying from .54 — .57 mm. Mesothoracic femora shorter than prothoracic femora, mesothoracic tibiae longer than prothoracic tibiae. Metathoracic femora .90 mm. long, hairs on dorsal margin rather numerous, the longest about .05 mm. Metathoracic tibiae varying in length from 1.05 — 1.17 mm. Hairs on outer margin of metathoracic tibiae varying from .06 — .08 mm. in



Essigella pineti n. sp.



Essigella agilis n. sp.



Essigella pergandei n. sp.

Plate I

length, the two lengths being intermixed. The hairs on this surface are slightly dull at the apex. The hairs on the inner margin of the metathoracic tibiae are much shorter than the hairs on the outer margin, finer, and less numerous. The first segment of the metatarsus is .15 mm. in length, the second metatarsal segment is variable in length, measuring from .21 — .24 mm. The dorsum of the first tarsal segment of all legs as a rule has two pairs of hairs. The more basal pair is much shorter than the apical pair and less spine-like. The basal hairs on the prothoracic and mesothoracic first tarsal segments are often very difficult to differentiate. A few specimens have as many as five hairs on the dorsum of the metathoracic first tarsal segment. These hairs are coarse and longer than the width of segment. The dorsum of the abdomen is provided with short, rather coarse hairs, which arise as a rule from small pigmented areas which are slightly darker than the caep. The cornicles are the color of the caep. The median posterior tubercle on the cauda is not well developed. Holotype,

apterous viviparous female, Morphotype, oviparous female, Allotype, apterous male. All taken on *Pinus ponderosa*, south of Glade Park, Colorado. (Mud Springs area). Holotype June 26, 1956. Morphotype and allotype, October 7, 1956, these mounted on the same slide. The two type slides deposited in the United States National Museum. All specimens taken by F. C. Hottes.

Slides seen in addition to types: *Pinus scopulorum* October 1, 1922, oviparous female determined as morphotype of *E. fusca* Gillette and Palmer, Estes Park, Colorado, F. C. Hottes. Paratype slide same data as type, Paratype slide same data as Morphotype. *Pinus ponderosa*, Hat Creek, California, June 24, 1955, E. O. Essig, three slides.

As indicated in the discussion of *E. fusca* specimens of this species were held to be that species by Gillette and Palmer. Specimens of this species may be differentiated from specimens of apterous *E. fusca* by the much lighter caepe. Apterous specimens differ from apterous specimens of *E. palmerae* by having shorter hairs on the femora and tibiae, and shorter femora and tibiae.

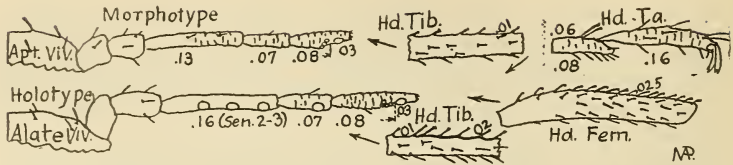
Essigella braggi n. sp.

Plate II

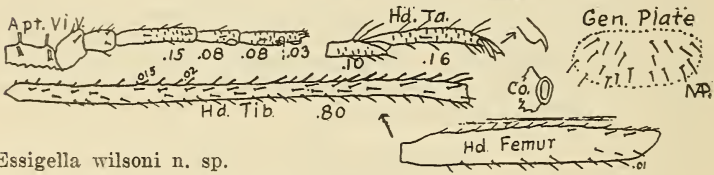
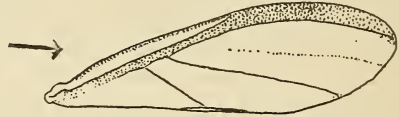
Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.25 — 2.47 mm. Dorsum of head thorax and abdomen covered by a light brown caepe. First antennal segment as a rule more or less concolorous with head, second antennal segment, and varying amounts of the third pale, apex of third and all of fourth and fifth segments dusky. Femora brown, shaded with dusky, often quite dark. Tibiae brown, shaded with dusky, at times quite dark. Tarsi dark brown. Rings of cornicles dark brown.

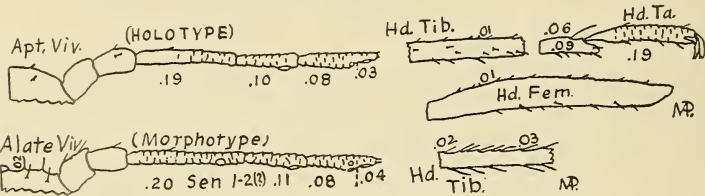
Antennal segments with the following lengths: III .195 — .23 mm., IV .09 — .12 mm., V .11 — .12 + .045 mm. The third segment is without sensoria. The primary sensoria on the fourth and fifth segments are very small and almost flat. The imbrications on the antennal segments are exceptionally well developed. Hair on antennal segments unusually well developed, distinctly spine-like, very conspicuous on the first and second and third segments, on the third segment the longest almost as long as width of segment. Vertex of head with distinct spine-like hairs which vary in length from .03 — .07 mm. Rostrum hardly reaching base of metathoracic coxae. Prothoracic femora unusually well developed, varying in length from .49 — .57 mm. provided with coarse spine-like hairs, those on the dorsal margin being dull at the apex, on one side the hairs are similar to those on the dorsum, remaining hairs less spine-like, and sharp pointed. Prothoracic tibiae varying in length from .60 — .72 mm. always conspicuously longer than prothoracic femora. Hairs on outer margin of prothoracic tibiae distinctly spine-like, dull at the end, and slightly longer than width of tibiae, but there are some hairs which are only subequal to the width of the tibiae. Hairs on remaining surface of prothoracic tibiae sharp pointed, slightly shorter, finer, but still spine-like. Mesothoracic femora about .45 mm. in length. Hair on mesothoracic tibiae much



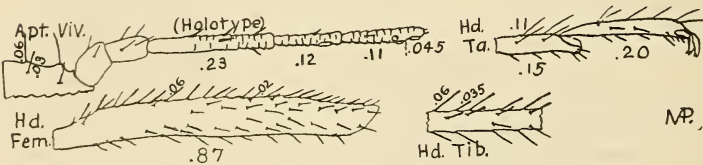
Essigella essigi n. sp.



Essigella wilsoni n. sp.



Essigella swaini n. sp.



Essigella braggi n. sp.

Plate II

shorter than the hair on the prothoracic tibiae, varying from about one third to one half the width of the tibiae. Metathoracic femora varying from .78 — .82 mm. in length. Dorsal margin of metathoracic femora with hairs more numerous than elsewhere, varying in length from .02 — .06 mm. dull at the tip and distinctly spine-like, similar hairs are found on one side of the femora, remaining hairs on this segment less spine-like, sharp pointed, the hairs on the ventral surface being few and rather fine. Metathoracic tibiae varying in length from 1.20 — 1.27 mm.

Hairs on metathoracic tibiae distinctly spine-like, varying in length from .035 — .06 mm. The hairs on the outer margin are more spine-like, and longer than the hairs on the inner margin, these hairs are also dull at the tip. On the outer margin shorter hairs alternate with longer. Dorsal surface of first metathoracic tarsal segment with two pairs of long hairs, the hairs being much longer than the width of the segment and very coarse. First tarsal segment of other legs with only one pair of hairs, and these not quite so long as those on the first tarsal segment of the metatarsus.

The first tarsal segment of the metathoracic legs varies in length from .135 — .15 mm. The second tarsal segment of the metathoracic pair of legs is .20 mm. in length, the hairs on the dorsal surface of this segment are much longer than the hairs on the ventral surface, more spine-like, and about one and one-half times the width of the segment in length.

Abdomen.—Dorsum of abdomen with a few short, rather spine-like hairs, which arise from pigmented areas. The hairs on the dorsum vary in length, the shortest being located on the anterior portion, the longest near the posterior portion of the abdomen. Hairs on ventral portion of abdomen in patches, numerous, the more lateral hairs being much longer and coarser than the hairs near the middle. Cauda and anal plate with numerous long sharp pointed hairs. Both cauda and anal plate imbricated.

This robust species may be differentiated by the coarse spine-like hairs on the antennae. From *E. fusca* Gillette and Palmer it may be differentiated by its lighter caudae, larger size, shorter tarsal segments, by the fact that the dorsal surface of the pro and mesothoracic tarsal segments have only one pair of hair, and by the shorter hairs on the mesothoracic tibiae. The hairs on the outer margin of the metathoracic tibiae are also shorter and more nearly capitate than are the hairs on this segment of *fusca*.

Holotype, apterous viviparous female, taken on *Pinus contorta*, Tuolumne Meadows, California, August 22, 1955. Collected by J. W. Mac Swain. Type in the collection of E. O. Essig. Two slides of the same collection have been made paratype.

Essigella californica (Essig)

Plate III

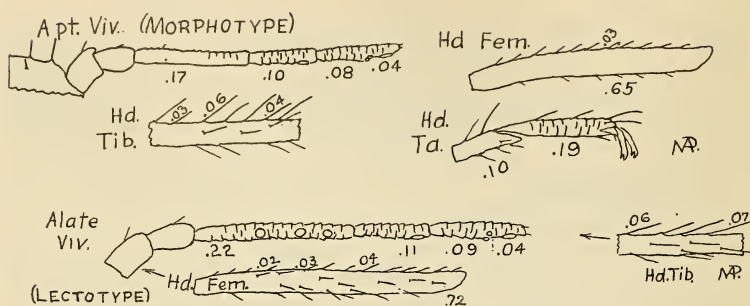
Essig, E. O.

1909. Aphididae of Southern California I. Pomona Jour. Ent. Vol. I, No. I pp. 1-4, figs. 1, 2. Original description (in part)

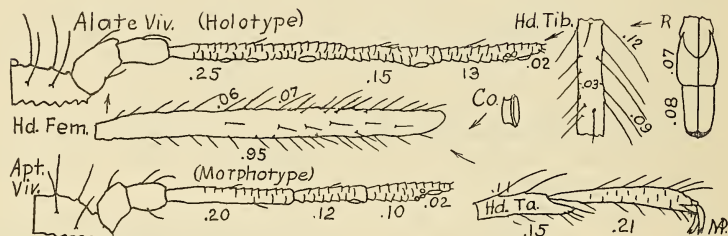
1912. Aphididae of Southern California X. Pomona College Jour. Ent. Vol. IV, pp. 780-785, figs. 247, 248. *Essigella gillettei* n. sp. Gillette, C. P. and Palmer, M. A.

Gillette, C. P. and Palmer, M. A.

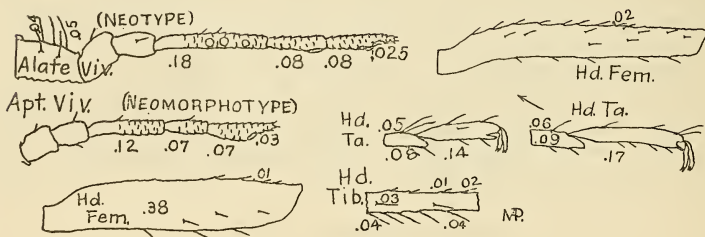
The Aphidae of Colorado, Part I. Annals Entomological Society of America Vol. XXIV 1931 pp. 838-839, fig. 9
Essigella gillettei n. sp.



Essigella californica (Essig)



Essigella gillettei n. sp.



Essigella pini Wilson

Plate III

Patch, Edith

1912 *Aphid Pests of Maine Food Plants of the Aphids Psyllid Notes*. Maine Agricultural Experiment Station Bulletin 202. pp. 169-170 figs. 286, 287. *Essigella patchae* n. sp.

Wilson, H. F.

1919. Three New Lachnids With Comparative Notes on Three Others (Homop.) *Entomological News* Vol. XXX No. 1,

pp. 1-2, figs. 1-6. *Essigella wilsoni* n. sp., *Essigella gillettei* n. sp.

As indicated under the description of *E. essigi*, Essig did not base his original description of this species entirely upon specimens belonging to it. Nor is Essig's redescription of this species in part X Aphididae of Southern California limited to it, the material in part consisting of *E. gillettei*. The references to *californica* by Gillette and Palmer, and those of Knowlton refer to *E. gillettei*. Wilson's 1919 reference to this species was most likely based on two species, *E. wilsoni* n. sp. and *E. gillettei* n. sp. This is indicated by Wilson's figures which do not agree with his description, and by his mention of two host species. The species recorded by Patch under this name is 1912 from *Pinus strobus* belongs to *E. patchae* n. sp.

Alate viviparous female.

Only four specimens of this form, from the original material are known to exist, neither is perfect, and neither is in a position to measure accurately as to length. The legs are pale dusky and quite uniform in color, the antennae are the same with the base of the third segment pale. Antennal segments with the following lengths: III .22 mm., IV .11 mm., V .09 + .04 mm. The third antennal segment has three sensoria. Fourth and fifth antennal segments with only primary sensoria. Hairs on antennal segments extremely sparse, fine and short. Vertex of head with a few long sharp pointed hairs, which are about .06 mm. in length. Prothoracic femora about .42 mm. in length. Length of mesothoracic femora about .33 mm. Metathoracic femora varying from .645 — .69 mm. in length, dorsal margin with a few fine, sharp pointed hairs, which are spaced at least in part further apart than the hairs are long. Length of metathoracic tibiae of one original "cotype" specimen 1.14 mm. the tibiae of the lectotype are not complete. Hairs on metathoracic tibiae of same type on both margins, fine, sharp pointed, and varying in length from .02 — .06 mm. with the shortest hairs near the base and the longest near the apex, where the hairs are rather droopy. Hair, as indicated, on original cotype specimen, on inner margin of metathoracic tibiae, much shorter than interval between hairs on upper third of segment, about as long as width of segment elsewhere. Hair on outer margin of metathoracic tibiae about two times width of segment when measured near the apex, shorter than this elsewhere. Cauda with distinct median posterior tubercle. Cauda and anal plate with long hairs. Media forked.

Apterous viviparous female.

Length from vertex to end of anal plate 1.65 mm. Color in life not recorded, probably pale green, definitely without cape. Antennae pale, legs pale dusky, tarsal segments concolorous with ends of tibiae. Antennal segments with the following lengths: III .17 mm., IV .10 mm., V .08 + .04 mm. Third antennal segment without sensoria, fourth and fifth segments with only primary sensoria. Hair on antennae almost absent. Vertex of head with a few moderately long hairs, the hairs being about as long as the width of the second antennal segment. Lengths of pro meso and metathoracic femora as follows: .375, .30, and .65 mm. Lengths of pro meso and metathoracic tibiae as follows:

.41, .45, and .90 mm. Lengths of metathoracic tarsal segments as follows: first, .10 mm., second, .19 mm. Prothoracic femora with a few hairs, hairs on dorsal margin no longer than those on vertex of head. Prothoracic tibiae with hairs on outer margin ranging in length from very short near the base, to hairs which are about equal to width of segment near the apex, the hairs on this margin are fine and sharp pointed. Hairs on inner margin of prothoracic tibiae for the most part about equal in length, and about one-third as long as the longest hairs on the outer margin. They are spaced for the most part further apart than their length. Hairs on outer margin of mesothoracic tibiae extremely short, and dull at the apex. Hairs on inner margin fewer than those on outer margin, slightly longer, and spaced much further apart than their length, more upstanding and sharp pointed. Hairs on metathoracic tibiae ranging in length from extremely short near the base to .06 mm. near the apex, fine and sharp pointed. Hairs on inner margin of metathoracic tibiae about half as long as those on outer margin, but similar to them in texture. First metatarsal segment with two pairs of hairs on the dorsum, apparently one pair of hairs is located on the dorsum of the pro and mesothoracic tarsal segments. Hairs on second metatarsal segment few and short. Median posterior tubercle on cauda well developed.

Lectotype and morphotype aphid collection of E. O. Essig. Both types are part of the original material collected on Monterey Pine, *Pinus radiata*, Claremont, California, Feb. 14, 1909. Four other slides definitely known to belong to the original material have been seen, one that of an alate belongs to this species, one of an apterous belongs to *E. gillettei* n. sp., both are in the Essig collection. The other slides are in the collection of the United States National Museum, one contains the type of *E. claremontiana* n. sp., the other contains two alates of *E. californica*. One other slide in the collection of the United States National Museum is suspected of belonging to the original material, it carries the data, "*Essigella californicus*, Claremont, Cal., E. O. Essig, on pine needles (Monterey Pine) 240.83." The printing is that of Essig. The specimen is an alate viviparous female of this species. The slide is very thick, so that it fits in a slide box with difficulty, in this respect it is similar to the slide on which the lectotype is mounted. It is also similar to the slide on which the Holotype of *E. claremontiana* is mounted. All three slides have similar cover slips and the balsam is similarly stained. I suspect that none of the labels are original, and all differ in size. The number 240.83 is not a Museum number.

Several other slides, determined by Essig as *Essigella californica* have been seen. They were taken by him on *Pinus radiata* at Santa Paula, California, June 26, 1911 and carry the number "47". Some are of *E. gillettei* n. sp. and were perhaps made use of by him in his redescription of this species which he published in 1912.

This species differs from *gillettei* in shorter fourth antennal segment, shorter tibiae and femora, and shorter, fewer and more droopy hairs on the tibiae. The hairs on the dorsal margin of the metathoracic femora are also very much shorter.

At the time Essig described this species Holotypes were not being designated by aphid workers, and it may be questioned if the slides

which constitute the remaining original material cited in the original description as "common on some cultivated pines at Claremont, California during the winter of 1908-09." but which actually carry the data, "Monterey Pine, Claremont, California, February 14, 1909," were cited as cotypes on the slides at the time of description, because only the original slides remaining in the Essig collection are so indicated. The labels on these slides are not original. As indicated here, and in the descriptions of *E. gillettei* n. sp., *E. claremontiana* n. sp., and *E. essigi* n. sp. the original material did not consist of one species.

Palmer, 1952, p. 14 indicates the type as being in the Essig collection and gives the number as "47". It may be assumed that neither Gillette or Palmer ever saw the type, they having seen only a slide bearing the number "47" determined by Essig as *californica*, now in the Colorado Aphid collection to which Palmer has added the word "metatype." The specimens on this slide were taken at Santa Paula, California, by Essig on *Pinus radiata* June 26, 1911. This slide and others with similar data have been seen. None of the slides taken at Santa Paula in 1911 are eligible for designation as holotype, lectotype or metatype. All specimens of this collection are *E. gillettei* n. sp.

Essigella claremontiana n. sp.

Plate IV

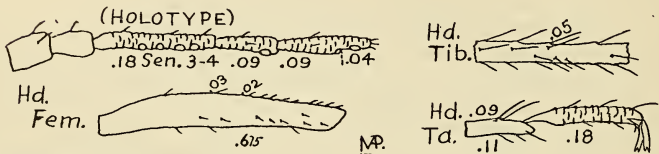
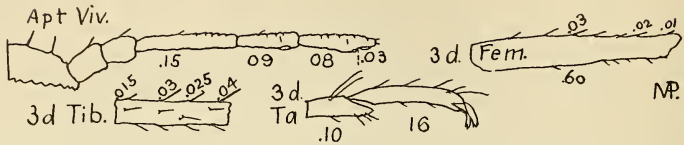
Essig, E. O. *Lachnus californicus* (in part)

1909. Aphididae of Southern California I. Pomona Jour. Ent. Vol. I, No. I, pp. 1-4, figs., 1-2.

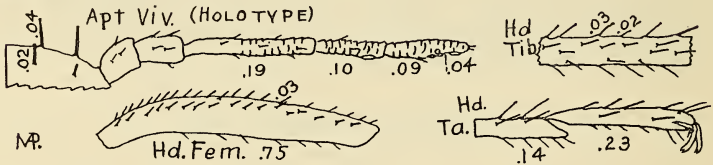
Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.80 — 2.12 mm. Color in life not recorded, apparently without cape, apparently quite similar in color to *E. californica* and taken for that species. Antennal segments one, two, and basal portion of three concolorous with head, remaining portion of antennae dusky. Tibiae of all legs quite uniform in color, except for a slightly dusky area near apex. Tarsal segments concolorous with ends of tibiae.

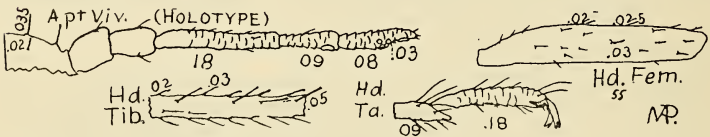
Length of antennal segments as follows: III .18 mm., IV .09 mm., V .08 + .03 mm. Fourth and fifth antennal segments with primary sensoria. Hair on antennal segments extremely short and fine, also very sparse. Rostrum extending to mid-portion or slightly beyond the metathoracic coxae. Prothoracic femora .375 mm. in length, provided with few hairs which vary in length from .02 — .03 mm. on dorsal margin, where they are slightly dull at the apex. Hairs on ventral margin of prothoracic femora about twice as long, finer and sharp pointed. Prothoracic tibiae .45 — .48 mm. in length, hairs on this segment fairly numerous, those on outer margin varying from .015 mm. near the base to .045 near the apex, where the hairs on the outer margin are the longest, however even here the hairs are shorter than the width of tibiae. All hairs on the outer margin of the tibiae are coarse and dull at the apex, with the exception of one or two hairs near the apex. The basal hairs on this margin are spaced much further apart than their length. Remaining surface of this segment provided with finer



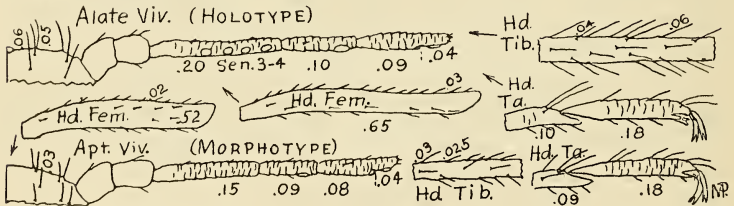
Essigella patchae n. sp.



Essigella robusta n. sp.



Essigella claremontiana n. sp.



Essigella maculata n. sp.

Plate IV

sharp pointed hairs, which show less variation in length than those on the outer margin.

Near the apex of the tibiae on the inner margin there is a brush of short fine hairs, the hairs on this segment are extremely few, those on the outer margin are very short, while those on the inner margin show considerable variation in length despite the fact that all are short, the

longest hairs being shorter than one-half width of tibiae. The hairs on the outer margin of the mesothoracic tibiae are coarse and distinctly capitate, those on the inner margin are fine and sharp pointed. The metathoracic femora vary in length from .55 — .67 mm. The dorsal margin of this segment is provided with coarse short hairs, which are dull if not actually capitate at the apex. They are spaced much further apart than their length. The hairs on the ventral margin, and lateral surfaces of this segment are only slightly finer, but are sharp pointed. Hairs on metathoracic tibiae varying in length from .015 mm. near the base to .045 mm. near the apex. These hairs are dull or capitate at the apex, and are rather coarse. The longest hairs at the apex are only slightly longer than the width of segment at this point. The hairs on the inner margin of the metathoracic tibiae are fewer in number than those on the outer margin. They are sharp pointed and shorter in length than the width of the tibiae. The metathoracic tibiae vary in length from .77 mm. to .90 mm. First metatarsal segment .09 mm in length, the dorsal surface of this segment has one pair of hairs, which are as long or longer than the width of segment, there are very few hairs on the ventral surface of this segment. Second metatarsal segment .18 mm. in length, both ventral and dorsal surfaces with very few, fine short hairs, the hairs near the apex being longest. Cornicles dusky, distinctly darker than the abdomen. Median posterior tubercle on cauda poorly developed. Both cauda and anal plate with long fine hairs.

This species may be differentiated at once from *E. californica* (Essig) by the shorter hairs on the tibiae, and by the hairs on the outer margin being blunt at the apex, and by fewer, shorter hairs on the femora. From *E. pini* Wilson it may be differentiated by a greater number of hairs on the metathoracic tibiae by the hairs being capitate, and by the poorly developed median posterior tubercle on the cauda. From apterous forms of *E. patchae* it differs in having a longer third antennal segment, shorter first and longer second metatarsal segments, in length of hind tibiae and in having shorter hairs on the basal region of outer margin of tibiae.

Holotype, apterous viviparous female, in the collection of the United States National Museum. Host, *Pinus radiata*, February 14, 1909, Claremont, California. It will be noted that the data associated with this slide is the same as that associated with "type slides" of *E. californica* (Essig). The slide was determined as *Essigella californica* (Essig), and the printing on the original label which is in poor condition appears to be that of Essig, but the two labels on this slide differ from those on "cotype" slides which I suspect are not original. None of the adults indicated as cotypes now in the Essig collection belong to this species.

I have seen two other slides, both in the United States National Museum. One, 124083 "on needles of Monterey Pine" det. as *Essigella californicus*, Claremont, California, but with no other data, I take it to be of the original material, and the printing is that of Essig. The other slide carries only the name *Essigella californicus* Essig, and California.

E. cocheta n. sp.

Plate I

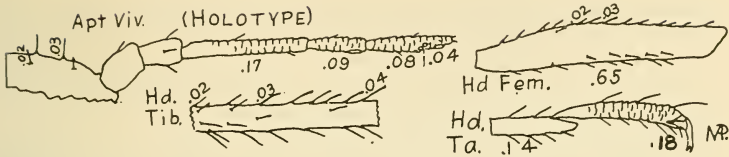
Apterous viviparous female

Length from vertex to end of anal plate varying from 1.97 — 2.25 mm. Color not recorded from life, cleared specimens are pale yellowish dusky, femora pale yellowish shaded with dusky, tibiae dusky tan uniform throughout, tarsal segments concolorous with tibiae. First antennal segment pale dusky, second segment and basal two thirds of the third segment pale, remaining antennal segments dusky. Cape hardly differentiated from rest of abdomen but slightly darker.

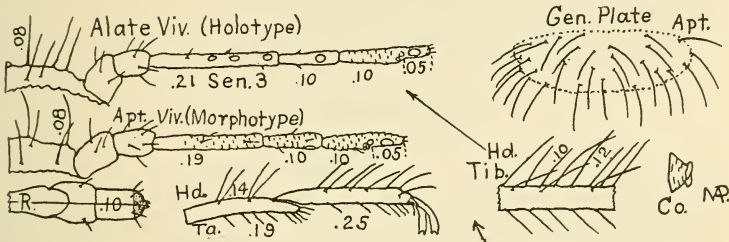
Anterior margin of head with hairs about .05 mm. in length. Length of antennal segments as follows: III .195 — .225 mm., IV .105 mm., V .09 — .105 + .03 mm.

There are no sensoria on the third antennal segment, the primary sensoria on the fourth and fifth antennal segments are small and not tuberculate, that on the fifth segment located very close to the end of the unguis. Antennal hair sparse, short and fine. Rostrum when extended reaching to the middle of metathoracic coxae. Length of pro, meso and metathoracic femora as follows: .45, .375, and .70 mm. Length of pro, meso, and metathoracic tibiae as follows: .555, .60, and 1.08 mm. Length of first and second tarsal segments of the metathoracic legs as follows: .105 and .165 mm. Prothoracic femora with hairs on dorsal margin .045 mm. in length, not numerous, these hairs taper to a moderately dull apex, remaining hairs on this segment somewhat finer and slightly longer. Hairs on outer margin of prothoracic tibiae .03 mm. in length with somewhat shorter hairs near the base, and slightly longer hairs near the apex. Only the hairs near the apex on the outer margin are sharp pointed, the other hairs being moderately dull.

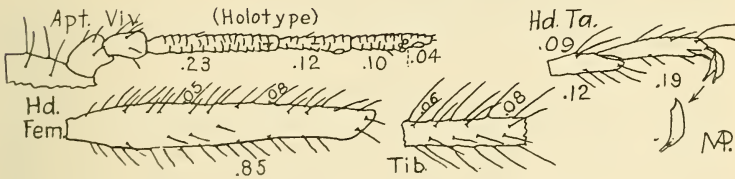
Hairs on inner margin of prothoracic tibiae fine, sharp pointed, and for the most part shorter than those on the outer margin. The hairs on the dorsal margin of the mesothoracic femora are about .015 mm. in length, fine and sharp pointed, remaining hairs on this segment are slightly longer and finer, with the hairs on the ventral margin longest, as well as fewest. The hairs on the outer margin of the mesothoracic tibiae are dull at the end and vary from .015 mm. to slightly less in length. The hairs on the inner margin are finer but about the same length, they are also sharp pointed. The hairs on the dorsal margin of the metathoracic femora are not numerous, being limited to about two rows, they are about .045 mm. in length, slightly coarse, tapering to a dull point, remaining hairs on this segment slightly longer, finer and definitely sharp pointed. The hairs on the ventral margin of the metathoracic femora are sparse, but by far the longest hairs on this segment. Metathoracic tibiae with fairly numerous hairs on the outer margin, the hairs vary in length from .015 — .075 mm. They are rather up-standing, coarse and definitely dull at the end. Hairs on the inner margin of the metathoracic tibiae measure up to .075 mm. in length with the hairs near the apex of segment shortest, the hairs on this margin are slightly finer, not quite so numerous and sharp pointed. The first tarsal segment has one pair of hairs on the dorsal surface, the hairs are rather coarse and longer than the width of segment. The



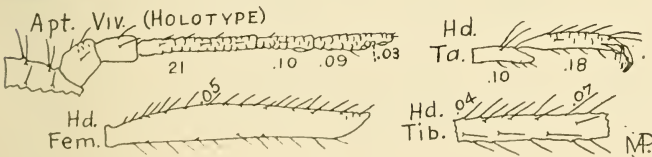
Essigella knowltoni n. sp.



Essigella palmerae n. sp.



Essigella monelli n. sp.



Essigella cocheta n. sp.

Plate V

hairs on the dorsum of the second metatarsal segment are no longer than the width of segment, those on the ventral surface of this segment are fine and short. Tarsal claws not definitely divided at the end, appearing as though only one of the bifurcations developed, the other remaining rudimentary.

Hairs on dorsum of abdomen in transverse rows, short, sparse, sharp

pointed. Hairs just anterior to cauda coarser and darker than others. Genital plate longer than wide with sides only slightly wavy but with no teeth. Cauda and anal plate normal.

Holotype, apterous viviparous female, mounted on same slide as holotype of *E. monelli* and with the same data.

This species shows much in common with *E. monelli*, differing in the shorter leg segments, shorter hairs, and fewer hairs on dorsal margin of metathoracic femora. It may be differentiated from *monelli* by the hairs on the dorsal surface of the second metatarsal segment being shorter than the width of segment.

Several specimens of this species are mounted on the Holotype slide.

Essigella essigi n. sp.

Plate II

Alate viviparous female

Length from vertex to end of anal plate varying from 1.61 — 1.82 mm. Color in life not recorded. Mounted, cleared specimens indicate the head and thorax as pale dusky, the abdomen may be either pale green or yellowish with transverse rows of small pigmented spots. Cauda and anal plate dusky. Antennae concolorous with head, as a rule with the base of the third segment pale. Legs pale dusky, quite uniform in color. Costal margin of wing pale dusky.

Antennal segments with the following lengths: III .16 mm., IV .07 mm., V .08 + .03 mm. The segments showing very little variability as to length. Third antennal segment with from one to three sensoria. All antennal segments imbricated. Antennal hair sparse and minute. Anterior margin of head with a few short blunt hairs. The rostrum reaches to the metathoracic coxae. Dorsal margin of metathoracic femora with short, blunt curved hairs, the hairs being spaced about a hair length apart, other hairs on this segment sharp pointed and sparse. Prothoracic femora about .30 mm. in length, with numerous sharp pointed hairs. Prothoracic tibiae with numerous hairs, those on the outer margin shorter than the others and dull at the end, all hairs on this segment much shorter than the width of segment. Mesothoracic femora about .24 mm. in length, fewer hairs than in the case of the prothoracic femora. Metathoracic femora varying from .50 — .52 mm. in length. Metathoracic tibiae varying from .63 — .67 mm. Hairs on outer margin of hind tibiae much shorter than width of tibiae, rather coarse, and dull at the end, remaining tibial hairs slightly longer, but still shorter than width of segment, sharp pointed. Hairs on inner margin of tibiae fewer than those on outer margin. First tarsal segment .08 mm. in length, second metatarsal segment .16 mm. long. Dorsal surface of first segment with two hairs, which are about twice as long as the width of segment and dull at the end. Costal margin of wings slightly fuscous. Media simple, with one or two exceptions, and these abnormal in some respect. Most specimens show the stigma and the cell formed by the radial sector continuous and of the same color.

Cornicles mere rings. Cauda with distinct median tubercle. Genital plate with hairs evenly distributed over the surface.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.57 — 1.82 mm. Color not recorded. Head and prothorax dusky brown, remainder of thorax and abdomen with a deep dusky brown cape. Color of remaining structures much as in alate viviparous female.

Antennal segments with the following lengths: III .13 mm., IV .07 mm., V .08 + .03 mm. The segments show almost no variation. The third and fourth antennal segments show no sensoria. The sensorium on the fifth segment is on the unguis. The rostrum reaches to the metathoracic femora. Hairs on prothoracic femora much shorter than the hairs on this segment in the alate female. Dorsal margin of the metathoracic femora with rather short curved hairs, spaced slightly farther apart than their length, these hairs are dull at the tip. The average length of the prothoracic femora is .26 mm., the average length of the mesothoracic femora is .23 mm. In length the metathoracic femora vary from .345 — .45 mm. The metathoracic tibiae are about .51 mm. in length. All hairs on the tibiae are short, those on the outer margin are dull at the tip, they are also rather thick. Remaining features as in the alate viviparous female.

Holotype, alate viviparous female. Morphotype, apterous viviparous female. Both types returned to the collection of E. O. Essig. Host, *Pinus radiata*, Redwood City, California, June 10, 1939. Collected by L. Blanc.

I am sure that specimens of this species were part of the original material from which Essig described *Lachnus californicus*, although there is no actual proof in the remaining cotype material. That this supposition is most likely true is strongly suggested by Essig's illustration fig. 2, which fail to indicate the long hairs on the tibiae. Essig's figure of the alate of *californicus* is not of this species, as is indicated by the wings, nor does this species appear to have been present in the material when *californicus* was described for the second time in part ten of "Aphididae of Southern California."

E. essigi may be differentiated from *E. californica* (Essig) as here restricted by the shorter hairs on the tibiae, and by the fact that some hairs are blunt. The wings of the alates differ. *E. essigi* also has a distinct cape.

Slides seen:

Sixteen paratype slides with same data as types. *Pinus radiata*, Stanford University, California, April 25, 1930. P. S. B. *Pinus coulteri*, Stanford University, California, March 8, 1931, P. S. B. *Pinus* sp. Imperial County, California, May 1, 1953, Ed. Fish. Twelve slides, Pine, Los Angeles, California, Lot 44 - 1199, United States National Museum. *Pinus tuberculata* Feliciana Mt. Mariposa County, California, July 25, 1946 H. P. Chandler *Pinus radiata*, Berkeley, California, November 10, 1935, E. O. Essig.

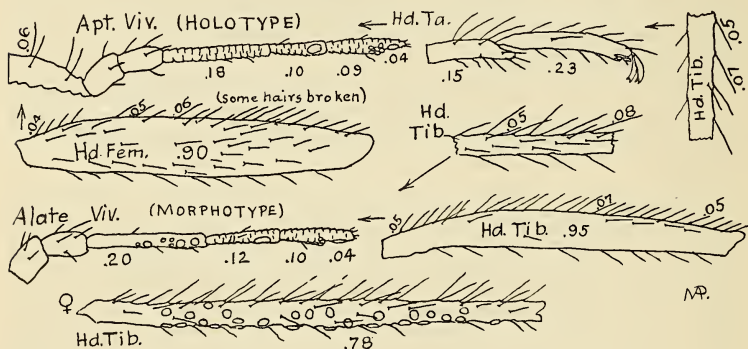
Essigella fusca Gillette and Palmer

Plate VI

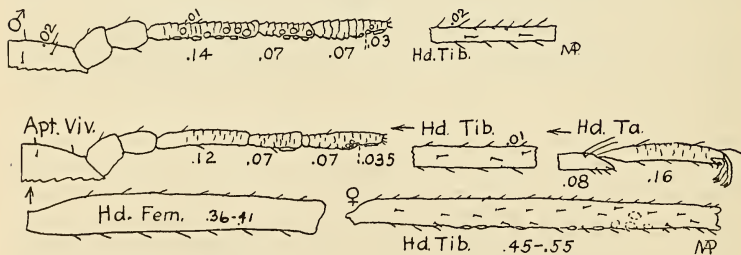
Essigella fusca Gillette and Palmer, 1924: 6 (original description) and 1931: 839 (in part).

Apterous viviparous female

Length from vertex to end of anal plate approximately 2.10 mm. Color of body deep dark blackish brown. Dark color due to color of cape for most part but ventral surface is also dark. Femora similar to color of body, tibiae dark brownish dusky, tarsal segments concolorous with ends of tibiae. Antennal segments with the following lengths: III .18 mm., IV .10 mm., V .09 + .4 mm. Hairs on first and second antennal segments long, some hairs on second segment almost half as long as width of segment. Hair on other antennal segments sparse, but rather coarse. Hairs on anterior margin of head about .06 mm. in length, rather coarse. Rostrum extending to coxae of metathoracic legs. Lengths of pro and metathoracic femora .55 and .90 mm. Lengths of pro and metathoracic tibiae .675 and 1.20 mm. Hairs on prothoracic femora coarse, on dorsal margin about .06 mm. in length. Hairs on



Essigella fusca Gillette and Palmer



Essigella hoerneri Gillette and Palmer

Plate VI

outer margin of prothoracic tibiae about .075 mm. in length, coarse, rather dull at the apex. Hairs on inner margin of prothoracic tibiae few, widely spaced, sharp pointed, much shorter than width of segment, in contrast to the hairs on the outer margin which are slightly more than two times width of segment. Hairs on outer margin of mesothoracic tibiae shorter than width of segment and almost capitate at the apex. Dorsal margin of metathoracic femora with hairs varying from .05 — .06 mm. in length, fairly numerous. Hairs on outer margin of metathoracic tibiae varying in length from .05 — .08 mm. coarse hairs on inner margin of metathoracic tibiae few, shorter than width of segment, and for the most part spaced further apart than their length. Metatarsal segments .15 and .23 mm. in length. Dorsal surface of all first tarsal segments with two pairs of hairs. Hairs on dorsal surface of second metatarsal segment about two times width of segment in length. Dorsum of abdomen with comparatively few short coarse hairs which arise from small pigmented spots, on the anterior portion of the abdomen these hairs are arranged in irregular transverse rows, near the posterior the hairs are scattered. Hairs near posterior of abdomen, and those on cauda and anal plate coarse. Cornicles not differentiated in color from caepe.

Alate viviparous female

Length from vertex to end of anal plate approximately 2.70 mm. Color not recorded but not nearly so dark as the apterous viviparous females. Antennal segments with the following lengths: III .20 mm., IV .12 mm., V .10 + .04 mm. Third antennal segment with from three to four normal sized sensoria and about four very much smaller sensoria. Hairs on first and second antennal segments very well developed, remaining antennal segments with normal hair. Anterior margin of head with hairs about .09 mm. in length. Lateral lobes of thorax with hairs confined largely to inner portion of lobes. Median posterior lobe of thorax with very few hairs. Prothoracic femora varying in length from .52 — .60 mm. provided with numerous hairs of about equal length. Prothoracic tibiae varying from .60 — .69 mm. in length, with the hairs on the outer margin about .08 mm. long, hairs on inner margin shorter than width of segment, few, and less coarse than the hairs on the outer margin. Mesothoracic femora with fewer and much shorter hairs on the prothoracic femora. Mesothoracic tibiae with hairs few and shorter than width of segment on both margins, hairs on inner margin much fewer and finer than the hairs on the outer margin. Hairs on dorsal margin of metathoracic femora numerous, varying in length from .05 — .07 mm. Some of the remaining hairs on this segment longer than the longest on the dorsal margin. Hairs on outer margin of metathoracic tibiae coarse varying in length from .05 — .08 mm. Hairs on inner margin of this segment fewer, finer and shorter than width of segment. The hairs on the outer margin of the metathoracic tibiae are almost dull at the apex, those on the inner margin are sharp pointed. Metatarsal segments .15 and .225 mm. in length. All first tarsal segments with two pairs of hairs on the dorsum. Dorsum of abdomen with numerous pigmented spots, each provided with a hair. The spots vary in size. They are arranged in irregular transverse rows, and some may be joined to produce a spot which is two or three times longer

than wide. Cornicles pigmented rings. Cauda and anal plate with numerous coarse hairs.

The original description of this species was based on two species as is indicated from the description and an examination of the type material. Palmer's 1952 description under this name also applies to two species. Knowlton's records probably apply only to the form here described as *E. agilis*. The name *E. fusca* in this paper is restricted to specimens which agree with the lectotype, an apterous viviparous female, in the United States National Museum, indicated as "type" by Palmer 1952. This form and oviparous females as well, have a very dark cape, referred to in the original description of the viviparous female as "marked on entire dorsum by solid dusky patch."

Part of the original description of the apterous viviparous female applies to the species described as *E. agilis*. The original description of the alate viviparous female applies only to specimens of *E. fusca* for specimens from which the description of this form was made were offspring of the lectotype. The original description of the male most likely applies to the male of *E. agilis*. The original description of the oviparous female is that of *E. agilis*, but specimens of this form which belong to *E. fusca* have a very dark cape, similar to that of the apterous viviparous females. The specimens mentioned as being taken by Bragg in Denver are not of this species.

This species is most likely closely allied to *E. palmerae* from which apterous specimens may be differentiated by the presence of the very dark cape. Both apterous and alate specimens differ from similar specimens of *E. palmerae* by the much shorter hairs on the femora and tibiae, and shorter tarsal segments.

Holotype apterous viviparous female, United States National Museum No. 41953. Host, *Pinus ponderosa* Rocky Mt. National Park. (Craggs Hill, near Bald Pate Inn) July 12, 1923, Coll. M. A. Palmer. Morphotype, alate viviparous female, same host, reared from lectotype, July 27, 1923, Coll. M. A. Palmer.

Essigella gillettei n. sp.

Plate III

Essigella californica (in part) Essig, E. O. Aphididae of Southern California X. Pomona College Journal of Entomology 1912 Vol. IV pp. 780-785.

Essigella californica Palmer, 1952, p. 14

Apterous viviparous female

Length varying from 1.87 - 2.25 mm. Color pale green, speckled with dusky at base of hairs, legs and antennae pale dusky. Length of antennal segments as follows: III .20 - .21 mm., IV .12 - .13 mm., V .09 - .10 + .02 mm. There are no secondary sensoria. Lengths of pro meso and metathoracic femora varying as follows: .45 - .47 mm., .37 mm., .67 - .82 mm. Lengths of pro meso and metathoracic tibiae varying as follows: .51 - .57 mm., .50 - .60 mm., 1.02 - 1.05 mm. Hairs on anterior margin of head coarse and about .06 mm. in length. Hairs on outer margin of prothoracic tibiae numerous and about .075 mm. in length, much longer than width of tibiae, and much longer than hairs on inner

margin. Hairs on prothoracic femora about .06 mm. length. Hairs on mesothoracic femora few and much shorter than the hairs on the prothoracic femora. Hairs on outer margin of mesothoracic tibiae few and about one and a half times width of segment. Hairs on inner margin of mesothoracic tibiae hardly half width of tibiae in length. Hairs on dorsal margin of metathoracic femora about .07 mm. in length, coarse, numerous, longer and coarser than other hairs on this segment. Hairs on outer margin of metathoracic tibiae varying in length from .06 mm. near base to .09 mm. near middle. The hairs on this segment are numerous, coarse and sharp pointed. Hairs on inner margin of metathoracic tibiae few, hardly equal to width of segment and quite upstanding. First tarsal segment of pro and mesothoracic legs with one pair of hairs on the dorsum, this segment of the metathoracic legs has two pairs of hairs. Hairs on dorsum of second metatarsal segment much longer than width of segment. Median posterior tubercle on cauda moderately well developed.

Alate viviparous female

Length varying from 1.80 -2.40 mm. Head and thorax dusky, abdomen pale green, with very pale pigmented spots arranged in transverse rows. First and second antennal segments concolorous with head, base of third antennal segment pale, remainder of antennae dusky. Legs dusky with the metathoracic legs darkest. Antennal segments with the following lengths: III .25 mm., IV .15 mm., V .13 + .02 mm. Third antennal segment with from two to four sensoria. Lengths of pro meso and metathoracic femora as follows: .55 - .63 mm., .37 .45 mm., .97 - 1.05 mm. Lengths of pro meso and metathoracic tibiae varying as follows: .67 - .72 mm., .71 - .75 mm., 1.42 - 1.72 mm. Lengths of metathoracic tarsal segments .15 and .21 mm. Prothoracic femora with numerous hairs over all of surface, the hairs being about .07 mm in length. Mesothoracic femora with few short fine hairs, the hairs being not much longer than .02 mm. Dorsal margin of metathoracic femora with numerous long coarse hairs which are about .07 mm. in length, hairs on ventral surface of this segment much shorter and finer in texture, also fewer in number. Hairs on outer margin of prothoracic tibiae numerous about .10 mm. in length, hairs on inner surface of this segment fewer and hardly as long as width of segment. Hairs on outer margin of mesothoracic tibiae about one-third longer than width of segment, hairs on inner margin of this segment shorter than width of segment. Hairs on outer margin of metathoracic tibiae numerous, long and fine, sharp pointed. The hairs on this margin are about three times the width of segment in length and vary from about .09 mm. near the base to about .12 mm. near the middle of segment. Hairs on inner margin of metathoracic tibiae few, upstanding, fine and short. Metathoracic tarsal segments .15 mm. and .21 mm. in length. The dorsum of the first metatarsal segment has two pairs of hairs, the first tarsal segments of the other legs has only one pair of hairs. Media once branched. Dorsum of abdomen with from three to four rows of small pigmented spots each giving rise to a short hair. Cornicles dusky. Cauda and anal plate dusky. Median posterior tubercle on cauda not well developed.

This new species has been recorded in aphid literature in part by

Essig in his redescription of *E. californica* in part X of his "Aphididae of Southern California." The records to *E. californica* (Essig) of Gillette and Palmer, of Palmer, and of Knowlton refer to this species. It is suspected that part of the material described by Wilson under the name *E. californica* belonged to *E. gillettei*. Gillette and Palmer and Palmer 1952 have described all forms of this species. This species is allied to *E. californica*, and differs from it, in longer antennae, longer legs, longer and more upstanding hairs on tibiae, longer hairs on dorsum of metathoracic femora, longer tarsal segments

Holotype, alate viviparous female, taken on *Pinus murrayana*, Stove Prairie Hill, Bellevue, Colorado, June 16, 1922, Coll. M. A. Palmer. Morphotype apterous viviparous female, same data as holotype except for date June 14, 1922 Coll. by M. A. Palmer and M. F. C. Both types deposited in the United States National Museum. *Pinus murrayana* the host recorded for this species by Gillette and Palmer is a synonym of *Pinus contorta*. This species has also been taken on *Pinus ponderosa*, *Pinus radiata* and *Pinus albicaulis*.

Part of the material taken by Essig on *Pinus radiata* June 26, 1911 at Santa Paula, California and recorded by him under the name *E. californica* and the number "47" is of this species. L. G. Gentner took this species on *Pinus albicaulis* October 2, 1956 at Crater Lake, Oregon.

Essigella hoerneri Gillette and Palmer

Plate VI

Essigella hoerneri Gillette and Palmer, New Colorado Lachnini. Annals Entomological Society of America Vol. XVII pp. 5 - 6, 1924. Original description.

The type slide of this species, on which the lectotype is indicated is in the United States National Museum. It has been seen, together with several slides indicated as paratypes. I collected this species for the first time since 1922 in the summer of 1956 after looking for it for years. As indicated by Palmer in Aphids of the Rocky Mountain Region, it was abundant. I was attracted to the tree on which I collected the specimens by a flock of small birds which I suspected of feeding on a species of *Cinara*. Not finding specimens of that genus, I directed my search to *Essigella* which I found without difficulty. This was early in July, from this time onwards specimens were reared on twigs, and followed on the tree on which they had been taken originally some miles north of Rifle, Colorado, to the time when the sexual forms were produced. At no time were alate specimens produced, I suspect they are produced but once a year, perhaps the second generation.

Apterous male

Length from vertex to end of anal plate .975 mm. Head and thorax pale greenish dusky, abdomen pale green, free from pigmented spots. First antennal segment pale, third segment pale at base, remainder of antenna dusky. All femora and tibiae pale, tarsal segments light dusky. Length of antennal segments as follows: III .14 mm., IV .07 mm., V .07 + .03 mm.

Third antennal segment with 7 - 10 small tuberculate sensoria. Fourth antennal segment with 4 - 7 small sensoria. Metathoracic femora .30 mm. in length, length of metathoracic tibiae .465 mm. Length of first metatarsal segment .06 mm., length of second metatarsal segment .135 mm. Anterior margin of metathoracic femora with a row of very short hairs, remainder of segment with very few hairs. Hairs on metathoracic tibiae similar to those of apterous females. Dorsum of first tarsal segment of pro and mesothoracic legs with one pair of hairs, dorsum of metathoracic first tarsal segment with two pairs of hairs.

Apterous viviparous female

Gillette and Palmer, and Palmer 1952 have described the apterous viviparous and oviparous females of this species. Length from vertex end of anal plate from 1.375 - 1.5 mm. Head and thorax very pale dusky, abdomen pale green, with caepe extremely pale dusky, always present but at times difficult to differentiate, nor is the caepe of the abdomen always continuous, at times taking the form of broad transverse bands. Antennal segments with the following lengths: III .12 mm., IV .07 mm., V .07 + .035 mm. Lengths of pro meso and metathoracic femora as follows: .33 mm., .325 mm., .36 - .36 mm., .33 mm., .48 - .55 meso and metathoracic tibiae as follows: .30 - .36 mm., .33 mm., .48 - .55 mm. Vertex of head with a few very short blunt hairs. Hairs on antennal segments extremely sparse, and very very short, but at the same time coarse. Imbrications on antennal segments very coarse, and wide apart. Rostrum with last three segments extending beyond metathoracic coxae. Dorsal margin of metathoracic femora with few hairs, the hairs being slightly curved and spaced further apart than their length, but little longer than the hairs on the vertex of the head and dull at the apex. Remaining hairs on the metathoracic femora slightly longer and sharp pointed. Hairs on tibiae comparatively few, short, about .01 mm. in length or slightly longer near the apex of the segment, spaced as a rule further apart than their length, and much the same on both outer and inner surfaces. Metatarsal segments with the following lengths: .08 and .16 mm. first segment of this pair of legs with two pairs of hairs on the dorsum, the more basal pairs of hairs being shorter and finer than the hairs closer to the apex, and much harder to differentiate, therefore vary apt to be overlooked or suspected of being missing. First tarsal segments of pro and mesothoracic legs with only one pair of hairs on the dorsum. Genital plate deeply excavated in mid anterior region, sometimes almost divided. Hairs on ventral surface of abdomen not numerous but confined to slightly pigmented transverse bands, much longer than hairs on the dorsum which are exceedingly short, few, and scattered over the surface. Cauda with median posterior tubercle only slightly developed, but always visible.

The host of this species is *Pinus edulis*. Palmer also records *Pinus ponderosa* and *Pinus flexilis*. The holotype is in the United States National Museum. Male reared on *Pinus edulis*, taken October 3, 1956, Grand Junction, Colorado, lost in process of repairing slide. The male was reared from specimens taken north of Rifle, Colorado. The drawings of the viviparous and oviparous females are from paratype specimens in the Colorado collection.

Slides of this species seen as follows: Lectotype with the following

data: *Pinus edulis*, Owl Canyon, Larimer County, Colorado, September 25, 1921 J. L. Hoerner in United States Natural Museum.

Pinus edulis, Owl Canyon, Larimer Co., Colorado, September 25, 1921, September 28, 1921, November 6, 1921. The slide taken November 6th contains the oviparous female drawn and indicated as morphotype by Professor Palmer. *Pinus flexilis*, Estes Park, Colorado, July 22, 1922, slide indicated as metatype. *Pinus edulis*, Rifle, Colorado, August 17, 1956, Grand Junction, Colorado, September 2, 1956, September 10, 1956, September 21, 1956.

***Essigella knowltoni* n. sp.**

Plate V

Essigella pini Wilson (in part) Palmer 1952 p. 16

Apterous viviparous female

Length from vertex to end of anal plate varying from 1.82 - 2.10 mm. Color in life not recorded. Mounted specimens which have not been cleared show the head dusky yellow, this continues on to the prothorax, remainder of body dark brown, the brown being in the form of a cape which continues on to the ventral surface of the abdomen. First, second and basal third of third antennal segments pale, remainder of antennae pale dusky. Femora and tibiae of prothoracic legs dusky and quite uniform in color. Mesothoracic femora and tibiae quite similar to these segments on the prothorax. Metathoracic femora and tibiae dusky throughout, darker than segments on anterior legs, with dorsal margin of femora darkest. All tarsal segments dusky, slightly darker than ends of tibiae. Cornicles not differentiated from cape, situated on distinctly raised areas.

Antennal segments with the following lengths: III .165 - .17 mm., IV .075 - .09 mm., V .08 + .04 mm. Third segment without sensoria, fourth and fifth segments with primary sensoria. Hair on antennae minute. Rostrum when extended reaching to end of metathoracic coxae. Hair on anterior margin of head .03 mm. in length and dull at the apex, hair on dorsum of head very sparse, of varying lengths, the longest .045 mm. Some of these hairs are sharp pointed. Prothoracic femora .33 mm. in length, provided with fairly numerous fine sharp pointed hairs, the hairs on the dorsal margin being slightly shorter than the others. Length of prothoracic tibiae .45 mm. provided with numerous hairs, those on the outer margin increasing slightly in length from base to apex, the longest shorter than width of segment, all hairs on this surface dull at the apex. Hairs on inner margin of prothoracic tibiae sharp pointed and decreasing in length from base to apex of segment. Mesothoracic femora .375 mm. in length, length of mesothoracic tibiae .57 mm. Hair on these segments much shorter than hair on similar segments of prothorax, but hair like that on anterior tibiae in character. Length of metathoracic femora varying from .65 - .675 mm. provided with short bluntly pointed hairs on the dorsal surface, hairs on remainder of femora sharp pointed and slightly longer. Metathoracic tibiae varying in length from .93 - .96 mm. The hairs on the outer margin of this segment vary in length from .02 - .04 mm., all but the longest near the apex are blunt at the end or slightly capitate, the longest hairs are almost sharp pointed, in length they are

slightly longer than the width of segment. The hairs on the inner surface of the hind tibiae are all sharp pointed. They vary in length, all are shorter than the width of the segment, and may be spaced one short and one long. First metatarsal segment .14 mm. in length, length of second segment .15 - .18 mm. Dorsum of first tarsal segment with one pair of hairs, on the lectotype these hairs are slightly longer than the width of segment and dull at the end. Hairs on the ventral and dorsal surfaces of the second metatarsal segment short and fine. Hair on dorsum of abdomen exceedingly sparse, and short, not arranged in regular rows. Genital plate broadly transverse, provided with a moderate number of fine, sharp pointed hairs, which cover most of the surface. Median posterior tubercle on cauda not well developed. Both cauda and anal plate provided with long, fine hairs.

This species is perhaps most closely allied to *E. essig* from which it may be differentiated by its longer legs, brownish not dusky cape, longer hairs on tibiae and by the fact that the prothoracic tibiae are distinctly longer than the prothoracic femora. From *E. fusca* Gillette and Palmer this species differs as follows: shorter and almost capitate hairs on dorsal margin of metathoracic femora, shorter and blunter, with some capitate hairs on outer margin of metathoracic tibiae, and cape not so dark.

Holotype, apterous viviparous female, deposited in the United States National Museum collection. Host, *Pinus contorta*. Taken by G. F. Knowlton, Pingree Park, Colorado, August 23, 1935 and determined by him as *E. fusca* Gillette and Palmer. Specimens determined by Palmer as *Essigella pini* Wilson from Cameron Pass, Colorado are of this species.

Slides seen in addition to type: Two paratype slides with same data as type, except date August 19, 1935. Two paratype slides, August 18, 1940, *Pinus contorta* G. F. Knowlton, Cameron Pass, Colorado. One slide Pinus, Logan Canyon, Utah, August 24, 1934 G. F. K., and T. O. T.

Essigella maculata n. sp.

Plate IV

Alate viviparous female

Length from vertex to end of anal plate 2.13 mm. Head and thorax pale dusky green, mid dorsal region of thorax distinctly brown. Abdomen very pale green, free from spots. Antennal segments one and two almost concolorous with head, remaining antennal segments dusky except for base of third segment which is pale. Prothoracic femora pale dusky, except for basal fourth which is slightly paler, tibiae of the same pair of legs dusky, slightly darker at end. Metathoracic femora very pale, tibiae of same legs almost uniform dusky. Tarsal segments concolorous with end of tibiae.

Anterior margin of head with few distinctly spine like hairs, which vary in length from .05 - .06 mm. these hairs are dull at the end. Length of antennal segments as follows: III .20, IV .10 mm., V .09 + .04 mm. Third antennal segment with from three to four sensoria. Remaining antennal segments distinctly imbricated, except the first and second. Hair on antennae almost absent, shorter than space between imbrications. Both margins of prothoracic femora with similar hairs, the hairs being fine, sharp pointed, and about .045 mm. in length. The hairs on the pro-

thoracic femora are not numerous, but are spaced closer together than their length. Outer margin of prothoracic tibiae with coarse hairs, the hairs are dull at the apex and about .045 mm. in length, the hairs on the inner margin of this segment are only half as long as the hairs on the outer margin, and distinctly shorter than this near the apical third of segment. Inner apex of prothoracic tibiae with brush made up of very short fine hairs. Media simple, very faint. Prothoracic femora .405 mm. long. Length of prothoracic tibiae .495 mm. Metathoracic femora .675 mm. in length. Hairs on dorsal margin of metathoracic femora more numerous than hairs on ventral margin, they are fine and very short. Metathoracic tibiae 1.00 - 1.05 mm. long, provided on outer margin with hairs which vary from .04 - .06 mm. in length, these hairs are slightly dull at the apex. Inner margin of metathoracic tibiae with hairs on basal three fourths of segment similar to those on outer margin, but distinctly sharp pointed, fewer than those on outer margin. Hairs on apical fourth of segment distinctly shorter, finer and slightly more droopy. Inner apex of metathoracic tibiae with brush. Dorsum of first tarsal segment with one pair of hairs, hairs on ventral surface of this segment few, short and fine. Hairs on dorsal surface of second metatarsal segment less than two times length of hairs on ventral surface, hairs on both dorsal and ventral surfaces few.

Cornicles not differentiated from abdomen except as rings. Cauda with small median posterior tubercle. Anal plate and cauda with setulae, both with few hairs. The long hairs on the cauda confined largely to the posterior surface, there are a few much shorter hairs anterior to these, ventral surface of cauda with hairs somewhat shorter. Genital plate small, not much wider than deep, with few hairs.

Apterous viviparous female.

Length from vertex to end of anal plate 1.68 mm. Color pale green. Femora, tibiae and tarsal segments pale dusky.

Head and thorax.—Anterior margin of head with a few dull short spine like hairs. Antennal segments with the following lengths: III .15 mm., IV .09 mm., V .08 + .04 mm. There are no secondary sensoria. Antennal segments almost without hair. Segments three, four and five coarsely imbricated. Rostrum reaching well beyond metathoracic coxae. Prothoracic femora .375 mm. long, provided with few comparatively short hairs which are similar on both dorsal and ventral surfaces, and varying in length from .01-.035 mm. the long and the short hairs being intermixed, most of the long hairs being dull at the end. First segment of prothoracic and metathoracic tarsi with two pairs of hairs on the dorsum, this segment of the mesothorax has only one pair of hairs on the dorsum. Metathoracic femora .52 mm. in length, provided with comparatively few hairs, the hairs on the dorsal margin being the more numerous. Metathoracic tibiae .825 mm. in length, hairs on outer margin spine like, blue at the apex, varying in length from .015-.03 mm. for the most part spaced farther apart than their length. Hairs on inner margin of tibiae fewer, sharp pointed, slightly shorter, than those on outer margin. First metatarsal segment .09 mm. in length. Second metatarsal segment .18 mm. long, with hairs on the dorsum but little longer than the hairs on the ventral surface.

Cornicles mere rings, slightly dusky. Dorsum of abdomen without

spots. Cauda and anal plate with setulae, both with hairs confined to posterior margins and ventral side. Cauda without median posterior tubercle.

Apterous viviparous females of this species differ from similar forms of *E. hoerneri* Gillette and Palmer by the longer hairs on the tibiae, by having the median tubercle lacking on the cauda, longer hairs on the vertex and longer tibiae.

Holotype, alate viviparous female, morphotype, apterous viviparous female, both deposited in the United States National Museum. Host, *Pinus edulis*, taken Sept. 2, 1956, Grand Junction, Colorado. Both reared from material collected north of Rifle, Colorado in July. This species was associated with specimens of *E. hoerneri*.

This species is known from only three specimens, one of which has been made paratype.

Essigella monelli n. sp.

Plate V

Apterous viviparous female.

Length from vertex to end of anal plate 2.36 mm. Color in life not recorded. The color of the body is pale yellowish dusky, with the cape only a shade darker than the body. Cornicles pale brown. Apex of third antennal segment and all of fourth and fifth segments pale brown. Femora pale buff with dorsal margins slightly darker. Tibiae pale dusky brown, uniform throughout, tarsal segments concolorous with apex of tibiae.

Antennal segments with the following lengths: III .23 mm., IV .12 mm., V .10 + .04 mm. Primary sensoria on fourth and fifth antennal segments small, not tuberculate. Third, fourth and fifth antennal segments strongly imbricated. Hairs on vertex of head tapering and about .06 mm. in length, they are slightly dull at the end. Remaining hairs on the head sharp pointed, longer and finer than those on the vertex. The rostrum is not in a position to measure. Length of prothoracic femora and tibiae .525 mm. and .65 mm. Length of mesothoracic femora and tibiae .42 mm. and .66 mm. Length of femora and tibiae of metathoracic legs .805 mm. and 1.215 mm. Dorsal margins of pro and mesothoracic femora with numerous, long, slightly dull or sharp pointed hairs, on the metathoracic femora these hairs vary from .05-.08 mm. in length, they are spaced closer together than their length. The hair on the mesothoracic femora are much shorter and fewer than those on the other femora. Hair on prothoracic tibiae numerous, those on the outer margin vary from about .06 mm.-.075 mm. they are rather coarse and dull at the tip, but not blunt. The hairs on the inner margin of the prothoracic tibiae are about .03 mm. long, much finer and sharp pointed, in contrast to the hair on the outer margin. The hairs on the mesothoracic tibiae are much fewer than those on the prothoracic tibiae, also shorter, those on the outer margin being about .03 mm. long, they are rather thick, of uniform width, and definitely dull at the end, the hairs on the inner margin are only slightly shorter, but finer and sharp pointed. For the most part the hairs on the mesothoracic tibiae are shorter than the space between them. Dorsal margin of metathoracic femora provided

with distinctly spine-like hairs which are definitely dull at the end if not slightly capitate, these hairs are fairly numerous, and vary in length from .05-.08 mm. remaining hairs slightly shorter and less spine-like. Metathoracic tibiae with numerous hairs, those on the outer margin are quite upstanding, varying in length from .06-.08 mm. and dull at the apex, if not slightly capitate, on the inner margin the hairs are shorter and finer than those on the outer margin and sharp pointed. All first tarsal segments with one pair of hair on the dorsal surface, the hairs being longer than the width of segment. Second metatarsal segment with hairs on the dorsum much longer than width of segment, hairs on ventral surface of this segment fine and short. All claws of this species differ from the usual condition found in this genus, by not being definitely divided at the apex, but with a single finger-like process at the end.

Abdomen.—Hairs on dorsum of abdomen just anterior to cauda slightly longer and thicker than remaining hairs on this surface.

Holotype, apterous viviparous female, in the collection of E. O. Essig. Host, *Pinus tuberculata*, Fort Bragg, California, May 8, 1936, E. O. Essig.

This species may be differentiated from all other known species within the genus except *E. wilsoni* and *E. cocheta* by the claws not being definitely bifurcate. From *cocheta* it may be differentiated by the longer segments of the legs, and longer hairs on the tibiae, as well as the more numerous hairs on the dorsal margin of the metathoracic femora. The hairs on the tibiae of *wilsoni* are much shorter than the hairs on this structure of *monelli* or *cocheta*.

Essigella palmerae n. sp.

Plate V

Alate viviparous female.

Length from vertex to end of anal plate 2.49 mm. Color in life not recorded. Mounted specimens show the head and thorax dark dusky brown, with the area median to the eyes somewhat lighter. Antennae with the exception of the pale-yellowish base of third segment dusky brown, to almost black. Femora yellow with dusky brown at apex and along anterior margins. Metathoracic femora lighter than other femora in color. All tibiae and tarsi black. Abdomen yellow, with pigmented spots, some of which are confluent, and for the most part moderately large. Cornicles located within pigmented spots and of the same brownish color. Between the cornicles there is a very irregular pigmented band, which has several clear areas. Some specimens may lack this cross band. Posterior region of abdomen, cauda and anal plate dark brown. Hairs on dorsum of abdomen limited to pigmented areas, those near the posterior end much darker and coarser than those more anterior.

Antennal segments with the following lengths: III .21 mm., IV .10 mm., V. 10 + .05 mm. The third segment has from two to three sensoria. All antennal segments with minute hairs, strongly imbricated. Width of head through the eyes .51 mm. Prothoracic femora very strongly developed, longer and wider than those of mesothorax, and with longer and more numerous hairs. Prothoracic tibiae with numerous hairs, those on outer surface longer and much coarser than those on inner surface.

Mesothoracic tibiae with hairs much fewer, finer and shorter than those on the prothoracic tibiae, the hairs much fewer, finer and shorter than those on the prothoracic tibiae, the hairs on the inner surface being especially sparse, fine and short. Metathoracic femora with dorsal margin with numerous, long, coarse hairs, ventral margin almost free from hairs, and these extremely fine and rather short. Hind tibiae 1.35 mm. in length. Hairs on hind tibiae numerous, varying in length from .10-.12 mm., much longer and coarser as well as more numerous on the outer margin than on the inner. All tibial hairs sharp-pointed. Apex of tibiae enlarged on the inner margin, this region has several fine short hairs. First tarsal segment with five long hairs on the dorsal surface, and as a rule five pairs of the short hairs on the ventral surface, these hairs do not extend the full length of the segment, but have their origin just beneath the first pair of hairs on the dorsal surface. The first tarsal segment varies from .18-.19 mm. in length. The second tarsal segment varies from .225-.25 mm. in length. The cornicles are mere rings. Lateral lobes of thorax with from 24-26 hairs, most of which are confined to the anterior and median region. The median posterior lobe of the thorax is free from hairs. Costal margin of wing smoky, stigma the same. Radial sector bordered with fuscous. Media once branched, very faint. Cubital and anal veins fuscous.

Apterous viviparous female.

Length from vertex to end of anal plate 2.55 mm. Color in life not recorded. Mounted specimens indicate that the color was mostly yellowish, perhaps slightly dusky due to a very pale dusky cape. Within the cape there are a few darker pigmented spots each of which gives rise to a short coarse hair. Antennal segments with the following lengths: III .19 mm., IV .09 mm., V .10 + .05 mm. The third segment is without sensoria, the fourth and fifth segments have primary sensoria, that on the fifth segment being located about midway on the unguis.

All antennal segments are strongly imbricated. The antennal hairs are minute and sparse. The rostrum reaches to the metacoxae. The metathoracic tibiae vary in length from 1.125-1.20 mm. Tibial hairs as in alate viviparous female, but the tibiae are not always so dark. The first tarsal segment is .167 mm. in length, the second is .225 mm. long. Cauda with a distinct wart, located in the middle of the posterior margin.

In Palmer's key to the genus *Essigella* in "Aphids of the Rocky Mountain Region" this species keys to *E. californica* (Essig). As indicated herewith *E. californica* (Essig) of Gillette and Palmer is not the species considered to be *californica* in this paper. It differs from the species considered such by Gillette and Palmer, by its larger size, longer tarsal segments, longer coarser hairs on tibiae and femora, and color of tibiae. From *E. fusca* Gillette and Palmer it differs in the tibial hairs not being blunt or slightly capitate, by the longer tibial hairs, and by the absence of the dark cape in the apterous females. Alates of this species differ from alates of *fusca* by having longer hairs on the femora and tibiae, longer tarsal segments and sharp-pointed hairs on the tibiae.

Holotype, alate viviparous female. Morphotype, apterous viviparous female. Both types mounted on the same slide, which has been deposited in the United States National Museum. Host, *Pinus ponderosa*. Summer-

haven, Arizona (near Tucson), Santa Catalina Mts., June 13, 1954.
F. C. Hottes.

The material seen consists of the types mentioned and several paratype slides, all taken June 13, 1954, with the Types.

Essigella patchae n. sp.

Plate IV

Essigella californica. Patch Bulletin No. 202 Maine Agricultural Experiment Station pp. 169-170, 1912 (misidentification)^r

Apterous viviparous female.

Length from vertex to end of anal plate approximately 2.17 mm. Color recorded by Patch as green with antennae and legs with dusky tips. Mounted specimens suggest that the color of the body was uniform throughout. Length of antennal segments as follows: III .15 mm., IV .09 mm., V .08 + .03 mm. There are no sensoria on the third antennal segment, the fourth and fifth antennal segments with only primary sensoria. Hair on third antennal segment almost absent, extremely short and fine when represented. Vertex of head with few thick blunt hairs which are about .015 mm. in length. Rostrum extending to base of metathoracic coxae. Prothoracic femora .355 mm. in length, provided with comparatively few hairs which are no longer than those on the vertex of the head. Prothoracic tibiae .375 mm. in length. Hair on outer margin of prothoracic tibiae about .015 mm. in length, rather thick and bluntly pointed, hairs on inner margin extremely sparse, shorter than those on the outer margin and sharp pointed, remaining hairs longer and sharp pointed. Mesothoracic femora with few hairs, hairs on dorsal margin shorter than those on ventral margin, and dull at the apex, remaining hairs on this segment sharp pointed, all hairs on this segment slightly longer near the apex than elsewhere.

Metathoracic femora .63 mm. in length, provided with comparatively few hairs, all of which are more or less subequal in length to those on the vertex of the head, and all of which are sharp pointed. The hairs on the dorsal margin are shorter than the space between them. Metathoracic tibiae .795 mm. in length. Hairs on hind tibiae varying in length from .015-.04 mm. with the shortest hairs near the base. All hairs shorter than the width of segment, and none inclined more than forty-five degrees. Hairs on outer margin distinctly spine like and blunt at the apex. Hairs on inner margin finer than those on outer margin and set at an angle of about sixty degrees, and sharp pointed. These hairs are fewer than those on the outer margin. Metathoracic tarsal segments .10 and .16 mm. in length. The dorsal surface of the first tarsal segment has one pair of hairs. The ventral surface of the second tarsal segment has very few hairs, all of which are shorter than the width of segment, the longest being near the apex, the dorsal surface of this segment also has very few hairs, these are also very short. Tarsal claws bifurcate, but the divisions not equal, shaped like a mitten. Cape apparently absent. Cornicles same color as abdomen.

Alate viviparous female.

Length from vertex to end of anal plate 1.82 mm. Patch Bulletin No.

202 Maine Agricultural Experiment Station p. 169 describes the color as follows: "Head light greenish brown with I and II of the antennae concolorous. III, IV and V were each pale at proximal and dark at distal part. Eyes very red. Thorax green with lobes brown, and ventral plate dark brown. Abdomen light but vivid green and thickly speckled with fine dark dots." Antennal segments with the following lengths: III .18 mm., IV .09 mm., V .09 + .04 mm. Third antennal segment with sensoria varying from 3-4. All sensoria on this segment small, and only slightly tuberculate. Fourth antennal segment antennal with primary sensorium small and quite round. All hair on antennae short and fine. Hair on vertex of head varying from .015-.03 mm. in length, and only slightly dull at the end. Prothoracic femora .36 mm. long prothoracic tibiae .48 mm. in length. Hairs on outer margin of prothoracic tibiae in middle region about as long as width of tibiae, hairs near base, shorter than width of tibiae, hairs on this surface distinctly dull at the apex and rather coarse in texture. Hairs on inner margin of prothoracic tibiae fine, sharp pointed, and about half as long as those on the outer margin, not as numerous. Prothoracic femora with few hairs, the hairs are fine, fine, sharp pointed, and about half as long as those on the outer margin margin very sparse and short. Metathoracic femora .675 mm. long. Hairs on this segment very sparse, fine, sharp pointed, those on dorsal margin varying from .02-.03 mm. in length, they are spaced rather apart than their length. Metathoracic tibiae .975 mm. in length. Hairs on outer margin of metathoracic tibiae sparse, varying from .015 mm. at the base to just under .05 mm. towards the apex, these hairs are very much inclined near the base, a condition which may not be normal, beyond the middle the hairs are inclined at an angle of about forty-five degrees, these hairs are sharp pointed. The hairs on the inner margin of the metathoracic tibiae are shorter than those on the outer margin, more uniform in length, and fewer in number. The first tarsal segment has one pair of hairs on the dorsal surface, this segment is .11 mm. in length. The second metatarsal segment is .18 mm. in length, the hairs on the ventral surface are fine and short, being no longer than those on the ventral surface of the first segment, the hairs on the dorsal surface are longer than those on the ventral surface, but still shorter than the width of segment. Media of fore wings simple, stigma not distinctly separated, cell formed by radial sector, similar to that of *E. essigi*. Median posterior tubercle on cauda apparently absent, but this condition may be due to position in which the specimen is mounted.

This species may be differentiated from *E. californica* (Essig) by the media not being forked, by fewer shorter hairs on the femora, by the shorter hairs on metathoracic tibiae, and by the hairs on the prothoracic tibiae being blunt on the outer margin. From *E. pini* Wilson which also has the media simple, this species may be differentiated by the absence of the well developed median posterior tubercle on the cauda, by the longer hairs on the outer margin of the metathoracic tibiae.

Holotype, alate viviparous female, referred to by Patch as *E. californica* (Essig) Stillwater, Maine, July 4, 1909, on *Pinus Strobus*. Morphotype, apterous viviparous female Acc. No. 37-09, Orono, Main, June 27, 1909, on *Pinus strobus*, taken this side of Gilman Falls, Ben-

nock Road, Coll. Henry Millet. Notes by Patch associated with this slide are as follows: "*Lachnus agilis?*" this crossed out and "*Essigella californica* Essig?" added. Holotype in United States National Museum Morphotype returned to the Entomological collection of the University of Maine. One apterous viviparous female taken on *Pinus strobus*, Stillwater, Maine, July 4, 1909 is a paratype.

Essigella pergandei n. sp.

Plate I

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.05-1.42 mm. Color notes from life not available. Mounted specimens suggest the color was either yellow or pale green, with the head and thorax slightly darker than the abdomen. Cape either extremely pale or absent. Antennae concolorous with head, with the apex of fourth and fifth segments slightly dusky. Femora concolorous with body, tibiae slightly dusky, as are the tarsal segments. Length of antennal segments as follows: III .12-.13 mm., IV .06-.07 mm., V .07 + .04 mm. Fifth segment with primary sensorium slightly tuberculate. Antennae with minute hairs. Vertex of head with a few short blunt hairs, hairs on dorsum of head slightly longer, finer and more sharply pointed. Rostrum reaching to end of metathoracic coxae.

Lengths of pro meso and metathoracic femora as follows: .33 mm., .27 mm., .42 - .48 mm. Hairs on dorsal margin of metathoracic femora about .015 mm. in length, rather coarse, sharp pointed, other hairs on this segment quite similar. Lengths of pro meso and metathoracic tibiae as follows: .36 - .40 mm., .40 - .45 mm., .615 - .80 mm. Hairs on prothoracic tibiae varying from .015 - .02 mm. in length with the hairs on the outer margin slightly longer and coarser than the hairs on the inner margin, and not quite so sharp pointed. Hairs on mesothoracic tibiae similar to those on prothoracic tibiae, but not quite so long. Hairs on outer margin of metathoracic tibiae varying from .02 - .03 mm. in length. The hairs on the inner margin of the hind tibiae are slightly longer than the hairs on the outer margin, somewhat finer, and sharper pointed. First metatarsal segment varying from .075 - .09 mm. in length, the dorsum with one pair of hairs. Second metatarsal segment varying from .135-.16 mm. in length, the hairs on the dorsum of this segment are not much longer than the hairs on ventral surface and only slightly coarser. All tarsal claws bifurcate. Dorsum of abdomen with a few short coarse hairs, which do not arise from pigmented spots. Cauda with few hairs, the median posterior tubercle is well developed.

Holotype, apterous viviparous female, deposited in the United States National Museum, Host, *Abies concolor*, Seattle, Washington, July 17, 1955, M. J. Forsell collector. Holotype slide and paratype slide with several specimens.

This species is allied to *Essigella wilsoni* from which it differs in having the tarsal claws bifurcate, sharp pointed hairs on the tibiae, longer hairs on the tibiae, and the better developed median posterior tubercle on the cauda.

Essigella pineti n. sp.

Plate I

Alate viviparous female.

Length from vertex to end of anal plate 2.275 mm. Color in life not recorded. Cleared with head and thorax dark dusky brown, abdomen clear, possibly light green in life, with five transverse rows of small pigmented spots, each of which is provided with a hair which is about as long as the width of the spot, or but little longer. Cauda and anal plate dusky, both slightly setulose. Cornicles not differentiated from abdomen by color. Antennae dusky brown, except for the base of third segment which is pale. Femora light dusky brown, with dorsal margin slightly darker. Tibiae dark dusky with apical portions darker.

Anterior margin of head with a few long rather coarse hairs, which are slightly capitate at the ends, these hairs are about .06 mm. in length. Dorsum of head with very few hairs, the hairs on the posterior dorsum being much shorter than the hairs on the vertex, all hairs on dorsum of head sharp pointed, and finer than hairs on vertex. Antennal segments with the following lengths: III .24 mm., IV .12 mm., V .08 + .04 mm. Third antennal segment with from two to four sensoria, fourth and fifth segments with only primary sensoria. All antennal segments very coarsely imbricated. Pro, meso, and metathoracic femora with the following lengths: .06, .39, 1.00 mm. Pro, meso, and metathoracic tibiae with the following lengths: .73, .73, 1.50 mm. First and second metatarsal segments with the following lengths: .13 and .23 mm. Prothoracic femora with the dorsal margins with a moderate number of hairs which vary from .03 - .045. These hairs are dull at the apex. Hairs on ventral surface of prothoracic femora very sparse, sharp pointed and about .03 mm. in length. Hairs on mesothoracic femora few, fine, sharp pointed and about .01 mm. in length or even less. Hairs on dorsal margin of metathoracic femora few, hardly .04 mm. in length, dull at the end. Hairs on ventral margin of metathoracic femora shorter than those on dorsal margin, spaced farther apart than their length. Hairs on prothoracic tibiae differing on outer and inner margins, those on outer margin coarse, and dull at the end, the longest in the mid region about .06 mm. in length, the shortest near the base, are hardly .015 mm. in length. The hairs on the inner margin of the prothoracic tibiae are fine sharp pointed and about .03 mm. long. Hairs on mesothoracic tibiae much shorter than width of tibiae. Hairs on metathoracic tibiae varying from .04 - .06 mm. in length on the outer margin, with the hairs near the base somewhat shorter. All hairs on the outer margin of the metathoracic tibiae capitate at the end, and distinctly dull. Hairs on inner margin of metathoracic tibiae fine, shorter than those on the outer margin and sharp pointed. Media once-branched. Stigma ending in a distinct point.

The pigmented spots on the dorsum are small, they are arranged in transverse rows, and each is provided with a short hair, each row is one spot wide. Directly beneath the spots on the dorsum, there are transverse bands of long fine hairs on the venter. Cornicles mere rings. Portion of abdomen dorsal to genital plate with row of coarse bluntly pointed hairs. Genital plate with a few widely spaced hairs. Median tubercle on posterior portion of cauda not well developed.

The abdomen of this species suggests the abdomen of *E. essigi* but the genital plates differ, as do the stigma, the lengths of the prothoracic femora and tibiae, and the length of the tibial hairs.

Holotype, alate viviparous female, returned to the Essig collection. Host, *Pinus ponderosa*, Yosemite, California, May 17, 1938. E. O. Essig, collector. The apterous female mounted on the type slide may or may not belong to this species, and because of this question it is not described.

This species is known only from the holotype.

Essigella pini Wilson

Plate III

Essigella pini Wilson, H. F. Three New Lachnids with Comparative Notes on three others (Homop.). Ent. News Vol. XXX No. I pp. 2 - 3 1919. Original description.

Essigella pini Wilson, Gillette and Palmer 1931: 841, (misidentification).

Essigella pini Wilson, Palmer 1952 p. 16, (misidentification).

Alate viviparous female.

Length from vertex to end of anal plate 1.80 mm. Specimen not cleared, as mounted, head and thorax light dusky. Abdomen yellowish, with small dusky spots on the dorsum, these are arranged in rows, each side of the abdomen has a row of slightly larger and darker spots than those on the dorsum. Femora slightly dusky, tibiae uniform in color, lighter than femora, tarsal segments concolorous with ends of tibiae. Length of antennal segments as follows: III .18 mm., IV .08 mm., V .08 + .025 mm. Third antennal segment with three sensoria, fourth and fifth antennal segments with only primary sensoria. Vertex of head with few comparatively fine dull pointed hairs, other hairs on the head quite similar. Media simple. Prothoracic femora .345 mm. in length, length of metathoracic femora .525 mm. Hairs on dorsal margin of metathoracic femora very short, stubby and dull at the end, hairs on other regions of this segment much longer, finer, and sharp pointed. Metathoracic tibiae .825 mm. in length, hair on this segment of two types, those on outer margin of variable length, usually short to very short, thick, and dull at the apex, hairs of this type are arranged in about three rows, they often have to be looked for, one row is often much shorter than the other two. Remaining hairs on the metathoracic tibiae much longer, finer and very droopy, some almost procumbent. Metathoracic tarsal segments with the following lengths: first .09 mm. second .17 mm. The first tarsal segment has one pair of hairs on the dorsum. Cornicles slightly elevated rings, slightly darker in color than the abdomen. Median posterior tubercle on cauda extra well developed, larger than that of any such tubercle of known species, distinctly nipple like.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.28 - 1.60 mm. Specimens mounted without clearing are a uniform pale yellow, in life most likely pale green. Cape apparently absent. Antennal segments with the following lengths: III .12 mm., IV .07 mm., V .07 + .03 mm. There are no secondary sensoria. Anterior margin of head with a few hairs of variable length, but none long, the distal end of which is dif-

ficult to classify being neither distinctly dull or sharp. Rostrum when extended reaching to coxae of metathoracic legs. Prothoracic femora .30 mm. in length, length of mesothoracic femora .255 mm., length of metathoracic femora .45 mm. Dorsal margin of metathoracic femora provided with a few extra short, dull pointed hairs which are spaced further apart than their length, other hair on this segment very sparse, fine, and slightly longer as well as sharp pointed. Metathoracic tibiae varying in length from .40 - .55 mm., with hairs on outer margin similar to those of alate viviparous female, so short that they have to be looked for, remaining hairs on this segment sharp pointed, for the most parte equal to width of segment, but often shorter, never longer. Cornicles as in alate female. Median posterior tubercle similar to that of alate viviparous female. Cauda and anal plate with numerous fine sharp pointed, rather long hairs. Hairs on dorsum of abdomen extremely sparse, fine and not much if any longer than the slightly elevated area from which they arise.

Essigella essigi may be easily differentiated from *pini* Wilson by the much shorter, less droopy hairs on the tibiae, the alates have more spots on the dorsum of the abdomen, the aptera have a well developed cape, and the blunt hairs are more numerous.

All references to this species known to me except those of Tissot refer to other species.

Lectotype alate viviparous female in collection of A. A. Granovsky. Morphotype apterous viviparous female also in Granovsky collection Both types from original material described by Wilson and formerly in his collection. Three slides from the aphid collection of the University of Maine have been seen. They are part of the original material and carry the same accession number 82 - 41 over 11. Two of the slides carry the date June 28, 1914, one May 24, 1914, a date not mentioned in the original description. The Maine slides were not determined.

Other slides of this species which have been seen were taken and determined by A. N. Tissot on *Pinus taeda*, Gainesville, Florida, March 3, 1928. On *Pinus taeda*, St. Augustine, Florida, May 5, 1945. Two slides in the United States National Museum are of interest, both contain apterous viviparous females. One slide, with the number 121649 carries the following note, "N. Gen. of Lachnids, on Pine", but no other information. One slide with the number 183t (1.3.66) has the following data. "On Pine, Eufoula, Ala. March 10, 76." This is the first record of specimens of the genus *Essigella* known to me. Both slides appear to have been labeled by Pergande.

Essigella robusta n. sp.

Plate IV

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.10 - 2.32 mm. Color recorded by Essig as green. Cleared specimens indicate the color of the cape as pale buff. Legs pale dusky with the tibiae slightly darker near the apex. Antennal segments one, two and the basal three fourths of the third pale, a remainder of third segment and all of fourth and fifth segments pale dusky.

Vertex of head with a few thick blunt hairs which vary in length from

.015 - .05 mm. The shorter of these hairs do not taper to the end, but are of uniform thickness throughout, the longer hairs taper a little towards the apex. Remaining hairs on head slightly longer than those on vertex, thinner, and sharp pointed. Antennal segments with the following lengths: III .18 - .195 mm., IV .09 mm., V., .109 + .03 mm. Third antennal segment without sensoria. Primary sensoria on fourth and fifth antennal segments small, not tuberculate. Antennal hairs very sparse, fine, and short, difficult to differentiate except on first and second segments where they are better developed. Rostrum when extended reaching to end of metathoracic coxae. Prothoracic femora varying from .48 - .525 mm. in length. Prothoracic tibiae varying from .525 - .65 mm., always longer than prothoracic femora. Mesothoracic femora varying from .405 - .45 mm. in length. Metathoracic femora varying from .705 - .75 mm. Metathoracic tibiae varying in length from 1.05 - 1.08 mm. Prothoracic femora with numerous hairs on dorsal margin, these hairs are almost straight, rather thick and blunt at the end, they vary in length from .015 - .03 mm. There is an irregular row of similar hairs near them on one side of the femora, but the remaining hairs on the prothoracic femora are fine and sharp pointed. The hairs on the prothoracic tibiae are numerous, those on the outer margin are thick, blunt at the end and about .03 mm. or slightly less in length. The remaining hairs on the prothoracic tibiae are the same length as those on the outer margin, but they are somewhat finer, and sharp pointed. The hairs on the mesothoracic tibiae are shorter and fewer than the hairs on the tibiae of the prothoracic pair of legs, on this segment there are also two types of hairs. The hairs on the dorsal margin of the metathoracic femora are about .03 mm. in length, these hairs are straight, and blunt at the end. The hairs on the outer margin of the metathoracic tibiae vary in length from about one third the width of the tibiae, to subequal to width, to just equal to width. These hairs are coarse, thick, and dull at the end, they vary in length from .015-.45 mm. First tarsal segment of metathoracic legs varying from .12 - .14 mm. This segment, like the first tarsal segment of the prothoracic and mesothoracic pairs of legs has two pairs of rather coarse hairs, of which the more basal pair is shortest, the dorsal hairs are blunt at the end. The second metatarsal segment varies from .17 - .23 mm. in length, it has few hairs, as a rule the hairs on the dorsal surface are coarser and slightly longer than the hairs on the ventral surface, the apical dorsal hairs being longest.

Dorsum of abdomen with a few transverse rows of short coarse hairs, the hairs just anterior to the cauda being longer and coarser than the hairs more anterior. The genital plate has the long fine sharp pointed hairs uniformly distributed over its surface, the lateral margins of this structure are irregular, at times even toothed.

This species is much larger than *E. essigi* and lacks the dusky cape of *essigi* and also has two pairs of hairs on the dorsum of the first tarsal segment. From *E. braggi* it differs in shorter hairs, by having two pairs of hairs on the dorsum of all first tarsal segments, and finer, shorter, not bristle like hairs on the antennae. The two species have much the same body shape.

Holotype, apterous viviparous female, returned to the Essig collection.

Host, *Pinus contorta* (lodgepole pine), alt. 7500 ft. upper Echo Lake, California. Aug. 6, 1937, E. O. Essig, collector.

This species is known from only one collection. Twelve slides have been made paratype.

Essigella swaini n. sp.

Plate II

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.02 - 2.10 mm. Color in life not recorded. Mounted specimens which have been cleared are very pale throughout, with some specimens showing a very pale buff colored cape. Apical portion of third antennal segment and remaining antennal segments slightly dusky. All legs light dusky, uniform in color.

Antennal segments with the following lengths: III .17 - .19 mm., IV .09 - .10 mm., V .075 - .08 + .03 mm. Hair on antennae extremely sparse, almost totally lacking, the few hairs present not longer than the space between imbrications and very fine. First and second antennal segments likewise almost free from hair. Third segment of antennae without sensoria, primary sensoria on fourth and fifth antennal segments small, not tuberculate. Rostrum when fully extended with last two segments extending beyond metathoracic coxae. Vertex of head with a few short stubby hairs, remaining hairs on head short, fine, and sharp pointed.

Dorsum of thorax and abdomen with a very pale buff colored cape. Hair on dorsum of abdomen extremely sparse and so short that it can only be seen on specimens mounted on their side. Cornicles mere rings, slightly elevated from the abdomen. Cauda with median posterior tubercle. Prothoracic femora varying from .36 - .43 mm., mesothoracic femora varying from .30 - .31 mm., length of metathoracic femora varying from .54 - .72 mm. each extreme represented by a single specimen. Most common length of metathoracic femora is .62 mm. All femora with few hairs, which are short and fine. The hairs on the dorsal margin of the metathoracic femora are blunt at the end, slightly curved, and for the most part farther apart than their length. All tibiae with few, extremely short fine hairs, of which those on the outer margin are short and blunt at the end, in contrast with the remaining hairs which are slightly longer and sharp pointed. In cases the tibial hairs are so short and sparse that they have to be looked for. The metathoracic tibiae vary in length from .82 - .91 mm. The first tarsal segment of the metathoracic legs is .09 mm. in length, this segment has two long curved hairs on its dorsal surface. The second segment of the metathoracic tarsus varies from .17 - .19 mm. this segment has few hairs, they are short, and about the same length on the dorsal and ventral surfaces.

Alate viviparous female.

Length from vertex to end of cauda varying from 1.20 - 1.38 mm. Color as indicated by uncleared specimens most likely dusky green. Antennae and legs pale dusky, quite uniform throughout.

Length of antennal segments as follows: III .20 - .21 mm., IV .11 mm., V .08 - .09 + .04 mm. Third, fourth and fifth antennal segments with one sensorium each. All antennal segments well imbricated. Third and fourth

antennal segments without hairs, hairs on fifth limited to the apex of the unguis. Primary sensorium on fifth antennal segment not tuberculate, located on the unguis small, and apt to be overlooked. The marginal sensoria on this segment are bunched at the junction of the unguis and base of the fifth segment, they are apt to be taken for the primary sensorium. First and second antennal segments with hardly any hair. Vertex of head with a few short blunt hairs. Rostrum extending beyond metathoracic coxae by about the last segment. Media once forked, wings rather pale. Prothoracic femora varying from .43 - .47 mm., metathoracic femora varying from .67 - .73 mm. Prothoracic tibiae varying from .46 - .48 mm. always slightly longer than femora. Metathoracic tibiae varying from 1.09 - 1.20 mm. Dorsal margins of all femora with short, fine, slightly dull hairs, which are weakly curved and spaced as a rule so that there is no overlapping. The tibial hairs are longer than the hairs on this segment of the apterous female, but may be classed as short. Hairs on prothoracic tibiae numerous, more numerous on outer margin than on inner. On the outer margin they vary in length from .04 - .05 mm. they are slightly longer than the width of segment, and blunt at the apex, remaining hairs on this segment, sharp pointed. Metathoracic femora very slender. Hairs on outer margin of metathoracic tibiae shorter than width of segment and dull at the end, these hairs are slightly curved, and so spaced that they just barely overlap. The hairs near the base of the tibiae are much shorter than those near the middle, while the hairs near the apex are slightly longer and much more inclined, being almost procumbent. The hairs on the inner surface of the metathoracic tibiae are short, at least some are upstanding, they are at times widely spaced. The dorsal surface of the first tarsal segment has two pairs of hairs. The hairs on the ventral surface of the second metatarsal segment are but a little shorter than those on the dorsum. The hairs at the apex of this segment on the dorsal surface are much longer than other hairs on this surface. The specimens are not sufficiently cleared to show the cornicles, or to differentiate the cauda and anal plate.

Holotype, apterous viviparous female, taken on *Pinus sabiniana*, Kelseyville, California, April 12, 1936, collected by P. Schulthesis. Morphotype, alate viviparous female on *Pinus sabiniana* (Digger Pine), Kelseyville, California, July 15, 1935, E. Daybell collector. Both slides are in the Essig collection. Two slides of this species taken on Pine, Pinnacles National Monument, San Benito, California, April 24, 1948, collected by J. W. MacSwain have been seen. Another slide taken on *Pinus sabiniana*, May 20, 1916 at Red Bluff, California by C. B. Weeks is in the Essig collection.

This species is allied to *E. essig* from which it may be differentiated at once by the lack of a deeply pigmented cape in the apterous forms, by shorter and fewer tibial hairs, and by longer femora and tibiae, and by the fact that the media is once forked.

Essigella wilsoni n. sp.

Plate II

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.42 - 1.80 mm. Color notes taken from living specimens not available. Cleared speci-

mens indicate that the color was more or less uniform, probably very pale yellow, or green, with the dorsum covered by a very pale dusky cape only slightly darker than the rest of the body. Fourth and fifth antennal segments slightly darker than remaining segments. Femora slightly darker than body, tibiae and tarsal segments darker than femora, but at most pale dusky. Cauda and anal plate dusky. Cornicles with rim slightly darker than surrounding area. Abdomen in adults free from pigmented spots, but immature specimens with light pigmented dorsal spots from which a hair arises.

Antennal segments with the following lengths: III .12 - .15 mm., IV .067 - .08 mm., V .075 - .08 + .03 mm. Hair on antennae minute. There are no secondary sensoria. All antennal segments imbricated. Anterior vertex of head with a few short blunt pointed hairs, elsewhere on the head the hairs are longer and sharp pointed. Rostrum reaching to end of metathoracic coxae. Metathoracic femora varying from .45 - .57 mm. in length, provided with short rather coarse sharp pointed hairs, on the dorsal margin these hairs are slightly farther apart than the hairs are long. Hind tibiae varying from .60 - .85 mm. in length, provided with comparatively few hairs which differ in character on the inner and outer margins. The hairs on the outer margin being short, measuring about .02 mm. in length near the middle of the tibiae, and with a blunt end. Near the apex of the tibiae, on this surface the hairs are slightly longer than they are near the middle and sharp pointed. The hairs on the inner margin of the hind tibiae are longer than those on the outer margin, and all are sharp pointed at the end. The longest hairs on this surface however, are considerably shorter than the widths of the tibiae. First segment of the hind tarsus varying from .075 - .10 mm. in length, this segment has one pair of hairs on the dorsal surface, the hairs on the ventral surface of this segment are few and confined largely to the apical half of the segment. The claws of this species are not distinctly bifurcate in all cases, and in some specimens distinctly not so. In the latter case the condition may be due to one terminal claw not developing. Dorsum of abdomen with very few extremely short blunt hairs. Cornicles with rims slightly elevated on very low cone-shaped areas. Cauda with median posterior tubercle.

This species is closely allied to *E. pergandei* from which it differs in not having the claws distinctly bifurcate, in having the hairs on the outer margin of the tibiae blunter at the end, coarser hairs on the dorsal margin of the metathoracic femora, and the median posterior tubercle on the cauda not so well developed.

Holotype, apterous viviparous female, taken on *Pseudotsuga menziesii* (Douglas fir), Whitby Island, Seattle, Washington, Aug. 29, 1955 by M. J. Forsell. The holotype is in the collection of E. O. Essig. One paratype slide with several specimens with the same data as the holotype has been seen. Mr. Forsell sent part of the original material to F. C. Hottes, none of which is in good condition.

Prof. H. F. Wilson for whom this species is named, in a paper which he published in 1919, mentions a species of *Essigella* which he calls *californica* (Essig) as having been collected on *Pseudotsuga douglasi* at Corvallis, Oregon. His figure of the hind leg of this species, particularly the hairs on the tibiae, strongly suggest that he was dealing with

specimens of the species *wilsoni*. Of this I have no proof, however this figure is not in agreement with the hairs of *E. californica* (Essig). It should be noted that Wilson's figure is that of an alate viviparous female, in the text he mentions the hairs on the legs as being long, prominent and spine-like in the apterous form, again hardly characteristic of *E. californica* (Essig). Again I have no proof, but I suspect that Wilson described the species here called *E. gillettei*, while his figure at least in part was drawn from *wilsoni*. It should be noted that part of Wilson's material which he determined as *californica* had *Pinus ponderosa* as host.

Wilson, H. F.

1919 Three New Lachnids With Comparative Notes on Three Others (Homop.). *Entomological News* Vol. XXX pp. 1-2 figs. 1-6.

Key to Species of Essigella

1. Tarsal claws with ends not distinctly bifurcated..... 2
Tarsal claws with ends bifurcated..... 3
2. Hairs on outer margin of hind tibiae .06 - .08 mm.; metathoracic femora .805 mm.; metathoracic tibiae 1.2 mm..... *monelli* n. sp.
Hairs on outer margin of metathoracic tibiae .04 - .07 mm.; metathoracic femora .70 mm.; metathoracic tibiae 1.08 mm.....
..... *cocheta* n. sp.
Hairs on outer margin of metathoracic tibiae .015 - .02 mm.; metathoracic femora .45 - .57 mm.; metathoracic tibiae .60 - .85 mm.
..... *wilsoni* n. sp.
3. Hairs on first, second and third antennal segments coarse, distinctly bristle-like..... *braggi* n. sp.
Hairs on first, second and third antennal segments not coarse, not distinctly bristle-like..... 4
4. First metatarsal segment .12 mm. or more..... 5
First metatarsal segment less than .12 mm..... 11
5. Cape of apterous forms extremely dark, blackish-brown.....
..... *fusca* Gillette and Palmer
Cape of apterous forms present or absent, not blackish-brown..... 6
6. Hairs on dorsal margin of metathoracic femora .06 - .08 mm.; hairs on outer margin of metathoracic tibiae .09 - .12 mm..... 7
Hairs on dorsal margin of metathoracic femora .05 mm. or shorter; hairs on outer margin of metathoracic tibiae not longer than .08 mm. 8
7. First metatarsal segment .16 - .19 mm.; third antennal segment of alate viviparous female .21 mm.; fourth antennal segment .10 mm.; tibiae very dark; tibial hairs coarse on outer margin .10 - .12 mm. black; hairs on dorsal margin of metathoracic femora .075 - .09 mm.
..... *palmerae* n. sp.
First metatarsal segment .11 - .15 mm.; third antennal segment of alate viviparous female .25 mm.; fourth antennal segment .15 mm.; tibiae dusky but not dark; hairs on tibiae not coarse on outer margin, not dark; hairs on dorsal margin of metathoracic femora .06 - .07 mm..... *gillettei* n. sp.
8. Hairs on mid region of outer margin of metathoracic tibiae .02 - .03 mm. 9

- Hairs on mid region of outer margin of metathoracic tibiae .04 - .08 mm. 10
9. Metathoracic femora .75 mm.; hairs on vertex blunt, distinctly spine-like, .03 - .04 mm. in length; second metatarsal segment .17 - .23 mm. long; caepe pale; hairs on dorsal margin of metathoracic femora numerous; a robust species.....*robusta* n. sp.
Metathoracic femora .65 mm.; hairs on vertex coarse, blunt, not over .03 mm. in length; second metatarsal segment .15 - .18 mm.; caepe distinct; hairs on metathoracic femora few; a medium sized species.....*knowltoni* n. sp.
10. Metathoracic femora of alate viviparous female 1.00 mm. in length; hairs on outer margin of metathoracic tibiae .04 - .06 mm. distinctly dull at end.....*pincti* n. sp.
Metathoracic femora of apterous viviparous female .84 - .95 mm.; hairs on outer margin of metathoracic tibiae .03 - .07 mm. not distinctly blunt at end; caepe pale.....*agilis* n. sp.
11. Greatest length of hairs on mid region of outer margin of metathoracic tibiae .03 mm. as a rule much less..... 14
Greatest length of hairs on mid region of outer margin of metathoracic tibiae more than .03 mm..... 12
12. Hairs on outer margin of metathoracic tibiae .03 - .07 mm. metathoracic femora of aptera .63 mm. of alate .72 - .78 mm. media once branched; caepe absent.....*californica* (Essig)
Hairs on outer margin of metathoracic tibiae not longer than .06 mm. as a rule much less; media simple..... 13
13. Hairs on vertex of head not less than .03 mm.; hairs on outer margin of metathoracic tibiae sharp-pointed.....*maculata* n. sp.
Hairs on vertex of head less than .03 mm.; hairs on outer margin of metathoracic tibiae blunt at end.....*patchae* n. sp.
14. Apterous females with distinct caepe.....*essigi* n. sp.
Apterous females with caepe absent or indistinct..... 15
15. Median tubercle at apex of cauda especially well developed, distinctly wart or nipple-like.....*pini* Wilson
Median tubercle at apex of cauda not especially well developed, not wart or nipple-like..... 16
16. Hairs on outer margin of metathoracic tibiae of apterous viviparous females .02 - .03 mm..... 17
Hairs on outer margin of metathoracic tibiae hardly over .01 mm. 18
17. Size small not over 1.42 mm. third antennal segment .13 mm. at most; greatest length of metathoracic tibiae 0.4 mm.....
.....*pergandei* n. sp.
Size large, 1.80 mm. up to 2.12 mm. in length, third antennal segment .18 mm. long, length of metathoracic tibiae .77 - .90 mm.....
.....*claremontiana* n. sp.
18. Antennal segment three of apterous viviparous female .10 - .15 mm.; prothoracic femora and tibiae about equal in length.....
.....*hoerneri* Gillette and Palmer
Antennal segment three of apterous viviparous female .19 mm.; prothoracic tibiae longer than femora.....*swaini* n. sp.

PROCEEDINGS
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NEW NEOTROPICAL WATER-STRIDERS
(HEMIPTERA)

BY CARL J. DRAKE

Smithsonian Institution, Washington, D. C.

The present paper contains the descriptions of a new genus and two new species of Gerridae and a new genus and four new species of Veliidae. The types are in the Drake Collection, U. S. N. M.

Family GERRIDAE Leach 1815

Tachygonus, new gen.

Limnometra Champion, 1898, Biol. Centr.-Amer. Rhynch. 2:150-151.

(Desc. and figs. two new spp. from Centr. Am.).

Tenagogonus Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash. 10:209.

(Cat. of Am. spp.).

Tenagogonus Drake and Harris, 1934, Ann. Carn. Mus. 23:131-134.

(Desc. gen., spp., figs. and gives key to spp.).

Tenagogonus Kuitert, 1942, Bull. Univ. Kan. Univ. 28:131-134. (Desc.,

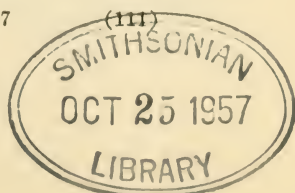
figs. and gives key to Am. spp.; two new spp. desc.)

The name *Tachygonus* is here proposed for the reception of the American species hitherto wrongly assigned to the genus *Tenagogonus* Stal (1853, 1855). The generic characters of *Limnometra* Champion (1898) (not Mayr) and by the authors Drake and Harris (1934) and by Kuitert (1942) (not *Tenagogonus* Stal, 1855) belong to the new genus *Tachygonus*. *Tenagogonus adamsoni* Drake is here designated as the genotype of *Tachygonus*.

The water-striders catalogued by Kirkaldy and Bueno (1909) also belong to *Tachygonus*. The species included by Hungerford (1919) in the genus *Tenagogonus* belong to the genus *Limnogonus* Stal. *Tenagogonus spinulosa* Poisson (1954, Beitr. F. Perus Bd. 4, p. 68, figs.) also belongs to *Limnogonus* and is a synonym of a Neotropical member of this genus. In addition to the type species, *Tachygonus* comprises *T. celocis* (Drake and Harris), *T. opacus* (Champion), *T. quadrilineatus* (Champion) and *T. dulineatus* (Kuitert). (New combinations). *T. duolineatus* (Kuitert) is a synonym of *T. adamsoni* (Drake). (New synonymy).

Ovatametra bella, new sp.

Apterous male: Head ochraceous with median stripe reaching from middle of vertex anteriorly between anterior pair of long sensory hairs, labrum and anterior part of front fuscous-black; three pairs of long, erect, sensory hairs (trichobothria?) placed as follows: First pair placed near base of head, second pair on vertex near middle of eyes and third pair just in front of eyes, the pairs widely separated from one another



and individuals of a pair by the width of vertex, each hair on a feebly raised, dark fuscous spot. Labium testaceous with posterior half blackish. Antenna shortly pubescent, testaceous or ochraceous with apical fourth of segment II, distal half of III and entire IV blackish, measurement—I, 0.50; II, 0.30; IV, 0.48. Entire body slightly shiny, with some bluish spots above, lateral sides and beneath quite bluish. Inferior surface whitish testaceous with narrow basal part of mesosternum, metasternum and abdomen blackish fuscous. Length, 2.70 mm.; width, 1.25 mm.

Pronotum short, depressed on disc, brownish ochraceous, with small, median basal spot and the broad, inverted U-shaped mark fuscous-black, the arms of the latter not quite reaching to base of pronotum. Mesonotum large, depressed on median line, brownish ochraceous, with a small, transverse, median spot in front, a triangular basal spot at middle and lateral stripes (one on each side) widely interrupted (not existing from behind middle to apical fourth) fuscous-black. Metanotum subquadrate, black. Mesopleuron with a black stripe along inferior edge and a median longitudinal stripe. Abdominal tergites above with posterior part of segments III to VII (inclusive) testaceous, II with a median testaceous spot. Connexivum very little narrowed apically, with last segment subquadrate, testaceous with exterior margin blackish. Male genital segments testaceous, beneath widely depressed on apical third; parameres fairly long, curved inward, narrowed apically. Last segment of ventor about as long as two preceding segments, roundly emarginate behind.

Anterior leg testaceous with a longitudinal black stripe on outer face of femur, tarsus dark fuscous; femur 0.94 mm. long; tibia 0.75 mm. long, distinctly bowed inward, with a large, slightly raised ovate spot of short dense hair in middle of convex inner face, between there and apex with a fringe (3 or 4 hairs deep) of numerous longer brown hairs. Intermediate and hind legs dusky testaceous with tibiae and tarsi infuscate. Middle femur 1.50 mm. long, tibia 2.40 mm. long and tarsus 1.75 mm. long. Hind femur 1.50 mm. long, tibia 0.82 mm. long and tarsus 0.56 mm. long.

Female: More robust than male with lateral stripe on each side of mesonotum solid and not interrupted; metanotum with a large ochraceous spot on each side of median line. Antennal measurements—I, 0.58 mm.; II, 0.34 mm.; III, 0.42 mm.; IV, 0.52 mm. Anterior femur with a prominent black stripe on outer face; tibia slightly bowed apically, without hairy ovate patch as in male but with fringe of brown hairs (3 or 4 hairs wide) on apical third beneath. Middle femur 1.50 mm. long, the tibia 2.30 mm. long and tarsus 1.75 mm. long. Hind femur 1.60 mm. long, the tibia 1.00 mm. long and tarsus 0.68 mm.

Type (Male) and *Allotype* (female), both apterous, Quarto Ojos, Bolivia, April 27, 1957, collected in a small stream.

The lateral, longitudinal, black stripe on outer face of anterior femur separates this species at once from the new species described below. The black markings of dorsal surface and lateral sides and the modified anterior tibia (especially the hairy ovate patch in male) distinguish *O. bella*, new sp. from the members heretofore characterized in the genus.

Ovatametra amnica, new sp.

Apterous female: Head above ochraceous with lateral stripe on each side coalescing anteriorly with black apical part of frons, wide median

stripe of black extending anteriorly almost to darkened part of frons; beneath whitish testaceous. Antennae dusky brownish testaceous with basal half of segment II testaceous, clothed with short pubescence, measurements—I, 62; II 0.42; III, 39; IV, 0.60. Labium testaceous with distal two segments blackish. Length, 2.80 mm.; width, 1.30 mm. long. Male unknown.

Dorsal surface brownish ochraceous, with prominent markings, somewhat bluish, much more bluish beneath. Pronotum short, depressed, with lateral sides and hind margin jointly rounded, with a black spot behind each eye; narrow median stripe and exterior outer edge (lateral sides and behind) edged with black. Mesonotum slightly paler on median line, with the large, median, subbasal, black spot longly attenuated from apex anteriorly, broad lateral black-fuscous stripe on each side solid and not extending to base of segment, front margin margined with black-fuscous. Metanotum black, large, subquadrate. Mesopleuron with inferior and median longitudinal stripes black-fuscous, not broken. Abdominal tergites very little narrowed apically, black-fuscous with all segments narrowly margined behind with ochraceous; connexivum black with first three segments ochraceous, last segment subquadrate and only a little smaller than the second. Body beneath pale testaceous with broad, median part of venter blackish fuscous.

Anterior leg dusky brown, paler beneath, without longitudinal stripe on femur; tibia straight without long brown hairs on apical part beneath, slightly shorter than femur, 0.80 mm. long. Middle legs with femur 1.60 mm. long, the tibia 2.62 mm. long, and the tarsus 1.70 mm. long. Hind femur 2.00 mm. long, the tibia 0.95 mm. long and tarsus 0.62 mm. long.

Type (female), Canal Zone, Panama, February 10, 1938, C. J. Drake, netted in a small stream emptying into the Canal.

Distinguished at once from *O. bella*, new sp. by the color markings of pronotum, antennal measurements and lack of a longitudinal black stripe on outer surface of fore femur.

The genus *Ovatametra* Kenaga (1942) now comprises *O. parvula* Drake and Harris (genotype) from Brazil, *O. obesa* Kenaga (1942) from Brazil, *O. fusca* Kenaga (1942) from Brazil and the two new species characterized above from Bolivia and Panama, respectively.

Velia paxilla, new sp.

Apterous form: Brown with base of first antennal segment pale, lateral sides of abdomen partly black, inferior surface of connexiva brownish testaceous. Legs brownish testaceous with distal half of superior surface of femora darker. Male and alate forms unknown. Length, 4.00 mm.; width, 2.50 mm.

Head above plump, clothed with pale pubescence, with longer hairs in front of eyes, with usual impressed median line, entire dorsal surface beset with numerous, short, stout, black, conical spinulae with sharp tips. Antennae moderately long, rather densely pubescent, with longer pubescent hairs on last two segments, segment II slenderer than I, III and IV slenderer than II, measurements—I, 0.75 mm.; II, 0.58 mm.; III, 0.56 mm.; IV, 0.60 mm. Labium testaceous with black tip.

Pronotum 1.28 mm. long, as wide as long, thinly clothed with short pubescence, depressed, without distinct calli, divided by a transverse row of large punctures into two distinct lobes; anterior lobe rectangular in

outline, pitted on posterior part, approximately one-third as long as hind lobe, with numerous, minute, erect, dark, conical setae on transverse, impunctate ridge behind collar, the collar constricted, short, ornated with an encircling row of small, low, rounded tubercles (no pits); hind lobe large, rounded behind humeri, coarsely rugosely pitted, with minute, conical, dark setae on elevated ridge along posterior border. Wing-pads not visible. Abdominal tergites slowly evenly narrowed posteriorly, with a broken pair (one on each side) of carinate ridges on all visible segments except VII, the two ridges somewhat bluish, parallel, extending entire length of segment II, thence progressively shortened and present only on basal part of III to VI (inclusive); connexivum fairly broad, widest near middle, slowly narrowed apically with apex truncate. Legs moderately long, unarmed, with femora scarcely swollen, clothed with short pubescent hairs, inferior face of middle and hind femora with pubescence more abundant and longer; tarsal segment II slightly shorter than III in both middle and hind legs. Pubescence of dorsal surface short and golden.

Holotype (female), Lorenzo, Salta, Argentina, Jan. 10, 1950.

Distinguished at once from *V. brachalis* Stal and other members of the group by the numerous minute, conical, dark spinulae on head and pronotum, lack of long hairs and annulae on legs and especially by the bicarinate dorsal tergites of abdomen.

***Velia nama*, new sp.**

Macropterous male: Head brownish with median longitudinal part in front dark fuscous, with usual impressed median line, transocular width 0.80 mm., vertex at narrowest point subequal to width of an eye. Labium not reaching to middle of mesosternum, testaceous with black tip. Antennae 2.87 mm. long, dark fuscous, shortly pubescent, without long hairs or even bristly hairs on first two segments, measurements—I, 1.00 mm.; II, 0.75 mm.; III, 0.56 mm.; IV, 0.56 mm. Length, 4.90 mm.; width, 1.47 mm.

Pronotum 1.75 mm. long and 1.70 mm. wide, triangularly extended behind humeri, long median carina widened anteriorly between calli, deeply coarsely punctate, each pit within furnished with depressed, silvery white, iridescent, short hairs; calli depressed, each densely clothed with a patch of appressed, silvery white, glittering hairs; median carina and callose hind margins impunctate, sparsely furnished with short, snowy white hairs; collar short, constricted, ornated with an encircling row of large pits; lateral sides of pronotum with two rows of large pits, the first four pits of upper row larger than the others. Mesosternum with a wide, obtusely angulate, deep, longitudinal furrow; metasternum tumid. Abdomen beneath with first three abdominal segments deeply transversely grooved on each side; upper edge of ventral surface of connexivum (base to segment V) equipped with a long and closely-set row (base to segment VI) of some 40 stridulatory pegs, the pegs becoming closer to one another apically; connexivum terminating behind in a sharp spine, triangular in outline from lateral aspect.

Hemelytra 3.10 mm. long, scarcely reaching beyond tip of abdomen, dark fuscous with veins a little raised and darkened; basal two cells and exterior cell beyond outer basal cell furnished with dense rows of transversely appressed, fairly long, silvery white, glittering hairs, the median open apical cell with a small white spot. Veins sparsely furnished with

short, pale decumbent pubescence. Male paramere broadly blade-like, posterior edge sinuate, apex rather sharply rounded. Fore legs dusky testaceous with tibia and tarsus brown or fuscous; femur 1.35 mm. long, the tibia a little shorter and provided with a short apical comb. Middle legs dusky testaceous; femur and tibia nearly equal in length, each 2.00 mm. long; tarsal segment II 1.25 mm. long, III 0.45. Hind femur sordid testaceous with stridulatory patch, postmedian band and apex dark brown or fuscous, not strongly swollen, armed beneath with short, black, irregularly arranged spines, one spine in front of middle, one spine near black band, four or five spines in band and seven or eight spines between band and apex (spines in band and beyond scattered); stridulatory structures arranged in a rectangular patch within, subbasal, composed of numerous longitudinal rows of minute, very closely-set, dark spinulae or spinelike structures; tibia straight, scarcely longer than femora, 1.85 mm. long, unarmed, with apical spur.

Type (male), Quarto Ojos, Rio Piray, Bolovia, June 1, 1957.

Separated at once from the species described below by the different type of stridulatory structures on hind femora and connexiva and the less swollen hind femora and humeral processes.

Velia alia, new sp.

Apterous form: Brown with basal third or more of all femora tending to be brownish testaceous, the hind femora with wide fuscous band situated just behind the middle. Dorsal surface of body and appendages clothed with short pubescence, the hairs on ventral face of all femora and tibiae a little longer. Stridulatory organs present. Female and macropterous forms not known. Length, 4.50 mm.; width, 1.25 mm.

Head with median longitudinal line; labium barely reaching to connexival cavities of middle legs, testaceous with last segment black. Antennae brown, shortly pubescent, measurements—I, 0.19; II, 0.65; III, 0.63; IV, 0.53 mm. Pronotum 1.22 mm. long and 1.37 mm. wide at humeral angle, with fairly distinct median carina, calli depressed and silvery; humeral angles provided with a fairly large, upright, triangular, spinelike process on each side. Abdomen beneath convex, with the first three segments transversely grooved on each side.

Abdominal tergites slowly evenly narrowed posteriorly to segment VII, then with VII slowly widened and nearly a half longer than VI; connexivum widest on III, IV and V, feebly narrowed on VI, deeply concavely narrowed on VII, terminating behind in a fairly long and acutely angulate projection which extends posteriorly to the end of first genital segment. Male parameres thin, fairly wide, narrowed on both edges apically, with apex blunt and on median line. Stridulatory organs: (1) connexiva (each side) provided with a long row (from base to middle of IV) of a very large number of fine, closely-set, transverse striae which form a rodlike structure extending from base of connexiva (one on each outer side near upper edge) to middle of segment IV and (2) and a stridulatory patch on inner face near the base of hind femora. The latter patch is somewhat obovate with apex almost acutely angulate, equipped with around 50 short, black, peglike structures fairly evenly arranged and spaced.

Fore leg with femur and tibia subequal in length, each 1.15 mm. long, latter with a short, rodlike apical comb. Middle leg with femur 1.80 mm.

long, the tibia 1.90 mm.; tarsal segment II slightly shorter than III (50:40). Hind legs with trochanter provided with numerous dark teeth; femur moderately swollen, 1.65 mm. long, widest near middle, armed beneath with numerous, short, blunt spines (more like teeth), the teeth-like spines more numerous on middle third of segment (there three rows deep), then only a few spines on basal third, also apical third; tibia straight, armed beneath with three rows of teeth on basal half, then diminish to two apically, provided with large apical spur; tarsal segments II and III subequal. Wing pads pale, short.

Type (male). British Guiana (Bartica District), May 25, 1944, netted in a small stream.

Allied to *V. quadrispinosa* Hungerford, but easily separated from it by the elevated humeral angles, male parameres and striated rodlike stridulatory organ of connexival segments.

***Euvelia*, new gen.**

Head short, broad, feebly produced in front of eyes, deflected anteriorly, with median impressed line; eyes fairly large, widely separated, contiguous behind with anterior margin of pronotum. Labium stout, extending a little beyond prosternum. Antennae short, stout, with two or three bristly hairs on segments II and III, all segments of nearly equal thickness and differ from one another very little in length. Pronotum large, strongly extended posteriorly so as to conceal mesonotum except latero-posterior angles; metanotum rather short. Abdominal tergites slowly evenly narrowed posteriorly; connexiva fairly thick, reflexed obliquely upward outward, slowly narrowed apically with last segment subquadrate. Mesosternum very large, longitudinally furrowed. Procoxal cavities rather widely separated from each other, placed near the hind margin of the segment; mescoxal cavities widely separated from each other, also from procoxae, placed far back on mesosternum; metacoxal cavities more widely separated from each other than middle pair, situated just behind the outer side of middle pair. Legs rather short, stout; tarsi two-segmented. Tarsal segment II of middle legs very deeply cut-out on apical two-thirds so as to leave only a short basal cleft, equipped with four large, thin, pellucid, membraneous bladeliike structures attached at the base of the excavation, each blade almost two-thirds as long as the segment. Legs rather short, stout. Male and alate forms unknown.

Type species, Euvelia advena, new sp.

Most closely allied to the Neotropical genus *Husseyella* Herring, but quickly separated from it by the much stouter and shorter antennae with segments of nearly equal in length and thickness and the larger membraneous blades of middle tarsi. Up to this time, these are the only two genera of American veliids known to have bladeliike structures on the second tarsal segment of middle legs.

***Euvelia advena*, new sp.**

Apterous form: Black with a little bluish bloom; hind part of head adjacent to eyes, subapical habena of pronotum last five connexival segments (both surfaces), last tergite in greater part and dorsal surface of genital segments reddish brown. Legs testaceous with femora and tibiae lightly brownish, tarsi more infusate. Male and macropterous forms unknown. Length 2.00 mm.; width, 1.25 mm.

Head with impressed median line, vertex twice as wide as an eye. Antennae stout, short, segment II tapering from apex to base, IV fusiform, measurements—I, 17; II, 16; III, 21; IV, 20. (80 units equal 1 mm.) Pronotum very large covering all but lateroposterior angles of mesonotum, wider than long (90:40), strongly sinuate behind, there roundly produced on each side so as to form an excavation at middle, somewhat depressed on median line anteriorly, anterior lobe much shorter than hind lobe. Abdomen above with a few scattered hairs, tergites slowly evenly narrowed posteriorly; connexivum slowly roundly narrowed posteriorly, last segment subquadrate, about half as wide as basal segment, reflexed obliquely upward laterally at an angle of about 45 degrees.

Legs short, stout, unarmed, sparsely pubescent, all trochanters rather long. Anterior femur 0.45 mm. long, with a thin row of long hairs on inferior face; tibia 0.35 mm. long, with a short, blackish, apical comb, the tarsi stout. Middle femur 0.81 mm. long, the tibia 0.75 mm. long; tarsal segment I half as long as II (15:30), taken together half as long as tibia, II provided with four, long, thin, bladelike structures as described under genus. Hind legs with femur 0.50 mm. long; tibia scarcely longer than femur; tarsal segment I about half as long as II (8:18), the latter shallowly excavated beneath at apex of the reception of two claws.

Type (apterous female), Cuarto Ojo, Piray River, Bolivia, April 25, 1957. Separated easily from *Huseyella diffidens* (Drake and Harris) and *H. turmalis* (Drake and Harris) by the shorter and stouter appendages, length of antennal segments and modifications of tarsal segment II of middle legs.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF FOUR NEW VENEZUELAN BIRDS,
EXTENSIONS OF RANGES TO VENEZUELA
AND OTHER NOTES

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Further study of our collection indicates four new subspecies worthy of description and the extension of ranges of eight species and two subspecies to Venezuela.

We owe our thanks to the Curators of the American Museum of Natural History, the Carnegie Museum, the Chicago Natural History Museum, the Museum of Comparative Zoology and the Museum National d'Histoire Naturelle, Paris, for facilitating the comparison of our material with their collections.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

Anoüs minutus americanus (Mathews)

Megalopterus minutus americanus Mathews, Bds. Australia, 2, p. 423, 1912. (Caribbean Sea, Br. Honduras.)

2 ♀, Islas Los Roques (I. Bequevé), July 1.

This is the first record of the species for Venezuela. These specimens were among a large colony of nesting *A. stolidus stolidus* (Linné).

A single egg was reported by Belcher and Smooker¹ as having been collected on El Soldado Rock, off Trinidad, and Voous² reports that it was once recorded from Bonaire. It is apparently an exceedingly rare species off Venezuela.

Helicolestes hamatus (Temminck)

Falco hamatus "Illiger" Temminck, Nouv. Rec. Pl. Col., livr. 11, pl. 61, 1821. (Brasil.)

1 (?) imm., El Amparo, Río Arauca (Colombian frontier), Apure; collected November 11, 1946, at 100 meters.

This specimen constitutes an extension of range of this species to Venezuela from Colombia (Amazonian) and Brazil. Rusty edgings on wing feathers and scapulars denote immaturity. It is uniformly plumbous in color with black tail (above) with four white bands.

Accipiter poliogaster (Temminck)

Falco poliogaster "Natterer" Temminck, Nouv. Rec. Pl. Col., livr. 45, pl. 264, 1824. (Brasil; = Ypanema, Sao Paulo.)

¹Birds of the Colony of Trinidad and Tobago. Ibis, p. 296, 1934.

²De Vogels van de Nederlandse Antillen, p. 109, 1955.



1 ♀, Caño Cataniapo, Atures, Terr. Amazonas; collected February 8, 1943, at 100 meters. 1 ♂, Burgua (Camp. Petrolero), southwestern Táchira; collected November 10, 1952, at 350 meters, in forest.

These specimens constitute an extension of range of the species to Venezuela from Colombia (Santa Marta region) and Brazil. They are similar in color except that the male has the sides, flanks and shanks heavily barred and traces of rusty on sides of breast and cheeks.

Buteo swainsoni Bonaparte

Buteo swainsoni Bonaparte, Geog. and Comp. List, p. 3, 1838. (Colombia River, United States; *ex* Audubon.)

1 ♂ (?), Río Chama, Mérida, September 18, 1939; 2500 (?) meters.

This specimen constitutes an extension of the winter range of this species, migrant to Venezuela. In South America it was known from Colombia and Brazil.

We have questioned the sex and altitude because, being a Briceño Gabaldón skin, this information is unreliable. The plumage is similar to American Museum of Natural History specimen 51598 juv., Fort Verde, Arizona.

Piaya cayana insulana Hellmayr

Piaya cayana insulana Hellmayr Nov. Zool., 13, p. 43, 1906.

Orinoco Delta: 1 ♂, 2 ♀, San Francisco de Guayo; 2 ♀, Jobure.

These specimens confirm the correctness of Cherrie's³ identification of a "specimen collected at Las Barrancas [Monagas], Delta region" as *insulana*. This record was apparently overlooked by Peters⁴ as he gives the range as "confined to the Island of Trinidad."

Leucippus fallax

Trochilus fallax Bourcier et Mulsant, Ann. Soc. Agric. Lyon, 6, p. 44, 1843. (Colombia.)

The senior author examined the two specimens from "Cayenne" in the Paris Museum and found them similar to a large series of *L. f. richmondi* in our collection from the northeastern coast of Venezuela.

They are a part of a collection made in French Guiana by F. Geay previous to 1904. Simon 1921:318⁵ cites these specimens as well as Ménégau 1904:114⁶ and Berlepsch 1908:265⁷. Both Berlepsch and Simon also cite another specimen from "Cayenne" in the British Museum but the senior author did not find it there in 1951.

Inasmuch as all these specimens lack precise localities and dates we believe they are commercial skins of northeastern Venezuelan origin. As we have not found any more recent records from French Guiana we think the species should not be given a French Guiana range without additional proof.

³Science Bulletin (Brooklyn), 2, No. 6, p. 314, 1916.

⁴Birds of the World, 4, p. 47, 1940.

⁵Histoire Naturelle des Trochilidae. Paris. pp. 416.

⁶Catalogue des Oiseaux rapportés par M. Geay de la Guyane française et du Contesté Franco-Brasilién. Bull. du Muséum d'Histoire Naturelle, No. 3.

⁷On the Birds of Cayenne. Nov. Zool., 15, Pt. 2.

Monasa morphocus peruana Selater

Monasa peruana Selater, Proc. Zool. Soc. London, p. 194, 1855 (1856). (Chamacurros, Ucayali Valley, Perú.)

12 ♂, 5 ♀, Campamento La Cruz, pica Yavita-Pimichín, Terr. Amazonas.

These specimens extend the range of the species to Venezuela from southeastern Colombia (Caquetá) and Brazil (Rio Negro). The specimens were collected during March, 1946.

Capito niger niger (P. L. S. Müller)

Bucco niger P. L. S. Müller, Natursyst., Suppl., p. 89, 1776. (Type locality not indicated; Cayenne *ex* Buffon.)

2 ♂, 1 ♀, Carabobo, (240 m.), Alto Río Cuyuni, extreme eastern Bolívar, near the British Guiana frontier.

These specimens, collected in September, 1948, extend the range of the subspecies to Venezuela from British Guiana and Brazil.

Capito niger transilens Friedmann

Capito atratus transilens Friedmann, Proc. Biol. Soc. Wash., 58, p. 113, 1945. (Santa Isabel, Rio Negro, Amazonas, Brasil.)

Territorio Amazonas: 1 ♂, 3 ♀, El Carmen, Río Negro; 1 ♀, San Carlos, Río Negro.

These specimens extend the range of the subspecies to Venezuela from Colombia on the Río Negro and from Brazil, also on the Río Negro. The specimens were collected in July and September, 1947. At the same time we collected four specimens across the river in Colombia; see Dugand and Phelps 1948:233⁸.

Capito bourcierii bourcierii (Lafresnaye)

Micropogon Bourcierii Lafresnaye, Rev. Zool., p. 179, 1845. (Bogotá, Colombia.)

1 ♀, Altamira, Barinas (1300 m.); 4 ♂, 1 ♀, Cerro El Teteo, southwestern Táchira (1250, 1300 m.).

These specimens extend the range of the species to Venezuela from the Bogotá region of Colombia.

Piculus rubiginosus rubiginosus (Swainson)

Picus rubiginosus Swainson, Zool. Illust., 1, 1820, pl. 14 and text. ("Spanish Main"; "Cumaná" designated as restricted type locality by Hellmayr, Nov. Zool., 13, p. 38, 1906; Caracas substituted by Hellmayr Vern. Orn. Ges. Bayern, 13, p. 315, note, 1918. We accept Hellmayr's first locality, but as "Los Palmales, Cumaná" instead of "Cumana".)

Anzóategui: 6 ♂, 3 ♀, Quebrada Bonita; Sucre: 1 ♂, 1 ♀, Los Altos; 3 ♂, Cerro Papelón; 10 ♂, 6 ♀, Cerro Humo; 6 ♂, 1 ♀, Cerro Azul; Monagas: 1 ♀, Cerro Negro; 1 ♂, Caripe.

The material which Hellmayr had in his hands when he made his first designation of "Cumana" consisted of "1 ♂, ad., Los Palmales,

⁸Aves de la Ribera Colombiana del Rio Negro (Frontera de Colombia y Venezuela). Caldasia, 5. No. 22, pp. 225-245, Sept. 15, 1948.

Cumaná'' and six specimens from Trinidad. By error he omitted "Los Palmales" which is a subtropical locality to the southeast of Cumaná in the Eastern Coast Range in the present State of Sucre, near the border of the State of Monagas. Cumaná is at sea level on the coast.

Cory 1919:438⁹, and Peters 1948:111¹⁰, give the range of *P. r. rubiginosus* including both the Caracas and Cumaná regions. We now restrict the range to the Eastern Coast Range which extends from the Barcelona region, Anzoátegui, to the Paria Peninsula, Sucre, because the birds of the Caracas region are similar to *P. r. meridensis* (Ridgway) of the Mérida region in the principal subspecific character, which is the lack of pronounced barring on the two outer rectrices.

In *P. r. rubiginosus* the barring is pronounced on all specimens. In *P. r. meridensis*, from the Mérida region, the barring is entirely absent from the under surface of the rectrices and only suggested on the upper surface. Specimens from the Caracas region are sometimes intermediate in this respect but they are closer to *meridensis*. We therefore consider the range of *meridensis* to comprise the Caracas region as well as the Mérida and Perigá regions.

Hellmayr, in changing his designation from "Cumaná" to "Caracas" said: "My earlier idea that the type could have come from Cumaná was an obvious error which I, in another place, will explain." We have not been able to find the publication of the promised explanation.

In addition to the 39 specimens of *P. r. rubiginosus*, we have in our collection 102 specimens of *meridensis*, 44 from the Caracas region, 37 from the Mérida region and 21 from the Sierra de Perijá, Zulia. We rectify our error in listing the Caracas specimens as *P. r. rubiginosus* in our paper describing *P. r. paraquensis*, 1947:63¹¹.

***Myiophobus flavicans perijanus*, new subspecies**

Type: From Cerro Pejochaina, upper Río Negro, Sierra de Perijá, Estado Zulia, Venezuela; 2300 meters. No. 55077, Phelps Collection, Caracas. Adult male collected February 13, 1952, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *M. f. flavicans* (Selater), of Colombia and Ecuador, by less prominent crown patch, and from *M. f. venezuelanus* (Hellmayr), of Venezuela, by having a blackish mandible instead of flesh colored.

Range: Known from the Sierra de Perijá and from the eastern slopes of the Páramo de Tamá massif, in southwestern Táchira, in forests of the Subtropical Zone at altitudes from 1800 to 2300 meters.

Description of Type: Top and sides of head nearest to Warbler Green, merging into the Citrine of back and the Buffy Citrine of rump and upper tail-coverts; a semi-concealed Lemon Chrome crown patch; inconspicuous eye ring pale yellow; lores dusky. Chin yellowish white; throat, breast, sides and flanks near Pyrite Yellow merging into the Strontian Yellow of abdomen; under tail-coverts Citron Yellow. Wings Benzo Brown; primaries and secondaries narrowly edged basally with buffy olivaceous, the tertials heavily edged to the tips; inner webs of

⁹Catalogue of Birds of the Americas, Part II, No. 2.

¹⁰Check List of the Birds of the World, 6.

¹¹Descripción de seis Aves Nuevas de Venezuela y Notas sobre veinte y cuatro adiciones a la Avifauna del Brasil. Bol. Soc. Ven. Cien. Nat., No. 71, 1947.

remiges edged basally with Light Ochraceous Salmon, progressively more terminally toward tertials; greater wing-coverts broadly edged and tipped with Pinkish Cinnamon forming a prominent wing band; median coverts with a more olivaceous and indistinct band; lesser coverts edged with buffy olive; bend of wing Strontian Yellow; external under wing-coverts yellowish and dusky, interior ones and axillaries pale yellowish. Tail Benzo Brown, paler on under surface. Bill (in life) "black"; feet "greenish-black"; iris "dark". Wing, 66 mm.; tail, 53; exposed culmen, 10; culmen from base, 15; tarsus, 18.

Remarks: Sexes unlike in color, male with longer wing. Size similar to *venezuelanus*. Range of measurements: five adult males—wings, 66-70 (68.2) mm.; tail, 53-57 (55.8); culmen from base, 13-14 (13.6); five adult females—wing, 61-64.5 (62.7); tail, 52-55 (52.8); culmen from base, 13-14 (13.6). Measurements of *venezuelanus*: five adult males (AMNH)—wing, 66.5-68 (66.9); tail, 53-56 (54.4); culmen from base, 13-14 (13.7); five adult females (AMNH)—wing, 61-63 (62); tail, 50-53 (50.8); culmen from base, 12-13.5 (13).

Specimens Examined

M. f. caripensis.—VENEZUELA: Cerro Negro, Monagas, 1 ♀.

M. f. venezuelanus.—VENEZUELA: 19¹²; Queniquea, 2 ♂; Páramo Zumbador, 1 ♂, 1 ♀; Seboruco, 2 ♂, 1 ♀; Valle, 1 ♂; Quintero, 1 ♂; Cerro Niquitáz, 1 ♀; Cubiro, 1 ♂; Colonia Tovar, 1 ♂, 1 ♀; El Junquito, 3 ♂, 2 ♀; Cerro El Avila, 1 ♀, 1 juv.; Guarenas, 1 ♂, 2 ♀.

M. f. perijanus.—VENEZUELA: Cerro Perochaina, Perijá, 6 ♂ (inc. type), 5 ♀; Cerro Mashirampé, 1 ♂; divisoria ríos Macoíta y Apón, 2 ♂, 2 ♀; Río Chiquito, Hda. La Providencia, Táchira, 10 ♂, 13 ♀, 4 (?).

*M. f. flavicans*¹².—COLOMBIA: 28. ECUADOR: 47. PERÚ: 6.

*M. f. superciliaris*¹².—PERÚ: La Legia, 1 ♀.

Mecocerculus minor (Taczanowski)

Leptopogon minor Taczanowski, Proc. Zool. Soc. London, p. 233, 1879. (Tambillo, Perú).

1 ♂, Río Chiquito (Hda. La Providencia), southwestern Táchira; 1800 meters.

This specimen constitutes an extension of range of the species into Venezuela from the Colombian part of the Páramo de Tamá, where one specimen was collected by the Chicago Natural History Museum¹³.

Leptopogon rufpectus venezuelanus, new subspecies

Type: From Río Chiquito, Hda. La Providencia, Estado Táchira, Venezuela; 1800 meters. No. 61303, Phelps Collection, Caracas. Adult male collected January 22, 1955, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *L. rufpectus* (Lafresnaye) by blacker crown, less olivaceous or brownish; back purer green, less olivaceous.

Range: Known from the type locality in extreme southwestern Táchira,

¹²Specimens in the American Museum of Natural History. For localities see Zimmer and Phelps, Am. Mus. Nov., No. 1657, pp. 2, 3, May 25, 1954.

¹³Cory and Hellmayr, Bds. America, etc., Part V, p. 400, 1927.

in the Subtropical Zone at altitudes of 1800 and 1900 meters, and from adjacent Páramo de Tamá at 2500 meters.

Description of Type: Crown nearest to Olivaceous Black (2), the feathers of forehead, close to culmen, with brownish tips; back and rump Olive-Green; upper tail-coverts Dresden Brown; lores brownish; sides of head dusky olivaceous. Throat and breast Buckthorn Brown; sides and flanks olivaceous; abdomen Citron Yellow; under tail-coverts buffy whitish. Wings Fuscous \times Benzo Brown; primaries and secondaries margined outwardly and basally with olivaceous brown, tertials more broadly with olive green; inner webs of remiges, the primaries basally, margined with Pale Ochraceous-Buff; greater and median wing-coverts tipped with dull olivaceous yellow forming two conspicuous bands; under wing-coverts and axillaries Ochraceous-Buff. Tail nearest to Saccardo's Umber; outer webs of rectrices, except exterior ones, margined with olivaceous; inner webs, except median ones, margined dully with buffy.

Bill (in life) "black"; feet "flesh color"; iris, "brown". Wing, 72 mm.; tail, 64; exposed culmen, 10.5; culmen from base, 13; tarsus, 17.

Remarks: Sexes alike in color. Wings and tail of female shorter. Size similar to *rufipectus*. Range of measurements: six adult males (inc. type)—wing, 68-72 (68.3) mm.; tail, 59-65 (62.8); culmen from base, 13-14 (13.5); six adult females—wing, 63-65 (64.5); tail, 54-56 (54.9); culmen from base (5), 13. Measurements of *rufipectus* from Colombia: three adult males—wing, 66-69 (67.3); tail, 61-63 (62); culmen from base 12-13 (12.7); four adult females—wing, 62-68 (64.5); tail, 55-62 (58.3); culmen from base, 13-13 (13).

A fledgling, not fully grown, with wing, 55 mm. and tail, 30, and all remiges with sheaths, is similar in color to the adults. This new bird constitutes an extension of range of the species to Venezuela from Antioquia and the Bogotá region of Colombia.

Specimens Examined

L. r. rufipectus,¹⁵—COLOMBIA: Aguadita, Cundinamarca, 2 ♂ 2 [♀]; "Bogotá," 4 (?); La Candela, Huila, 2 ♀; La Palma, 1 ♀; Salento, Cauca, 1 ♂; Santa Elena, Antioquia, 1 ♀. ECUADOR: Sumaco Abajo, 3 ♂, 1 ♀; Baeza, 2 ♂, 1 ♀.

L. r. venezuelanus.—VENEZUELA: Río Chiquito, Táchira, 2 ♂, 3 ♀, 1 (?) juv.; Páramo de Tamá, 1 ♂.

Cyanolyca armillata armillata (Gray)

Cyanocorax armillatus Gray, in Gray and Mitchell, *Genera of Birds*, 2, pl. 74, 1845. ("Bogotá.")

2 ♂, 3 ♀, 1 (?), Río Chiquito (Hda. La Providencia), southwestern Táchira; 1800 and 1900 meters.

These specimens constitute an extension of range of the species to Venezuela from the Colombian part of the Páramo de Tamá, where two specimens were collected by the Chicago Natural History Museum.¹⁴

¹⁴Cory and Hellmayr, *Bds. Americas, etc.*, Part VII, p. 45, 1934.

¹⁵Specimens in the American Museum of Natural History.

Tangara schrankii venezuelana, new subspecies

Type: From Raudal Capuri, Caño Antabari, Caño Carún, Río Paragua, Estado Bolívar, Venezuela; 300 meters. No. 30714, Phelps Collection, Caracas. Adult male collected April 5, 1945, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Male differs from *T. schrankii* (Spix) in having the yellow rump patch less prominent, less extensive laterally, more confined to median line, of a less pure yellow and with a greenish tint.

Range: Known from the Tropical Zone, from 300 to 900 meters, in the upper Paragua River and from the headwaters of the Caura and Ventuari rivers, in southern Estado Bolívar and eastern Territorio Amazonas.

Description of Type: Forecrown, sides of head, and chin a continuous black mask; anterior eyelids with a ring of stiffened pale green feathers; crown Light Cadmium bordered (anteriorly narrowly, laterally widely, posteriorly through the nape and sides of neck) with bright golden green, lightly speckled with dusky; scapulars and back black the feathers edged with Yellow-Green; rump Lemon-Chrome; upper tail-coverts dusky margined with Yellow-Green. Chin black; upper throat, sides of neck, sides and flanks Yellow-Green; lower throat and center of breast more orange than Lemon-Chrome; abdomen along center line dull greenish yellow; under tail-coverts pale yellow with some dusky markings. Wings Bone Brown; primaries and secondaries edged with Turquoise Green, tertials more broadly with Yellow-Green; inner margins of remiges pale grayish white, basally; primary, medium and lesser wing-coverts edged with Turquoise Green, the greater ones with Yellow-Green; bend of wing Turquoise Green; under wing-coverts grayish white; axillaries pale greenish gray. Tail Bone Brown, under surface paler; rectrices, except the outer ones margined with Turquoise Green, the center ones with Yellow-Green; shafts of rectrices brown on upper surface and white on under.

Feet (in life) "dark gray"; iris "dark"; wing, 68 mm.; tail, 45; exposed culmen, 9; culmen from base, 13; tarsus, 17.

Remarks: Sexes different in color. Size similar to *schrankii*. Range of measurements: four adult males, including type—wing, 67-68 (67.5) mm.; tail 40-45 (42.2); culmen from base, 13-13.5 (13.1); five adult females—wing, 65-67 (65.5); tail, 40-42 (41); culmen from base, 12.5-13 (12.3). Measurements of *schrankii* from Puerto Indiana, Perú: five adult males—wing, 66-71.5 (68.2); tail, 40-42 (40.6); culmen from base, 12.5-13 (12.9).

Description of female. Crown without the orange yellow patch, yellowish green speckled with black; only an indication of yellow on rump; yellow of throat-breast more restricted and more greenish; yellowish of abdomen more greenish.

Description of juvenal male. Similar to adult male but with crown of the female. The specimen in the American Museum of Natural History from opposite Tahuapunto (Brazil), Río Uaupés, Colombia, is a juvenal so the identification is questionable.

Specimens Examined

T. s. venezuelana.—VENEZUELA: Kabadisocaña, Río Ventuari, Terr.

Amazonas, 1 ♂ [juv.]; Maniña, Alto Río Caura, Bolívar, 1 [♂], 1 [♂ juv.]; Sarariña, 1 [♂ juv.], 1 ♀; Cerro Paurai-tepui, La Faisca, 4 ♀; Erebenequén, Río Carún, Río Paragua, 1 [♀]; Raudal Capuri, Caño Antabari, 1 ♂ (type). 1 [♂], 2 ♀; Raudal Guaiquinima, 1 [♂].

T. s. schrankii.¹⁵—COLOMBIA: opposite Tahuapunto (Brazil), Río Uaupés, 1 [♂] juv.; Florencia, 1 ♀. ECUADOR: Río Suno Abajo, 1 ♂; Río Suno, above Avila, 2 ♂, 3 ♀; Napo, 5 ♂, 1 ♂ juv., 1 [♀]; Zamora, 2 ♂, 2 ♂ juv., 4 ♀; Sarayacú, 2 ♂, 1 ♂ [juv.], 1 ♀; San José, 1 ♂; San José Abajo, 1 ♂, 3 ♀; headwaters Río Marañón, 1 [♂], 1 [♀]; Mecas, 2 [♀]; Lagarta, Cocha, 2 ♂, 1 ♂ [juv.], 3 ♀. PERÚ: 92.¹⁶ BOLIVIA: Misión San Antonio, 6 ♂, 6 ♂ [juv.], 4 ♀; Todos Santos, 2 ♂, 1 ♂ [juv.], 3 ♀; San Mateo, 1 ♂, 2 ♀.

Habia rubica perijana, new subspecies

Type: From Barranquilla, Ranchería Julian, Sierra de Perijá, Venezuela; 960 meters. No. 58198, Phelps Collection, Caracas. Adult male collected March 2, 1953, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *H. r. coccinea* (Todd) but the male differs from all subspecies of *H. rubica* by brighter red breast and brighter, more extensively red, abdomen; differs additionally from *coccinea* by lighter, brighter red upper parts.

Range: Known from the Sierra de Perijá from the upper Río Negro to Cerro Alto del Cedro, at the northern extremity of the range; in the upper Tropical Zone at altitudes from 450 to 1300 meters.

Description of Type: Forehead and sides of crown nearest to Claret Brown; a prominent wide Scarlet-Red crown patch extending to the nape; back, rump and sides of head Garnet Brown. Chin and throat Scarlet-Red; breast Scarlet, duller on abdomen and under tail-coverts; sides, flanks and thighs with a brownish tint. Wings Benzo Brown; outer vanes of remiges brighter than Garnet-Brown; primary upper wing-coverts edged with dull red, the rest of the coverts brighter than Garnet-Brown; inner vanes of remiges Grenadine Pink basally, progressively more extensive terminally towards tertials; bend of wing like abdomen; under wing-coverts and axillaries Grenadine Pink. Tail and upper tail-coverts Morocco-Red; under surface of tail gray; shafts of rectrices blackish brown on upper surface, white on under.

Bill (in life) "maxilla black, mandible brown"; feet "brown"; iris "dark". Wing, 91 mm.; tail, 77; exposed culmen, 16; culmen from base, 21; tarsus, 24.5.

Remarks: Sexes unlike in color, males with longer wings and tail. Size similar to *coccinea*. Range of measurements: five adult males—wing, 88-91 (89) mm.; tail, 77-78 (77.6); culmen from base, 19-21 (19.6); two adult females—wing, 81-85 (83); tail, 70-74 (72.4); culmen from base, 19-20 (19.5). Measurements of *coccinea* (topotypicals from Colombia): three adult males—wing, 89-93 (90.3); tail, 78-80 (78.7); culmen from base, 19-20 (19.7); two adult females—wing, 81-81 (81); tail, 71-74 (72.5); culmen from base, 19-20 (19.5).

The adult female is brownish olive above, the tail more olivaceous, and with a semi-concealed orange crown patch; throat and breast brown-

¹⁶For localities and sexes see Zimmer, Am. Mus. Nov., No. 1245, Dec. 17, 1943, p. 2.

ish buffy; sides, flanks and abdomen paler; under tail-coverts like throat.

The juvenal plumage is darker brown above without crown patch and the tail is more or less reddish; below it is uniform light brown throughout. The many intermediate plumages of the species, both in male and female, are very complex and have been described by Zimmer in his *Studies of Peruvian Birds*.¹⁷ During all these changes the male is not different except when acquiring his all red plumage.

Specimens Examined

H. r. rubica.—BRAZIL: 6 ♂¹⁵, 3 ♂¹⁸. ARGENTINA: 3 ♂¹⁵, 1 ♂¹⁸.

H. r. bahiae.—BRAZIL: 2¹⁵.

H. r. amabilis.—BOLIVIA: 16 ♂¹⁸.

H. r. peruviana.—PERÚ: 15¹⁹, 3 ♂¹⁸.

H. r. hesterna.—BRAZIL: 66¹⁹.

*H. r. rhodinolaema*¹⁹.—BRAZIL: 3. ECUADOR: 7. PERÚ: 2.

H. r. rubra.—VENEZUELA: 23¹⁹; Cerro Azul, 1 ♀; Cerro Humo, 1 ♂, 1 ♀; Cerro Papelón, 7 ♂, 1 ♂ juv., 6 ♀, 2 ♀ juv.; Bergantín, 4 ♂, 1 ♀, 2 ♀ juv., 2 (?) ; Los Altos, 1 ♂. TRINIDAD: 17¹⁹, 1 ♂¹⁸.

H. r. coccinea.—VENEZUELA: La Azulita, 1 ♂²¹, 1 ♂¹⁵, 2 ♂²⁰, 1 ♀ juv.²⁰; Cerro El Cogollal, 1 ♂, 1 ♀ imm.; Burgua, 8 ♂, 1 ♂ imm., 2 (?) juv. COLOMBIA²⁰: La Colorada, Boyacá, 2 ♂ (inc. type), 2 ♀; Palmar, 1 ♂.

H. r. perijana.—VENEZUELA: Kunana, Perijá, 4 ♂, 1 ♀ imm.; Baranquilla, Perijá, 5 ♂, 1 ♂ imm., 2 ♀, 4 ♀ imm. VENEZUELA AND COLOMBIA²²: Cerro Alto del Cedro, Sierra de Perijá, 4 ♂, 3 ♂ imm., 2 ♀ imm.

H. r. vinacea.—PANAMÁ¹⁵: 64. COSTA RICA: 14 ♂¹⁸.

H. r. alfaroana.—COSTA RICA: 2 ♂¹⁸, 15¹⁵. NICARAGUA: 3 ♂¹⁵.

*H. r. confinis*¹⁵.—NICARAGUA: 9. HONDURAS: 27.

*H. r. rubicoides*¹⁵.—GUATEMALA: 16. MEXICO: 5.

H. r. affinis.—MEXICO: 3¹⁵.

H. r. nelsoni.—MEXICO: 2 ♂¹⁵.

H. r. rosea.—MEXICO: 3¹⁵.

¹⁷Am. Mus. Nov., No. 1304, p. 9, Dec. 28, 1945.

¹⁸Specimens in Chicago Natural History Museum.

¹⁹For list of specimens and localities see Zimmer, Am. Mus. Nov., No. 1304, pp. 11, 12, Dec. 28, 1945.

²⁰Specimens in Carnegie Museum.

²¹Specimens in Museum of Comparative Zoology.

²²The collecting camp was on the boundary. See Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 68, p. 20, May 20, 1955.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW BRAZILIAN THYSANOPTERA

By J. DOUGLAS HOOD

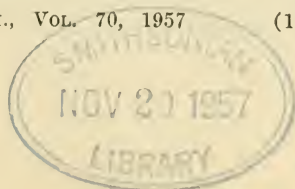
The following descriptions are presented with some reluctance, because there seems to be no way by which they can be accompanied by illustrations. However, carefully-made measurements have been given; and these, especially in the case of the head, could quickly be plotted on coordinate paper to form a moderately satisfactory picture, especially if a worker's experience has given him some familiarity with the particular genus or larger group. In any event, measurements are essential to any proper treatment of the species in this order of insects, and their omission from some current descriptions interposes difficulties in the path of other workers.

Measurements are in microns, except as otherwise stated. Almost invariably they are of the holotype, but have occasionally been supplemented by those of a topotypic paratype. Types, as usual, are in the author's collection.

Erythrothrips loripes, sp. nov.

Like *costalis* and *brasiliensis* in that the fore wings have a narrow, dark, costal band in addition to the broad band along posterior margin; but agreeing only with the former of these in having the head long (1.4 times as long as the width across eyes), differing from it in that the hind femora are strongly bent or curved at base, and the hind tibiae have a dense brush of long, roughened hairs extending along most of inner surface.

♂ (macropterous).—Length about 2.5 mm. (fully distended, 2.9 mm.). Color nearly uniform blackish brown, with red internal pigmentation, head somewhat darker; legs concolorous with body; fore wings blackish brown in about posterior half (including anal lobe), with a narrow dark line along costal margin in distal two thirds, and with a paler submarginal basal dark line which disappears at about middle of wing; antennae blackish brown except for the yellowish apical portion of segment II and the similarly colored basal two-fifths of III. Head 302, across eyes 216, just behind eyes 209, in front of basal collar 181, across basal collar 182, width in front of eyes 108; surface finely and closely cross-striate; eyes 102 long dorsally, 65 wide, 86 apart, ventrally prolonged and 127 long, 85 apart posteriorly, 66 wide; median ocellus 23, posterior ones 26, these last



36 apart and 30 from median; mouth-cone extending 126 beyond posterior dorsal margin of head, maxillary palpi 7-8 segmented. Antennal segments: I 60 (50), II 72 (39), III 185 (37), IV 159 (37), V 110 (35), VI 103 (33), VII 76 (31), VIII 31 (17), IX 17 (9). Prothorax 210, across coxae 294, exclusive of coxae 274, its structure and that of pterothorax normal; metanotal pelta somewhat elevated, sculptured throughout in the usual manner. Legs normal, except that the hind femora are curved strongly inward from near base, and the hind tibiae have a dense brush of roughened hairs extending along inner surface from near base; these hairs gradually decreasing in length toward apex of tibiae. Fore wings normal, 1270. Abdomen normal, without lateral flanges or lobes at sides of terga, VIII with anterior margin shallowly emarginate and its posterior margin deeply and roundly emarginate, IX with anterior margin deeply emarginate; seta I on IX 196, II 276, I-III on X each about 280.

BRAZIL: Nova Teutonia, S. C., Fritz Plaumann, May 20, 1949, 1 ♂ (holotype) without further data; and January, 1954, 1 ♂ from grasses.

Echinothrips asperatus, sp. nov.

Unlike all known congeners in that the third to fifth abdominal sterna are pale and membranous medially in about posterior two-fifths or one-half of median third (the second sternum less extensively weakened), and in having the large setae on fore wings, head, and pronotum asperate, rather than knobbed or pointed.

♀ (macropterous).—Length about 1.2 mm. (fully distended, 1.4 mm.). Color dark brown, with red internal pigmentation; fore legs yellow, lightly shaded at middle of femora; mid and hind tarsi and distal halves of their tibiae yellow, remainder of legs dark brown except for paler bases of femora; fore wings light gray; antennae dark brown in segments I and II, somewhat paler in VI-VIII, remainder pale yellow with III shaded in constricted portion just beyond pedicel and V very lightly shaded apically. Head 150, across eyes 148, greatest width across cheeks 139, at base 118, across frontal costa 20; cheeks slightly concave, serrate in about basal half, sculpture and chaetotaxy normal (much as illustrated for *subflavus*), but with the larger setae asperate, a few of the reticles roughened; mouth-cone and maxillary palpi normal. Antennal segments: I 23 (30), II 41 (27), III 54 (16), IV 44 (16-17), V 48 (16), VI 57 (16), VII 17 (8), VIII 26 (6); segments normal in form, chaetotaxy, and disposition of sense-cones, except that the stout subapical dorsal setae on II are asperate in about apical half. Prothorax 110, across coxae 180; sculpture of pronotum normal; major setae asperate, the outer and inner pairs at posterior angles largest and respectively about 59 and 40; fore wings 840, costa with 17 long setae, vein with 13-14, these (excepting the two apical ones on costa) asperate in apical half or more, those at middle of costa about 94, at middle of vein 70. Abdomen remarkable in that sterna II-V are emarginate posteriorly, the emargination of II narrow, that of III-V extending nearly to middle of sclerite and occupying about one-third of its width, these areas pale, somewhat irregular, and apparently membranous; sculpture normal, terga II-VI with numerous long microtrichia arising from the more posterior raised lines at sides; setae normal, disposed as usual, not asperate apically.

BRAZIL: Nova Teutonia, S. C., 1954, Fritz Plaumann, 1 ♀ (holotype) under fallen leaves.

Pseudothrips interruptus, sp. nov.

Very close to *spadix*, but with the comb on posterior margin of seventh abdominal tergum broadly interrupted at middle.

♀ (macropterous).—Length about 2.5 mm. (fully distended, 2.9 mm.). Color brown, paler in basal abdominal segments, shading to blackish brown in sides of last two abdominal segments; legs about concolorous with body, with tarsi, trochanters, both ends of all tibiae, sides of fore femora and tibiae, and bases of all femora, yellow; fore wings pale brown, lighter medially, anal lobe not darkened; antennae with segments I and II blackish brown, III yellow in pedicel and pale yellowish brown beyond, IV yellow at base, somewhat darkened to third whorl of microtrichia, rather abruptly blackish brown in remainder, V with pedicel dark, then yellow to first whorl of microtrichia, somewhat darkened to second whorl, its remainder and VI-IX blackish brown. Head 183 from base of cheeks to tip of front, 196 across eyes, 183 just behind eyes, 189 across cheeks, 175 across base; surface lightly striate in front of ocelli, smooth between them, and distinctly cross-striate behind them, the evenly rounded cheeks serrate; interocellar setae 58, dark and strong; eyes about 109. Pronotum 176, its width 238; surface with a few obscure cross-striae along front and hind margins and a dark line marking the posterior margin of a groove which is concentric with posterior margin; one pair of long setae at posterior angles, this 101 and nearly black; posterior margin with four pairs of setae, the mediad one 31; anterior angles with two pairs of moderately large setae, the upper 35. Mesothorax 283 across anterior angles, 340 in greatest width; anterior metanotal sclerite very sharply polygonally reticulate, the lines fine; fore wings 1040, with about 32 strong dark setae on costa, 22-25 on anterior vein, and 17-19 on posterior one. Abdomen 392 at segment IV; terga II-VII with posterior margin fringed at sides with microtrichia (only a few on the more basal terga), VIII with a complete comb; setae conspicuous, nearly black, I-III on IX respectively 161, 178, and 180, I-III on X 148, 157, and 133.

♂ (macropterous).—Much paler than female; front of head nearly colorless, its remainder much darker than the brownish yellow thorax; pronotum with obscure brown shading which includes a cloud extending toward anterior angles from middle; legs yellow, with middle portions of all femora and tibiae shaded; antennae with segments I and II largely gray, III yellow but very lightly shaded in its narrowed apex, IV and V nearly one-half yellow, except for the dark pedicel of V. Abdomen with microtrichia and the comb on tergum VIII as in female; sterna III-VIII each with a large, pale, transversely-elliptical glandular area; tergum IX with a pair of stout, thorn-like setae behind middle, posterior margin with a median tooth.

BRAZIL: Nova Teutonia, S. C., May 20 and November 17-18, 1949, Fritz Plaumann, 1 ♀ (holotype, taken May 20) and 3 ♂ ♂ (including allotype, taken May 20), from a plant which has not yet been determined.

Udeothrips, gen. nov.

(*oudas*, surface of the ground; *thrips*—in allusion to the habitat)

Allied to *Malacothrips* Hinds, but differing particularly in the large, finely-faceted eyes, which are close together and between which are five

pairs of setae, three of them in the ocellar area, two behind it. Head moderately long, somewhat broader across eyes than across cheeks, deeply incised behind eyes; eyes finely faceted, much broader than their interval, inner margins slightly sinuate; postocular setae normal, knobbed; other setae small and pointed, three pairs anterior to the paired ocelli, two pairs behind ocelli between eyes; surface of head completely sculptured with striae and reticles; mouth-cone moderately short, labium rounded. Antennae 8-segmented, terminal segment pedicellate, setae all pointed, sense-cones long. Prothorax normal, very delicately reticulate almost throughout; epimeron not fused with notum; antero-marginal setae well developed, coxal present, all knobbed; legs normal but slender, fore tarsi of female nearly or quite unarmed; wings nearly straight, at middle slightly narrowed and with the usual small pocket, with a few accessory setae on posterior margin, the three subbasal setae subequal and knobbed. Abdomen normal, with the usual wing-retaining setae, most of its dorsal surface very delicately polygonally reticulate; major setae largely knobbed; tube much shorter than head, not thickened, nearly smooth.

Type species: *Udeothrips vigilatus*, sp. nov.

***Udeothrips vigilatus*, sp. nov.**

♀ (macropterous).—Length about 1.7 mm. (fully distended, 2.1 mm.). Color yellow, cheeks edged with brown, ocellar area lightly shaded, tube brownish yellow in basal two-fifths and abruptly gray beyond; legs concolorous with body; fore wings brown but paler basally (except for anal lobe) as well as at middle and again at tip; antennae brown in segments I and II, yellow beyond, the segments beyond III shaded with brown except at base. Head 280 μ long, 182 across eyes, 154 just behind eyes, 178 across cheeks, 161 near base, 162 at basal collar, 78 across head-process; dorsal surface completely but delicately sculptured, polygonally reticulate in ocellar area, between eyes, just behind eyes, and narrowly across base, the cheeks and remainder closely cross-striate, the cheeks thus serrulate in dorsal aspect; postocular setae straight, expanded apically, 63 long, 99 apart, 30 from eyes; other setae short and pointed, two or three genal pairs borne on low eminences; eyes 114 long, 68 wide, 47 apart; ocelli close together, interval between posterior pair less than their diameter. Antennal segments: I 40 (41), II 56 (33), III 80 (28), IV 70 (26), V 70 (22), VI 69 (20), VII 57 (19), VIII missing in type; sense-cones (major) on III and IV 1 (1). Prothorax 120, across coxae 321, surface completely but very inconspicuously polygonally reticulate excepting the cross-striate posterior margin; mesonotum cross-striate, pelta of metanotum delicately reticulate; all setae present, straight, expanded at tip, antero-marginals 36, antero-angulars and mid-laterals 49, epimerals 64, postero-marginals 45, coxals 32; fore wings with 5 accessory setae. Abdomen 322 at segment IV; tube 120, across basal collar 72, at tip 37, terminal setae 224; IX with setae pointed, I 90, II 125.

BRAZIL: Rio Caraguatá, Matto Grosso, 1953, Fritz Plaumann, 1 ♀ (holotype) from fallen leaves.

***Pleurothrips*, gen. nov.**

(*pleura*, side; *thrips*—in allusion to the dorso-pleural line of abdomen)

Allied to *Eurythrips* Hinds, but differing particularly in the large, finely-faceted eyes, longer mouth-cone, moderately large antero-marginal

prothoracic setae but greatly reduced antero-angulars, very small and narrow metanotal scutellum, elongated abdominal sterna VII and VIII, slender legs, and, especially, in the dorsal position of the dorso-pleural line on abdominal segments II-VII. Head incised behind eyes, the latter as long as their distance from base of head; mouth-cone more than one-half the length of head, not narrowed basally, rounded at tip. Antennae 8-segmented, last segment somewhat narrowed at base, all setae pointed. Pronotum virtually without sculpture, fused with epimeron; legs slender, fore tarsi unarmed in both sexes; wings somewhat curved, at middle scarcely narrowed and without pocket, posterior margin with a few accessory setae, the three subbasal setae subequal and knobbed; metathoracic scutellum lobate, much narrower than scutum. Abdomen slender, with terga II-VII not attaining lateral margin, the dorso-pleural line thus paralleling the margin dorsally; sigmoid wing-retaining setae present on terga II-VII; tube much shorter than head, not thickened, nearly smooth.

Type species: *Eurythrips collaris* Hood.

Schazothrips, gen. nov.

(*schazos*, to let go or let loose; *thrips*—in allusion to the lack of wing-retaining setae even in macropterous individuals)

Allied to *Malacothrips* Hinds. Head moderately long, slightly produced, deeply incised behind eyes, the latter thus strongly protruding; head very lightly reticulate at extreme base dorsally, more strongly so in ocellar area, along cheeks, and posterior to eyes; postocular and post-ocellar setae about equal, moderately strong, knobbed; eyes moruloid, coarsely faceted; mouth-cone short, broadly rounded. Antennae 8-segmented, terminal segment pedicellate, setae and sense-cones long and pointed. Prothorax normal; epimeron not fused with notum; antero-marginal and the other usual setae well developed, coxal present, all knobbed; legs normal, fore tarsi of female with a slight projection at middle of inner surface, those of male with a strong tooth; wings nearly straight, slightly narrowed at middle, without accessory setae on posterior margin, the three subbasal setae subequal and knobbed. Abdomen remarkable in lacking sigmoid wing-retaining setae, their homologues small and straight; median tergite of segment I reticulate, as is most of tergum II, remainder of abdomen lightly sculptured only at sides; major setae mostly knobbed; tube much shorter than head, not thickened, with faint scallop-like reticulation.

Type species: *Schazothrips anadenus*, sp. nov.

Schazothrips anadenus, sp. nov.

♀, *forma macroptera*.—Length about 1.9 mm. (fully distended, 2.3 mm.). Color yellow; second abdominal segment darkened with brown or gray, but paler posteriorly, especially at middle; ocellar area lightly shaded with brown; legs concolorous with body; antennae brown, paler and more yellowish in first two segments, yellow at base of third, remainder dark brown; fore wings nearly uniform brown. Head 290 μ long, 172 across eyes, 134 just behind them, 175 across cheeks, 155 near base, 165 across basal collar, width of head-process 95; head prominently reticulated in groove back of eyes; postocular setae knobbed, 47 long, 135 apart, 44 from eyes; postocellar setae similar, about 52 long and 55

apart; eyes with 5 or 6 lateral facets. Antennal segments: I 46 (47), II 57 (35), III 66 (32), IV 66 (31), V 69 (28), VI 61 (24), VII 57 (23), VIII 41 (14); sense-cones on III 1 (2), IV 2 (2). Prothorax about 144 long, 336 across coxae, with a few marginal lines of sculpture; antero-marginal setae 37, antero-angular 43, midlateral 45, epimeral 62, postero-marginal 45, coxal 53, all knobbed; mesothorax 343 across anterior angles; fore wings 910; fore tarsi with a slight thickening at middle of inner surface; pelta of metanotum subtriangular, distinctly reticulate. Abdomen 365 at segment IV; median tergite of I about semicircular, reticulate; II reticulate except posteriorly, many of the reticles mucronate, the succeeding segments with some slight sculpture; terga without sigmoid wing-retaining setae; tube 146, across basal collar 87, at tip 39, terminal setae 147; seta I on IX 121, II 155, both pointed but rapidly tapering at tip.

♀, *forma aptera*.—Color and structure apparently identical with that of long-winged form, except for the absence of ocelli; eyes little or no smaller.

♂ (apterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color and structure as in long-winged female, but with fore tarsi strongly toothed at base; sterna without glandular areas.

BRAZIL: Nova Teutonia, S. C., May, 1953, to October, 1955 (holotype and allotype on latter date); Erechim, Rio Grande do Sul, August, 1956. All specimens (63 ♀♀ and 30 ♂♂) were taken by Mr. Fritz Plaumann from fallen leaves.

Eurythrips alarius, sp. nov.

Agreeing only with the following species (*peccans*) in having both pairs of setae on anterior margin of pronotum reduced in size; differing from that species in having head and most of body blackish brown, tube dark brown, with its two basal pores dorsal in position, and fourth antennal segment with only one sense-cone on inner surface, most unusual in that only the third subbasal wing-seta is large (in macropterous form).

♀ (macropterous).—Length about 1.7 mm. (fully distended, 2.2 mm.). Color light blackish brown, darker toward tip of abdomen, with metathorax much paler and yellowish; tube dark blackish brown but paler across base and apically; head darker than prothorax, abdominal terga II-VIII shaded along posterior margin; legs pale yellowish, femora somewhat shaded with brown; fore wings gray-brown, paler at base in front of anal lobe, and with a pale streak paralleling posterior margin in apical half; antennae with segment I and base and sides of II concolorous with head, remainder gray-brown with apical portion of II and pedicel of III yellow, the more apical segments darkest. Head 203, across eyes 144, just behind eyes 138, across cheeks 160, near base 158, across head-process 80; surface nearly smooth, with a few striae behind eyes and along sides, briefly reticulate across base; setae normal, postoculars 79, dull at tip, interval 148, distance from eyes 20; eyes 63, about 44 wide, about 56 apart; mouth-cone normal, 90. Antennal segments: I 39 (42), II 51 (34), III 63 (34), IV 60 (34), V 60 (32), VI 52 (30), VII 41 (23), VIII 40 (17), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 123, across coxae 280, pronotum with a few faint striae along posterior margin; antero-marginal setae vestigial, antero-angulars 33 and finely pointed, midlaterals 85, epimerals 93, postero-marginals 97 (all of these

dull at tip), coxals pointed, 27; mesothorax 290 across anterior angles; pelta of metanotum slightly elevated, outlined by reticulation, almost perfectly smooth medially; fore tarsi toothed on inner surface. Abdomen 357 at segment IV, nearly smooth, most setae dull or very slightly broadened at tip; tube 140, across base 73, at tip 37, terminal setae 85; setae on IX pointed, I 130, II 170.

BRAZIL: Nova Teutonia, S. C., November 1956, Fritz Plaumann, 1 ♀ (holotype), under fallen leaves.

Eurythrips peccans, sp. nov.

Agreeing only with the preceding species (*alarius*) in having both pairs of setae on anterior margin of pronotum reduced in size; differing from that species in having head and most of body yellow, tube nearly or quite yellow (but tipped with gray), with its two basal pores lateral in position, and fourth antennal segment with two sense-cones on inner surface.

♀ (brachypterous).—Length about 1.3 mm. (fully distended, 1.7 mm.). Color golden yellow (with red internal pigmentation), prothorax and front and sides of mesothorax darkened, abdomen brown in segment II and often darkened in some of following segments, tube yellow, tipped with gray; coxae brown, femora shaded except apically, tibiae and tarsi yellow; antennae yellow in segments I, II, and basal third of III, remainder blackish brown. Head 182, across eyes 130, behind eyes 120, across cheeks 142, near base 133, across head-process 80; surface rugose-reticulate in ocellar area, lightly reticulate across base, cheeks striate and rather strongly serrate, remainder smooth; postocular setae 48, slightly widened at tip, interval 84, distance from eyes 23; eyes 46, width 33, interval 64; mouth-cone normal, 57. Antennal segments: I 40 (39), II 46 (33), III 59 (33), IV 56 (33), V 51 (30), VI 50 (27), VII 42 (24), VIII 37 (14), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 118, across coxae 252, pronotum with a few striae along posterior margin, remainder smooth; antero-marginal and antero-angular setae vestigial, 3 or 4 long, midlaterals 52, epimerals and postero-marginals 67, coxals 28, these all slightly dilated at tip; mesothorax 238 across anterior angles; metanotum without well-differentiated pelta, nearly smooth; wing-pads minute, nearly circular, with one long seta; fore tarsi with a minute tooth on inner surface. Abdomen 281 at segment IV; median tergite of I lightly reticulate anteriorly; remainder of dorsal surface nearly smooth; tube 113, across base 68, at tip 33, terminal setae 74; most setae slightly broadened apically, those on IX pointed, I 116, II 131.

♂ (brachypterous).—Like ♀ in color; glandular area on sternum VIII confined to a narrow band along anterior margin.

BRAZIL: Nova Teutonia, S.C., May 1953—October 1955, Fritz Plaumann, 19 ♀♀ and 1 ♂ (including holotype and allotype taken in April 1954), from fallen leaves.

Eurythrips pusillus, sp. nov.

Distinctive because of small size (1.4 mm. long when well distended, head only 136 μ), presence of two sense-cones on inner surface of segment IV of antennae (in both long- and short-winged forms), and pointed post-ocular and prothoracic setae.

♀, *forma macroptera*.—Length about 1.1 mm. (distended, 1.4 mm.). Color yellowish brown throughout, tube not paler at base nor apically, darkest in fore coxae and along sides of thorax; femora somewhat paler than body and yellow at either end, tibiae paler, yellow at tip, tarsi yellow; fore wings brown throughout; antennae concolorous with head in segments I and II, III-VIII blackish brown, III paler than those beyond and with pedicel yellow. Head 136, across eyes 111, behind eyes 103, across cheeks 117, near base 109, across basal collar 114, across head-process 68; surface obscurely reticulate in ocellar area, cheeks widely cross-striate, remainder smooth; postocular setae 48, pointed, interval 80, distance from eyes 13; eyes 40, width 31, interval 48; mouth-cone normal, 69. Antennal segments: I 34 (33), II 43 (27), III 40 (29), IV 40 (27), V 45 (27), VI 43 (24), VII 36 (20), VIII 41 (14), sense-cones on III 1 (2), IV 2 (2), all setae pointed. Prothorax 94, across coxae 216, pronotum smooth, without striae along posterior margin; antero-marginal setae very fine and 18 long, anteroangulars 41, midlaterals 38, epimerals and postero-marginals 68, coxals 15, all pointed; mesothorax 224 across anterior angles; metanotum with slightly elevated triangular pelta whose sides end posteriorly at the two major setae, surface smooth; fore tarsi with minute tooth on inner surface. Abdomen 251 at segment III, median tergite of segment I smooth, remainder of dorsal surface almost smooth; tube 104, across base 63, at tip 31, terminal setae 76; all setae pointed, IX with I and II 119-123.

♀, *forma brachyptera*.—Paler than macropterous form, especially head and tube, these nearly yellow, the latter gray at tip; legs little or not shaded; antennae concolorous with head in segments I and II, remainder often nearly black, with III yellow in pedicel but often paler throughout.

BRAZIL: Nova Teutonia, S.C., May 1953 to October 1955, 8 ♀♀ (1, the holotype, macropterous, taken in February 1954, the others brachypterous); Erechim, Rio Grande do Sul, August 1956, 1 brachypterous ♀. All were taken from fallen leaves by Fritz Plaumann.

Eurythrips conformis, sp. nov.

Close to *costalimai*, agreeing with it in the thoroughly normal size and placement of the pronotal setae, the relatively smooth head, the presence of two sense-cones on outer surface of third antennal segment, the brown fourth and fifth antennal segments, and the smooth metanotum; but with head and body largely golden yellow, submedian setae on abdominal terga II and III dark and fully one-third the length of segment, more slender antennae, and longer tarsal tooth.

♀ (brachypterous).—Length about 1.3 mm. (fully distended, 1.7 mm.). Color golden yellow (with red internal pigmentation), prothorax slightly darkened, pterothorax much darker (especially along sides), abdomen shaded with brown along sides, along posterior margins of terga, and with a brown cloud behind antecostal lines on intermediate terga, IX dark brown along sides and posteriorly, tube dark brown but narrowly yellow across base and paler apically; legs yellow; antennae brownish yellow in segments I and II, remainder blackish brown except yellow pedicel of III. Head 170, across eyes 118, just behind eyes 111, across cheeks 133, near base 130, at basal collar 132, across head-process 75; surface obscurely reticulate in ocellar area, distinctly so across base, cheeks transversely striate, remainder nearly smooth; setae normal,

postoculars 52, expanded at tip, interval 86, distance from eyes 15; eyes 41, width about 29, interval 60; mouth-cone normal, 65. Antennal segments: I 40 (36), II 50 (30), III 57 (28), IV 50 (29), V 50 (27), VI 48 (23), VII 43 (20), VIII 43 (13), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 113, across coxae 245, pronotum with a few faint striae along posterior margin; antero-marginal setae minute, antero-angulars 48, midlaterals 43, epimerals 59, postero-marginals 62, coxals 40, all of these dilated at tip; mesothorax 228 across anterior angles; metanotal pelta broad, differentiated only by a few lines of reticulation laterad of the two major setae, metanotum otherwise smooth; fore tarsi with the usual moderately long recurved tooth on inner surface. Abdomen 330 at segment IV, nearly smooth, most setae dilated at tip; tube 120, across base 70, at tip 34, terminal setae 74; setae I and II on IX blunt or rapidly tapering at tip, 127-129.

BRAZIL: Nova Teutonia, S.C., July 1953 to October 1955, 8 ♀♀ (holotype taken in September, 1954); Erechim, Rio Grande do Sul, August 1956, 1 ♀. All specimens were collected by Fritz Plaumann from fallen leaves.

Eurythrips musivi, sp. nov.

Like the following species (*striolatus*), only, in having the head completely sculptured medially, from occipital line to median ocellus; differing from that species in that the head is polygonally reticulate (rather than striate with widely-spaced anastomosing lines) between the postocular and occipital setae, the cheeks evenly curved to eyes and toward base, the width just behind eyes only slightly (4μ) less than that in front of basal collar, the antennae more slender (segment IV nearly 2.5 times as long as wide), and seta I on abdominal segment IX dilated at tip.

♀ (macropterous).—Length about 1.6 mm. (fully distended 2.1 mm.). Color brown, darkest in head and tube, the former somewhat paler basally, the latter paler across base and in apical two-thirds; pterothorax nearly yellow dorsally; abdomen pale brownish yellow in segments I-IX, shaded along sides with gray (especially in II) and with a dark gray cloud margining the antecostal line in III-VII; legs yellow, with femora slightly darkened; fore wings brown, slightly darker marginally and in anal lobe, pale in front of latter at base, and with a more or less evident dark median streak; antennae brown, darkest in segments I and II, pedicel of III yellow. Head 203, across eyes 152, just behind eyes 136, across cheeks 156, near base 140, across basal collar 143, across head-process 85; surface polygonally reticulate throughout, save for a small patch on each side, adjoining postocular setae, these 85, dilated at tip, 112 apart, and 18 from eyes; eyes 70, width 46, interval 61; mouth-cone normal, 66. Antennal segments: I 42 (43), II 56 (34), III 70 (31), IV 67 (29), V 70 (27), VI 60 (24), VII 53 (21), VIII 50 (14); sense-cones on III and IV 1 (2), all setae pointed. Prothorax 114, across coxae 273, pronotum with a few faint striae along posterior margin, remainder smooth; antero-marginal setae 26, close together, slender, pointed, antero-angulars 88, midlaterals 90, epimerals 89, postero-marginals 98, coxals 36, these major setae all dilated at tip; mesothorax 269 across anterior angles; metanotum with somewhat elevated pelta which is polygonally reticulate throughout; fore tarsi with a small tooth on inner surface; fore wings 879. Abdomen 353 at segment IV; median

tergite of I reticulate throughout; remainder of dorsal surface nearly smooth; tube 143, across base 79, at tip 40, terminal setae 103; most setae broadened apically, I on IX 122, dilated at tip, II 137 and pointed.

BRAZIL: Nova Teutonia, S.C., May 1953 and April and May 1954, Fritz Plaumann, 4 ♀♀ (including holotype taken in May 1953), under fallen leaves.

Eurythrips striolatus, sp. nov.

For separation of this species, see description of *musivi*, above.

♀ (macropterous).—Length about 1.5 mm. (partially distended, 1.9 mm.) Color brown, usually darkest in head, first abdominal segment, and tube (the tube paler across base and in about apical half), metathorax pale and nearly yellow, intermediate abdominal segments dull brownish yellow but darkened laterally, especially in region of antecostal line, these lines on terga III-VII each with a dark blotch behind them medially; legs dull brownish yellow, darkest in coxae and femora; fore wings brown, slightly darker marginally and in anal lobe, pale in front of latter at base; antennae dull brownish gray, paler in apical part of II and base of III. Head 183, across eyes 133, just behind eyes 117, across cheeks 142, near base 132, across basal collar 135, across head-process 80; surface reticulate in and behind ocellar area, along cheeks, and broadly across base, striate and reticulate medially; postocular setae 73, dilated at tip, 108 apart, 26 from eyes; eyes 54, width 38, interval 57; mouth-cone normal, 73. Antennal segments: I 40 (40), II 53 (33), III 61 (33), IV 57 (32), V 65 (27), VI 56 (26), VII 44 (21), VIII 43 (14), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 110, across coxae 252, pronotum with a few faint striae along posterior margin, remainder smooth; antero-marginal setae 20, close together, slender, pointed, antero-angulars 75, midlaterals 69, epimerals 82, postero-marginals 91, coxals 48, these major setae all dilated at tip; mesothorax 259 across anterior angles; metanotum with somewhat elevated pelta which is polygonally reticulate throughout; fore tarsi with a small tooth on inner surface. Abdomen 361 at segment III; median tergite of I reticulate anteriorly; remainder of dorsal surface nearly smooth; tube 144, across base 70, at tip 38, terminal setae 86; most setae broadened apically, those on IX pointed, 150-152.

BRAZIL: Nova Teutonia, S.C., April 1954, Fritz Plaumann, 4 ♀♀ (including holotype), under fallen leaves.

Eurythrips xanthozonus, sp. nov.

Resembling *cinctus* in the normal size of pronotal setae, presence of one sense-cone on outer surface of third antennal segment and one on inner surface of fourth segment, and in the brown body with its pale yellowish second and third abdominal segments; but with head only 1.1 times as long as wide and segment VI of antennae nearly twice as long as wide.

♀ (macropterous).—Length about 1.6 mm. (partially distended, 2.0 mm.). Color brown or light blackish brown, head darker than prothorax, abdomen pale yellow in segment II, III yellow but darkened medially and posteriorly, IV-IX successively darker, tube blackish brown, paler in apical half; legs brownish yellow, fore coxae brown, fore femora shaded with brown in about basal half, other femora and all tibiae very lightly

shaded with brown, the tibiae basally; fore wings brown in anal lobe, light brownish yellow in about basal fourth, nearly clear beyond; antennae blackish brown throughout, with pedicel of III yellow. Head 185, across eyes 148, just behind eyes 145, across cheeks 167, near base 164, across head-process 90; surface almost perfectly smooth, with a few faint striae along cheeks; setae normal, postoculars 66, pointed, interval 130, distance from eyes 18; eyes 55, width 38, interval 72; mouth-cone normal, 90. Antennal segments: I 42 (44), II 57 (36), III 61 (37), IV 59 (37), V 62 (34), VI 60 (30), VII 56 (27), VIII 43 (18), sense-cones on III 1 (1), IV 1 (2), all setae pointed. Prothorax 134, across coxae 280, pronotum smooth, without striae along posterior margin; antero-marginal setae vestigial, antero-angulars 48, midlaterals 70, epimerals 100, postero-marginals 100, coxals 64, all of them finely pointed; mesothorax 284 across anterior angles; metanotum without differentiated pelta, smooth; fore tarsi toothed on inner surface. Abdomen 336 at segment IV, nearly smooth except for median tergite of I which is reticulated anteriorly and at sides; tube 143, across base 80, at tip 40, terminal setae 120; setae on IX finely pointed, I 199, II 207.

BRAZIL: Belém, Pará, August 2, 1951, J.D.H., 1 ♀ (holotype) from grass (some partially dead).

Eurythrips occipitalis, sp. nov.

Easily distinguished by the large, knobbed, occipital setae, which are almost equal to the postoculars; by the bright yellow color of antennal segments III-VI; and by the largely yellow pterothorax and fourth to seventh abdominal segments.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color brown or blackish brown, pterothorax and abdominal segments IV-VII yellow, III paler than II and VIII pale at base, tube pale at base and in about apical half; legs brown except for the yellowish tarsi, trochanters, knees, and mid and hind coxae; antennae brown in segment I and base of II, yellow beyond. Head 228, across eyes 146 (142), just behind eyes 126 (123), across cheeks 168 (164), near base 150, across basal collar 151, across head-process 86; surface rugose-reticulate in ocellar area, lightly reticulate across base, cheeks with short elevated angulate lines of sculpture, remainder smooth; postocular setae 70, dilated at tip, interval 100, distance from eyes 19; occipital setae 47, similar to postoculars, interval 80, distance behind postoculars about 29; eyes 53 (53), width 41 (39), interval 65 (65). Antennal segments: I 40 (41), II 57 (32), III 95 (31), IV 86 (29), V 86 (26), VI 69 (23), VII 57 (21), VIII 50 (13); sense-cones on III and IV 1 (2); all setae pointed. Prothorax 147, across coxae 330; pronotum with a few faint striae along posterior margin, remainder smooth; antero-marginal setae minute, antero-angulars 86, midlaterals 72, epimerals 72, postero-marginals 75, coxals 31, all of these nearly straight and dilated at tip; mesothorax 272 across anterior angles; metanotum with pelta reticulate throughout; fore tarsi with a minute tooth on inner surface. Abdomen 395 at segment III; median tergite of I somewhat narrowed anteriorly, lightly reticulate; remainder of dorsal surface nearly smooth; tube 139, across base 80, at tip 40, sides straight, terminal setae 107; most setae dilated apically, I on IX 130 and slightly dilated, II 143 and dull.

BRAZIL: Nova Teutonia, S.C., July 1955 (1 ♀) and August 1955 (1 ♀, holotype), Fritz Plaumann, under fallen leaves.

***Eurythrips cruralis*, sp. nov.**

Very different from the other species of the genus which have the normal complement of pronotal setae, two sense-cones on outer surface of antennal segment III, and yellow head, by the yellow femora and brown tibiae, yellow first antennal segment, yellow basal third of otherwise brown tube, and the smooth metanotum without differentiated pelta.

♀ (brachypterous).—Length about 1.7 mm. (fully distended, 2.1 mm.). Color golden yellow, prothorax shaded with brown, pterothorax darkened along sides and in front, abdomen somewhat shaded laterally, tube bright yellow in about basal third but shading to brown in remainder; femora about concolorous with body though slightly shaded, tibiae brown or blackish but narrowly yellow at base, tarsi yellow; antennae bright yellow in segment I, yellowish brown in II, remainder dark blackish brown excepting only the yellow pedicel of III. Head 214, across eyes 152, just behind eyes 133, across cheeks 161, near base 157, at basal collar 160, across head-process 90; surface somewhat reticulate in ocellar area, lightly reticulate across base, cheeks transversely striate, remainder smooth; setae normal, postoculars 56, dilated at tip, interval 91, distance from eyes 14; eyes 53, width 40, interval 72; mouth-cone normal, 119. Antennal segments: I 43 (42), II 56 (37), III 73 (34), IV 64 (32), V 67 (30), VI 60 (28), VII 50 (26), VIII 48 (16), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 168 (154), across coxae 336 (301), pronotum with a few faint striae along posterior margin; antero-marginal setae minute, antero-angulars 67, midlaterals 73, epimerals 92, postero-marginals 82, coxals 44, all of these dilated at tip; mesothorax 281 (260) across anterior angles; metanotum smooth, without differentiated pelta; fore tarsi with the usual recurved tooth on inner surface. Abdomen 447 (384) at segment III or IV, nearly smooth, most setae dilated; tube 140, across base 87, at tip 45; terminal setae 111; setae I and II on IX 153-156, both pointed.

BRAZIL: Nova Teutonia, S.C., August 1952 (holotype) and August 1955, Fritz Plaumann, 2 ♀ ♀ from fallen leaves.

***Eurythrips elongatus*, sp. nov.**

The long head (nearly 1.9 times the width across eyes) and the yellow third to fifth antennal segments distinguish this species from all others.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 2.1 mm.). Color yellow, head brownish and darker than prothorax, sides of pterothorax and junction of mesonotum and metanotum darkened, abdomen darker apically and becoming brown or nearly so in last two or three segments, tube brown but narrowly pale across base and again pale in more than apical one-half; legs yellow; wing-pads brown; antennae brown in segments I and II, the latter nearly yellow medially in apical half, III-V yellow, VI-VIII successively darker, VI yellow in pedicel, yellowish beyond. Head 241, across eyes 129, just behind eyes 109, across cheeks 150, near base 137, at basal collar 142, across head-process 88; surface reticulate in ocellar area and more lightly so across base, cheeks transversely striate, remainder smooth; setae normal, postoculars 60, slightly dilated at tip, interval 82, distance from eyes 26; eyes 46, width

about 31, interval about 67; mouth-cone normal, 105. Antennal segments: I 48 (47), II 57 (34), III 77 (33), IV 73 (31), V 71 (28), VI 62 (27), VII 46 (24), VIII 44 (16), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 140, across coxae 298, pronotum with a few faint striae along posterior margin; antero-marginal setae minute, antero-angulars 52, midlaterals 72, epimerals 70, postero-marginals 80, coxals 33, all of these slightly dilated at tip; mesothorax 252 across anterior angles; metanotal pelta only partially differentiated by a few reticles laterad and caudad of the two major setae, metanotum otherwise smooth; fore tarsi with a very small tooth on inner surface. Abdomen 333 at segment IV, nearly smooth excepting for the polygonally reticulate median tergite of segment I, most setae dilated; tube 133, across base 81, at tip 42, terminal setae 94; seta I on IX 158, II 148, both finely pointed.

♂ (brachypterous).—Like ♀ in color and structure; sternum VIII without glandular area, but with about 22 setae across middle.

BRAZIL: Nova Teutonia, S.C., July 1953 (1 ♀, holotype) and February 1954 (1 ♀ and 1 ♂, the latter the allotype), Fritz Plaumann, under fallen leaves.

Eurythrips nigriceps, sp. nov.

Resembling *citricollis* in having a dark brown head which contrasts strongly with a yellow prothorax, but differing from that species in that the major setae of the head and body are slightly dilated apically, cheeks rather heavily sculptured and distinctly roughened as seen under low magnification, metanotum smooth medially but with a few striae external to the two major setae, and the median tergite of segment I of abdomen broad, with its anterior portion broader than long.

♀ (brachypterous).—Length about 1.2 mm. (fully distended, 1.6 mm.). Color dull yellow, with dark brown head (yellowish in ocellar area and across base) and brown tube (yellowish across base and in about apical one-half), lightly shaded along sides of pterothorax and across metathorax, as well as in about posterior third of abdominal terga II-VIII, tergum IX largely brown; legs yellow; antennae yellowish brown in first two segments, uniform blackish brown beyond excepting yellow extreme base of III. Head 178, across eyes 116, just behind eyes 108, across cheeks 136, near base 118, at basal collar 120, across head-process 73; surface roughly reticulate in ocellar area, lightly reticulate across base, smooth medially, the cheeks coarsely transverse sculptured; setae normal, postoculars 52, dilated at tip, interval 93, distance from eyes 14; eyes 34, width 33, interval 50; mouth-cone normal, 64. Antennal segments: I 36 (37), II 47 (31), III 47 (32), IV 46 (29), V 47 (26), VI 46 (25), VII 38 (22), VIII 37 (15), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 112, across coxae 238, pronotum with a few striae along posterior margin; antero-marginal setae minute, antero-angulars 50, midlaterals 55, epimerals 63, postero-marginals 66, coxals 33, all of these dilated at tip; mesothorax 213 across anterior angles; metanotum without differentiated pelta, nearly smooth; fore tarsi with the usual recurved tooth on inner surface. Abdomen 253 at segment III, nearly smooth, most setae dilated; tube 110, across base 69, at tip 33, terminal setae 75; seta I on IX 118, II 127, both pointed.

BRAZIL: Nova Teutonia, S.C., August 1955, Fritz Plaumann, 1 ♀ (holotype) from fallen leaves.

Eurythrips hemimeres, sp. nov.

Readily known from the other species of the genus which have the normal complement of pronotal setae, two sense-cones on outer surface of antennal segment III, yellow head, prothorax, and legs, lightly polygonally reticulate pelta of metanotum, dark brown tube, and brown basal antennal segments, by the dark brown second abdominal segment (which is much darker than metathorax or abdominal segment III), tooth at anterior end of cheeks not fully attaining eyes, tergum II of abdomen not reticulate medially at base, and glandular area of ♂ occupying most of sternum VIII.

♀, *forma macroptera*.—Length about 1.5 mm. (fully distended, 1.9 mm.). Color golden yellow, with second abdominal segment dark brown, tube dark brown but narrowly paler across base and in apical half or more; shaded lightly with brown in fore coxae, in basal half of fore femora, along sides of mesothorax, at sides of metanotal sclerite, and at sides of abdominal segments, especially III, VIII, and IX; terga III-VI of abdomen with a narrow median dark dash just behind antecostal line; antennae with segments I-III yellowish brown, paler than the blackish brown IV-VIII, pedicel of III yellow, its tip shaded; fore wings brown, with a median dark streak and dark edges, pale at extreme base except for the dark anal lobe. Head 214 long, 138 across eyes, 117 just behind eyes, 145 across cheeks, 132 near base, 135 across collar, 80 across head-process; surface roughly reticulate in ocellar area and along cheeks, lightly reticulate across base, remainder smooth; setae normal, postoculars 46, slightly dilated, interval 84, distance from eyes 18; eyes 54, width 39, interval 60; mouth-cone normal, 64. Antennal segments: I 43 (40), II 54 (33), III 69 (29), IV 60 (29), V 61 (27), VI 55 (25), VII 45 (22), VIII 45 (14), sense-cones on III and IV 1 (2), all setae pointed. Prothorax 137, 266 across coxae, pronotum with a few striae along posterior margin; antero-marginal setae minute, antero-angulars 46, midlaterals 42, epimerals 59, postero-marginals 57, coxals 36, all of these dilated at tip; mesothorax 263 across anterior angles; metanotal pelta rounded at sides and posteriorly, polygonally reticulate; fore wings normal, 693; fore tarsi with the usual recurved tooth on inner surface. Abdomen 318 at segment IV, nearly smooth, most setae dilated; tube 133, across base 77, at tip 35, terminal setae 98; setae I and II on IX 100-106, both slightly dilated apically.

♀, *forma brachyptera*.—Color and structure essentially as in long-winged form.

♂ (brachypterous).—Color as in ♀; prothorax and fore legs heavier; glandular area occupying most of sternum VIII.

BRAZIL: Nova Teutonia, S. C., August 1952 to October 1955, Fritz Plaumann, 117 ♀♀ and 38 ♂♂; holotype (macropterous ♀), morphotype (brachypterous ♀), and allotype (♂) taken in April 1954; all from fallen leaves.

Chthonothrips, gen. nov.

(*chthon*, earth; *thrips*—in allusion to the habitat)

Allied to *Eurythrips* Hinds, but differing in the more massive and more heavily sclerotized body and appendages, the presence of pores on the antecostal lines and of a pair of large pores on most terga near middle, and the presence of a strong tooth near middle of fore tarsi in both

sexes. Head incised behind the small and coarsely-faceted eyes, surface almost perfectly smooth; mouth-cone large and heavy, not narrowed at base, semicircularly rounded at tip. Antennae heavily sclerotized, 8-segmented, last segment narrowed at base, all setae pointed, sense-cones not long, one on either side of segments III-VI. Pronotum smooth, not fused with epimera, anteromarginal setae minute, others moderate and dilated at tip; meso- and metanota smooth; legs short and stout, fore tarsi strongly toothed near base. Abdomen not broader than thorax; tube nearly equal in length to head, almost smooth, slightly narrowed at tip, sides thickened.

Type species: *Chthonothrips nigrocinctus*, sp. nov.

Chthonothrips nigrocinctus, sp. nov.

♀ (apterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color of body and appendages golden yellow, with abdominal segment II brown and mesothorax shaded with brown; tube brownish orange, pale at base and apex. Head 301 μ long, 178 across eyes, just behind eyes 161, across cheeks 195, near base 181, across basal collar 183, across head-process 118, this last 16-17 long at sides; surface with a few very indistinct reticles at sides of base, otherwise smooth; postocular setae slightly dilated apically, 77 long, 147 apart, 33 from eyes, other cephalic setae minute; eyes with about 5 lateral facets; mouth-cone 113. Antennal segments: I 62 (57), II 73 (45), III 81 (46), IV 61 (44), V 66 (41), VI 63 (38), VII 62 (31), VIII 63 (22); sense-cones on III-VI 1 (1). Prothorax about 200 long, 399 across coxae, smooth; antero-angular setae 33, midlaterals 54, epimerals 71, postero-marginals 69, coxals 51, all slightly dilated at tip; mesothorax 336 across anterior angles; metanotum slightly roughened in anterior angles. Abdomen 391 at segments IV-V; median tergite of segment I subtriangular, smooth; II faintly reticulate on either side of median line, other terga nearly smooth; tube 266, across basal collar 114, at apex 42, sides straight except for a slight apical narrowing; terminal setae 196; seta I on IX 280, II 252, both pointed.

Chortothrips, gen. nov.

(*chortos*, grass; *thrips*—in allusion to the habitat)

Allied to *Furythrips* Hinds, but differing in the more massive and more heavily sclerotized body and appendages, the presence of pores on the antecostal lines and of a pair of large pores on most terga near middle,

♂ (apterous).—Very similar to female in all respects; fore legs often swollen and with tarsal tooth stronger; glandular area on sternum VIII occupying about middle half, its ends emarginate.

BRAZIL: Nova Teutonia, S.C., Fritz Plaumann, November, 1954, and July, August, September, and October, 1955, 14 ♀♀ (holotype taken in September) and 9 ♂♂ (allotype taken in August), from fallen leaves. a tooth near base of fore tarsi in both sexes, the union of the last two antennal segments into a single unit, the short heavily thickened tube, and the presence of well-developed antero-marginal pronotal setae. Head long, incised behind the small and coarsely-faceted eyes, surface partially and lightly striate; mouth-cone large and heavy, not narrowed at base, rounded at tip. Antennae heavily sclerotized, 8-segmented but with the last two segments compactly united, all setae pointed, sense-cones not long.

Pronotum smooth, not fused with epimera, antero-marginal setae as large as anteroangulars, all dilated at tip; legs short and stout. Tube shorter than head, lightly reticulate, strongly narrowed to tip, sides much thickened.

Type species: *Eurythrips valens* Hood.

Plemmelothrips, gen. nov.

(*plemmeles*, discordant, dissonant; *thrips*—in allusion to the lack of large antero-angular pronotal setae)

Allied to *Terthrothrips*, but with the antennae stouter, pronotum not thickened along anterior margin and its anterior angles not prominent or produced, its antero-angular setae reduced, head short, broad, and somewhat flattened, with eyes less protruding and farther apart, and ocelli larger, tergite I of first abdominal segment triangular. Body moderately stout, not reticulated. Head notched behind eyes, moderately flattened, with long postocular setae; eyes protruding, more than one-half as long as cheeks, much narrower than their interval; ocelli large, the posterior pair behind middle of eyes, ocellar area not elevated; mouth-cone normal to group; antennae 8-segmented, moderately stout, last segment pedicellate; sense-cones normal, segment III 1 (2), IV 2 (2); all setae pointed. Prothorax with convex lateral margins, notum fused with epimeron; antero-marginal setae vestigial, antero-angulars reduced, others long and truncate at tip; pelta of metathorax weakly differentiated; fore wings nearly straight, without accessory setae, subbasal setae long; legs with numerous small setae, fore tarsi armed. Abdomen moderately heavy, nearly free of sculpture, setae long; median tergite of segment I broadly triangular; tube long, heavy, not sculptured, not thickened.

Type species: *Plemmelothrips defectus*, sp. nov.

Plemmelothrips defectus, sp. nov.

♀, *forma macroptera*.—Length about 1.7 mm. (nearly fully distended, 2.1 mm.). Color nearly uniform chestnut brown, with pale brown fore wings and pale dull-yellow legs, femora lightly shaded with brown; antennae with segments I and II about concolorous with head and darker than the following ones, III and IV pale to first whorl of setae, their apical portions and V-VIII dark brownish gray. Head 213, across eyes 169, just behind eyes 154, across cheeks 169, near base 151, across basal collar 158, across head-process 93, its surface with close anastomosing cross-lines at base medially, cheeks with raised lines of sculpture and thus serrate; postocular setae 67, somewhat curved, slightly dilated at tip, interval 116, distance from eyes 16; eyes 74, width 47, interval 77; mouth-cone 90. Antennal segments: I 47 (45), II 58 (32), III 83 (32), IV 86 (32), V 85 (27), VI 72 (24), VII 57 (22), VIII 68 (16). Prothorax 163, across coxae 293, pronotum smooth except for a few faint striae posteriorly; antero-marginal and antero-angular setae 16-35, slender and pointed, the others much stronger and diagonally truncate at tip, midlaterals 67-84, epimerals 89-94, postero-marginals 100, coxals about 39; mesothorax 295 across anterior angles; metanotal pelta not sharply delimited, lightly reticulate laterally and posteriorly; fore tarsi with a small recurved tooth on inner surface; fore wings 868. Abdomen 385 at segment III, median tergite of I smooth, most of following terga faintly subreticulate at sides and faintly cross-striate immediately behind antecostal line; tube 199, across base 85, at tip 43, sides straight, surface

smooth, terminal setae 110; other setae long, mostly somewhat dilated at tip, I on IX 203 and blunt, II 224 and pointed.

♀ *forma brachyptera*.—Like long-winged form in color and structure, but with smaller eyes (54 long, 32 wide, 86 apart).

♂ (brachypterous).—Like ♀ in color and structure; glandular area on sternum VIII of abdomen occupying about middle one-half of the length of segment and most of its width, emarginate laterally.

BRAZIL: Nova Teutonia, S.C., May 1953 to October 1955, Fritz Plaumann, 4 macropterous ♀♀ (including holotype taken in February 1954), 15 brachypterous ♀♀ (including morphotype taken in October 1955), and 1 ♂ (allotype, taken with morphotype), under fallen leaves.

Terthrotrips bucculentus, sp. nov.

Readily known by the yellow second abdominal segment, the stout and almost wholly brown antennae, and the very convex cheeks.

♀ *forma macroptera*.—Length about 1.3 mm. (fully distended, 1.74 mm.). Color brown (not blackish brown), darkest in pterothorax and along sides and front of head, the second abdominal segment pale yellow; abdomen darkened in about fourth and fifth segments (especially laterally) and becoming more yellowish in seventh and eighth, segments III-VIII with a small median gray spot on antecostal line, the tube brown but paler basally and in about apical half; legs yellow, little shaded with brown; fore wings brown, with a darker median streak; antennae blackish brown in most of segments I and II, brown beyond but paler and more grayish in about last three segments, III yellowish to near first whorl of setae, IV and V paler just beyond an indistinct dark basal ring. Head 195, across eyes 140, just behind eyes 117, across cheeks 143, near base 120, across basal collar 126, across head-process 73, the cheeks, roundly convex and curving nearly evenly to eyes and toward base; surface reticulate across base, with elevated cross-lines along cheeks (the latter thus distinctly serrate), reticulate in ocellar area, and with short cross-lines in median area from ocelli to basal reticulation, finely reticulostriate ventrally and without pustules; postocular setae 58, straight, roundly dilated at tip, interval 88, distance from eyes 17; eyes about 61, 42 wide 57 apart. Antennal segments: I 42 (36), II 53 (29), III 74 (27), IV 65 (25), V 59 (24), VI 51 (23), VII 43 (20), VIII 46 (13); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 99, across coxae 225; pronotum smooth except for a few faint striae along posterior margin; anterior margin and fore angles thickened; antero-marginal setae vestigial, antero-angulars 50, midlaterals 60, epimerals 67, postero-marginals 71, coxals 45, all of these last with tips dilated and divided; mesothorax 227 across anterior angles; pelta of metathorax well differentiated, reticulate, prolonged posteriorly by a line of reticles; fore tibiae serrate along inner surface, fore tarsi with the usual recurved tooth; fore wings 651. Abdomen 294 at segment IV; median tergite of I capstan-shaped, reticulate; most of following terga with faintly mucronate cross striae at sides; tube 118, across base 66, at tip 33, sides straight, surface smooth, terminal setae 67; other setae long, mostly dilated at tip, I and II on IX 100-104, both of these knobbed.

♀, *forma microptera*.—Like long-winged form in all respects.

♀, *forma brachyptera*.—Like long-winged form in all respects, eyes not smaller.

♂ (brachypterous).—Like female in color and structure; fore legs enlarged in heterogonic major forms; glandular area on sternum VIII occupying most of surface.

BRAZIL: Nova Teutonia, S.C., May 1953 to October 1955, Fritz Plaumann, 114 ♀♀ (including holotype, morphotype of micropterous form, and morphotype of brachypterous form taken in April 1954) and 24 ♂♂ (including allotype taken with holotype and morphotypes), under fallen leaves.

Terthrothrips peltatus, sp. nov.

Readily known by the uniform dark blackish brown head, thorax, and abdomen, yellow legs, and the reticulate metanotal pelta, which lacks a posterior prolongation.

♀, *forma macroptera*.—Length about 1.9 mm. (fully distended, 2.5 mm.). Color uniform dark blackish brown, with yellow legs; fore wings light brown, paler at base in front of anal lobe, darker marginally and with a still darker post-median streak at middle; antennae with segments I and II concolorous with head, III golden yellow, IV-VI with a dark basal ring and paler just beyond, remainder of antennae brown, more yellowish in IV, especially at its apex. Head 270, across eyes 168, just behind eyes 137, across cheeks 168, near base 149, across basal collar 156, across head-process 95, cheeks evenly convex except for a more or less evident tooth behind eyes; surface with a few large reticles medially in front of occipital line, with elevated interrupted cross-lines or rugae along cheeks (the latter thus distinctly serrate), pustulate along sides ventrally, ocellar area with a few indistinct rugae; postocular setae 83, straight, dilated apically, interval 99, distance from eyes 25; eyes about 78, width 46, interval 76. Antennal segments: I 55 (47), II 69 (34), III 113 (31), IV 114 (30), V 114 (29), VI 83 (27), VII 69 (21), VIII 69 (14); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 160, across coxae 301; pronotum smooth except for a few striae along posterior margin and a few slight wrinkles near anterior angles; fore margin thickened; antero-marginal setae vestigial, antero-angulars 79, midlaterals 100, epimerals 101, postero-marginals 120, coxals 72, all of these last with tips dilated; mesothorax 307 across anterior angles; pelta of metathorax well differentiated, reticulate, not prolonged posteriorly; fore tibiae serrate along inner surface, fore tarsi with strong recurved tooth; fore wings 864. Abdomen 416 at segment IV; median tergite of I capstan-shaped, with a few indistinct reticles; most of following terga with faintly mucronate cross-striae at sides; tube 154, across base 87, at tip 45, sides slightly concave near base, otherwise straight, surface smooth, terminal setae 106; other setae long, mostly dilated at tip, I on IX 136, II 153, both dilated apically.

♀, *forma microptera*.—Not significantly different from long-winged form.

♀, *forma brachyptera*.—Not significantly different from long-winged form.

♂ (brachypterous).—Like ♀ in color and structure; pronotum and fore legs enlarged in heterogonic major forms; glandular area on sternum VIII occupying most of surface.

BRAZIL: Nova Teutonia, S. C., February 1953 to September 1955, Fritz Plaumann, 80 ♀♀ (including holotype, morphotype of micropterous

form, and morphotype of brachypterous form taken in October 1954) and 16 ♂♂ (including allotype taken with holotype and morphotypes), under fallen leaves.

***Terthrotrips viduus*, sp. nov.**

Like *carens* and *bicinctus*, only, in having small antero-angular pronotal setae; but unlike former in having tube largely yellow (instead of blackish brown) and metathoracic pelta not sculptured between the two major setae; unlike latter species in lacking the two bright yellow bands across body.

♀ (macropterous).—Length about 1.3 mm. (fully distended, 1.7 mm.). Color brown, head darkest and blackish brown; abdominal segments II, III, basal half of IV, and all of VI-VIII darkened; tube yellow or yellowish, tipped with gray, sometimes lightly shaded; metathorax yellowish posteriorly; legs yellow, femora shaded with brown; fore wings light brown, paler basally, darkened marginally, medially, and in anal lobe; antennae gray-brown, segments I and II darkest (II black in pedicel), III pale yellowish in pedicel, IV-VI pale just beyond an ill-defined narrow basal dark ring. Head 172, across eyes 132, just behind eyes 116, across cheeks 133, near base 128, across basal collar 130, across head-process 72; dorsal surface lightly reticulate across base and along sides, nearly smooth in ocellar area and medially, cheeks not conspicuously serrate; postocular setae 65, straight, dilated at tip, interval 98, distance from eyes 12; eyes 62, protruding, width 41, interval 53. Antennal segments: I 35 (37), II 50 (28), III 63 (26), IV 72 (28), V 76 (24), VI 60 (21), VII 43 (18), VIII 47 (12); sense-cones on III 1 (2), IV 2 (2); all setae pointed. Prothorax 102, across coxae 235; pronotum smooth, without the usual faint striae along posterior margin; fore margin and anterior angles slightly strengthened, the latter not prominent; antero-marginal and antero-angular setae vestigial (about 7), midlaterals 80, epimerals 89, postero-marginals 101, coxals 54, all of these last nearly straight and with dilated tips; mesothorax 238 across anterior angles; metathoracic pelta well differentiated, not prolonged, reticulate at sides and posteriorly, smooth between the two major setae; legs normal, fore tibiae serrate along inner surface, fore tarsi with usual long recurved tooth; fore wings 633. Abdomen 281 at segment III; median tergite of I capstan-shaped, with a few obsolete reticles; most of following terga nearly smooth, but with a few short mucronate cross-lines at sides; tube 116, across base 58, at tip 33, sides slightly rounded or angulate at basal pores, straight beyond, surface in basal two-thirds with scale-like pattern of fine lines, terminal setae 72; other setae long, mostly knobbed, I on IX 112 and knobbed, II 142 and dull.

♂ (macropterous).—Like female in color and general structure; abdominal segment VIII somewhat paler than those adjoining, its glandular area occupying most of sternum.

BRAZIL: Nova Teutonia, S.C., April, August, and September, 1954, Fritz Plaumann, 9 ♀♀ (including holotype taken in September) and 1 ♂ (allotype, taken in August), under fallen leaves.

***Terthrotrips carens*, sp. nov.**

For separation from other species, see description of *viduus*, above.

♀ (macropterous).—Length about 1.3 mm. (fully distended, 1.8 mm.). Color chestnut brown, darker in pterothorax, yellowish in head except

along sides; legs yellow; fore wings light brown, paler basally, darker marginally, medially, and in anal lobe; antennae largely blackish brown in segments I and II, dark gray beyond, III-VI pale to first whorl of setae except for an indistinct narrow dark ring at base of IV-VI. Head 193, across eyes 144; just behind eyes 125, across cheeks 143, near base 129, across basal collar 131, across head-process 75; dorsal surface lightly reticulate across base and along sides, smooth in ocellar area and medially, cheeks not conspicuously serrate; postocular setae 69, straight, dilated at tip, interval 102, distance from eyes 16; eyes 67, rather strongly protruding, width 42, interval 61. Antennal segments: I 39 (37), II 53 (29), III 76 (25), IV 74 (26), V 77 (23), VI 63 (21), VII 43 (19), VIII 53 (13); sense-cones on III 1 (2), IV 2 (2); all setae pointed. Prothorax 122, across coxae 248; pronotum smooth, with a few faint striae along posterior margin; fore margin not strengthened, anterior angles with a slight notch marking off a small lobe at a lower level, this lobe bearing the antero-angular setae; antero-marginal setae vestigial (about 20), antero-angulars 20-32, both slender and pointed; midlaterals 79, epimerals 82, postero-marginals 89, coxals 46, all nearly straight and with dilated tips; mesothorax 218 across anterior angles; metathoracic pelta well differentiated, with a short overhanging loop at sides, not prolonged posteriorly, lightly reticulate between the major setae, clearly reticulate posteriorly; legs normal, fore tibiae strongly serrate along inner surface, fore tarsi with the usual recurved tooth; fore wings 633. Abdomen 290 at segment III; median tergite of I capstan-shaped, distinctly reticulate; most of the following terga nearly smooth, but with a few mucronate lines at sides; tube 123, across base 64, at tip 33, sides straight, surface smooth, terminal setae 58; other setae long, mostly knobbed, I on IZ 123 and knobbed, II 127 and pointed.

♂ (macropterous).—Like female in color and general structure; prothorax and fore legs often enlarged; abdominal segment VIII generally somewhat paler than those adjoining, its glandular area occupying most of sternum.

BRAZIL: Nova Teutonia, S. C., February and April 1954, 2 ♀♀ (including holotype taken in April) and 4 ♂♂ (including allotype taken with holotype); Erechim, Rio Grande do Sul, August 1956, 1 ♀ and 2 ♂♂. All specimens were taken by Mr. Fritz Plaumann, under fallen leaves.

Terthrothrips brunneus, sp. nov.

Closely related to *fuscatus*, but larger, with elevated portion of metanotal pelta semicircular, anterior angles of pronotum scarcely produced, and antennal segments IV and V without a pale subbasal ring.

♀ (macropterous).—Length about 1.9 mm. (fully distended, 2.3 mm.). Color nearly uniform chestnut brown, tube paler across base and in apical half or more; legs yellowish brown, with ends of femora and of middle and hind tibiae paler, tarsi yellow, fore tibiae yellowish only at base; fore wings light brown, slightly darkened marginally beyond middle and with a median dark streak in apical two-thirds, nearly colorless for a short distance near posterior margin beyond anal lobe, this last not darkened; antennae blackish brown in segments I and II, yellowish brown beyond, was basal seventh of III yellow and somewhat darkly shaded from thence to first whorl of setae, pedicels of IV and V pale. Head 263, across eyes 156, just behind eyes 126, across cheeks 159, near base 148, across

basal collar 155, across head-process 93, cheeks roundly convex, without tooth behind eyes, strongly serrate; surface cross-striate just in front of occipital line, with elevated interrupted cross-lines or rugae along cheeks, with a few pustules along sides ventrally, ocellar area and median line of dorsum with a few rugae; postocular setae 70, nearly straight, dilated apically, interval 94, distance from eyes 13; eyes about 74. Antennal segments: I 51 (47), II 63 (31), III 101 (29), IV 96 (27), V 91 (25), VI 76 (23), VII 57 (20), VIII 57 (13); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 171, across coxae 315; pronotum smooth except for a few striae along posterior margin; fore margin and anterior angles thickened; antero-marginal setae vestigial, anteroangulars 75, midlaterals 76, epimerals 85, postero-marginals 77, coxals 60, all of the major setae with tips dilated; mesothorax 287 across anterior angles; pelta of metathorax well differentiated, reticulate, prolonged posteriorly nearly to margin of sclerite, its elevated portion semi-circular and with sides overhanging; fore tibiae strongly serrate along inner surface, fore tarsi with a strong recurved tooth; fore wings 731. Abdomen 413 at segment III; median tergite of I narrowed anteriorly, scarcely capstan-shaped, surface largely lightly reticulate; most of following terga with faintly mucronate cross-striae at sides; tube 160, across base 80, at tip 39, sides slightly concave near base, otherwise straight, surface smooth, terminal setae 94; other setae long, mostly dilated at tip, I and II on IX 145, dilated apically.

BRAZIL: Nova Teutonia, S.C., April 1954, Fritz Plaumann, 5 ♀ ♀ (including holotype), under fallen leaves.

Terthrothrips bullifer, sp. nov.

A large species, with long head, nearly straight cheeks, and bent fore femora, unique in having a nearly spherical, bubble-like pustule near base of inner surface of fore femora.

♀ (macropterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color yellowish brown, somewhat darker in head and along sides of pterothorax, abdomen clouded with brown along sides of most terga, along antecostal line, and posteriorly; tube blackish brown at middle, pale across base and in about apical third; legs dull yellow; fore wings light brown, darker marginally and medially; antennae blackish brown in most of segments I and II, III-VIII brown, with about basal tenth of III yellow and yellowish also in pedicels of IV and V. Head 311, across eyes 185, just behind eyes 146, across cheeks 174, near base 160, across basal collar 167, across head-process 103, cheeks nearly parallel (only slightly convex), nearly semicircularly in-cut to eyes from a sharp tooth, strongly serrate; surface smooth from median ocellus to a few faint striae in front of occipital line, with short elevated rugae and prominent though small tubercles along cheeks, this sculpture continued for a short distance onto ventral surface; postocular setae 81, straight, dilated at tip, interval 99, distance from eyes 25; eyes 90, protruding and very prominent, width 54, interval 81. Antennal segments: I 56 (50), II 70 (34), III 123 (33), IV 119 (30), V 114 (26), VI 83 (23), VII 72 (22), VIII 66 (13); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax long (223), across coxae 370; pronotum almost perfectly smooth; fore margin and anterior angles thickened; antero-marginal setae vestigial, anteroangulars 75, midlaterals 95, epimerals 110, postero-marginals 107, coxals

70, all of these last straight and with dilated tips; mesothorax 336 across anterior angles; pelta of metathorax well differentiated, reticulate, not prolonged posteriorly, its elevated portion with sides curved and overhanging; fore femora strongly bent at base, with a prominent rounded tubercle on inner surface close to trochanter, just basal to the bend; fore tibiae curved, serrate along inner surface; fore tarsi with a strong recurved tooth; fore wings 1010. Abdomen 427 at segment IV; median tergite of I narrowed anteriorly but not capstan-shaped, surface lightly reticulate around edges; most of following terga with a few faint striae at sides; tube 182, across base 84, at tip 44, sides slightly concave near base, otherwise straight, surface smooth, terminal setae 112; other setae long, mostly dilated at tip, I on IX 150 and dilated at tip, II 157 and nearly pointed.

♂ *forma macroptera*.—Like female in color and general structure; glandular area on sternum VIII of abdomen occupying most of segment.

♂, *forma brachyptera*.—Like long-winged male, except in the somewhat smaller eyes and the short-wing-pads which extend about half way to abdomen.

BRAZIL: Nova Teutonia, S. C., November 1952 (1 ♂, brachypterous, morphotype), February 1953 (1 ♀), May 1953 (1 ♀ and 1 ♂, both macropterous; holotype and allotype, respectively), and November 1954 (1 ♂), all taken by Mr. Fritz Plaumann, under fallen leaves.

Terthrotrips irretitus, sp. nov.

Recognizable at once by the yellow antennae, completely reticulated head, and large size.

♀ (macropterous).—Length about 1.8 mm. (fully distended, 2.4 mm.). Color pale yellowish brown, with abdominal segment II yellow; pterothorax darkest, front and sides of head shaded, abdominal segments III-V or VI darkened, tube blackish brown but pale across base and in about apical third; legs yellow, with femora shaded with brown except at ends; fore wings nearly uniform brown, slightly darker marginally and basally; antennae dark brown in most of segments I and II, lemon yellow in remaining segments or very lightly shaded with gray. Head 258, across eyes 162, just behind eyes 126, across cheeks 165, near base 151, across basal collar 157, across head-process 90, cheeks evenly convex, strongly serrate; surface polygonally reticulate throughout, the sculpture elevated along cheeks to form rugae and tubercles which are not continued onto ventral surface; postocular setae 77, straight, dilated at tip, interval 104, distance from eyes 26; eyes 73, protruding and very prominent, width 48, interval 67. Antennal segments: I 50 (45), II 63 (37), III 97 (33), IV 103 (33), V 103 (27), VI 86 (25), VII 66 (20), VIII 63 (13); sensecones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 133, across coxae 308; pronotum smooth except for the usual faint striae along posterior margin; fore margin not strengthened at middle, but with anterior angles thickened and forming a broad tooth; antero-marginal setae vestigial, antero-angulars 74, midlaterals 84, epimerals 72, postero-marginals 102, coxals 32, all of these last straight and with dilated tips; mesothorax 297 across anterior angles; pelta of metathorax well differentiated, nearly rectangular, narrowly prolonged posteriorly, reticulate; legs normal, fore tarsi with a small tooth on inner surface, fore tibiae

weakly serrate along inner surface; fore wings 843. Abdomen 377 at segment IV; median tergite of I capstan-shaped, lightly reticulate over most of surface; most of following terga with a few faint mucronate striae and reticles at sides; sternum VIII without the usual pair of small setae on posterior margin between the stout submedian pair; tube 178, across base 85, at tip 46, sides straight, surface smooth, terminal setae 97; other setae long, nearly all of them dilated at tip, I and II on IX both dilated, 161-170.

♂ (brachypterous).—Like female in color and general structure; fore legs enlarged, tarsal tooth long and strong; anterior angles of pronotum with a large and prominent tooth-like prolongation; wing-pads extending onto segment III of abdomen; glandular area on sternum VIII occupying most of the segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to November 1954, Fritz Plaumann, 5 ♀♀ (including holotype taken in May 1953) and 1 ♂ (allotype, April 1954), under fallen leaves.

Terthrothrips luteolus, sp. nov.

The yellow antennae, yellow body with second abdominal segment abruptly blackish brown, rounded cheeks, and short coxal seta, should separate this species readily.

♀ (macropterous).—Length about 2 mm. (fully distended, 2.6 mm.). Color yellow, with abdominal segment II blackish brown, IX heavily shaded at sides; tube pale at base and in apical two-thirds, dark brown between; head darker than prothorax, heavily brown in ocellar area; fore coxae and all femora shaded with brown; fore wings light brown, somewhat darkened beyond base, marginally, and medially; antennae yellow, paler in apical segments, slightly darkened in I and II. Head 283, across eyes 172, just behind eyes 136, across cheeks 178, near base 149, across basal collar 157, across head-process 99; cheeks strongly and evenly convex, serrate; surface reticulate with dark lines in ocellar area, smooth at middle, lightly reticulate across base, sculpture of cheeks elevated to form rugae which are not continued onto ventral surface; postocular setae 86, straight, dilated at tip, interval 108, distance from eyes 30; eyes 84, protruding and prominent, width 50, interval 71. Antennal segments: I 52 (50), II 63 (39), III 110 (33), IV 113 (30), V 110 (28), VI 83 (25), VII 68 (23), VIII 69 (15); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 150, across coxae 343; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, antero-angulals 70, midlaterals 91, epimerals 84, postero-marginals 106, all of these last straight and with dilated tips, coxals very small (20) and dully pointed; mesothorax 342 across anterior angles; pelta of metathorax well developed, not overhanging laterally or posteriorly, pointed but not prolonged, reticulate throughout; legs normal, fore tibiae serrate along inner surface, fore tarsal tooth minute; fore wings 973. Abdomen 444 at segment III; median tergite of I narrowed in anterior portion but not capstan-shaped, its surface almost perfectly smooth; most of following terga with a few faint mucronate striae and reticles at sides; tube 197, across base 94, at tip 44, sides straight, surface smooth, basal pores dorsal, terminal setae 126; other setae long, mostly knobbed, I and II on IX scarcely pointed, 167 and 182, respectively.

BRAZIL: Nova Teutonia, S. C., 1954, Fritz Plaumann, 1 ♀ (holotype), under fallen leaves.

Terthrothrips balteatus, sp. nov.

The only species of the genus with blackish brown body, yellow second abdominal segment, and yellow antennae.

♀, *forma macroptera*.—Length about 1.4 mm. (fully distended, 1.8 mm.). Color blackish brown, with abdominal segment II and anterior part of III lemon yellow; legs bright yellow; fore wings light brown, edged with darker and with a dark median streak at middle; antennae blackish brown in most of segments I and II, bright yellow beyond. Head 211, across eyes 140, just behind eyes 119, across cheeks 142, near base 132, across basal collar 134, across head-process 80; cheeks curved rather abruptly to eyes and gently toward base, lightly serrate; dorsal surface with a few anastomosing striae across base, nearly smooth in ocellar area, very faintly rugose medially, with distinct raised lines along cheeks; postocular setae 63, straight, dilated at tip, interval 96, distance from eyes 13; eyes 59, protruding, width 42, interval 56. Antennal segments: I 44 (40), II 57 (31), III 90 (27), IV 84 (25), V 76 (24), VI 59 (23), VII 49 (20), VIII 53 (11); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 117, across coxae 253; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened, the latter prominent; antero-marginal setae vestigial, antero-angulars 56, midlaterals 70, epimerals 80, postero-marginals 86, coxals 53, all of these last nearly straight and with dilated tips; mesothorax 238 across anterior angles; pelta of metathorax well differentiated, not overhanging, not prolonged, reticulate throughout; legs normal, fore tibiae strongly serrate along inner surface, fore tarsi with the usual long recurved tooth; fore wings 630. Abdomen 304 at segment IV; median tergite of I capstan-shaped, reticulate anteriorly; most of following terga with a few mucronate lines and reticles at sides, otherwise nearly smooth; tube 129, across base 66, at tip 35, sides nearly straight, surface smooth, terminal setae 75; other setae long, nearly all knobbed, I and II on IX 124-127, both knobbed.

♀, *forma brachyptera*.—Head paler than in long-winged form, yellowish brown medially; other details of color, and the structure, apparently not different; wing-pads about attaining first abdominal segment.

♂ (brachypterous).—Color and structure essentially as in long-winged ♀, except that the head is yellowish brown medially and the eighth abdominal segment yellowish; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., February 1953 to October 1955, Fritz Plaumann, 23 ♀♀ (including holotype, macropterous, taken in August 1954; and morphotype, brachypterous, taken in August 1955) and 6 ♂♂ (including allotype taken in October 1955), under fallen leaves.

Terthrothrips hebes, sp. nov.

Distinct in having the head much more than twice as long as the width just behind eyes, and in having only one sense-cone on the outer surface of the third antennal segment.

♀ (brachypterous).—Length about 1.4 mm. (fully distended, 1.8 mm.). Color of head yellow, heavily shaded with brown along cheeks; prothorax

brown, pterothorax and abdomen blackish brown, the abdomen becoming paler in segments VIII and IX; tube blackish brown, paler across base and in apical half; legs yellow, with femora and tibiae shaded with brown excepting at ends, the femora darker; antennae largely blackish brown in segments I and II, III yellow, IV and V yellow in pedicels, their apical portions and VI-VIII dark gray-brown. Head 216, across eyes 115, just beyond eyes 92, across cheeks 137, near base 123, across basal collar 128, across head-process 75; cheeks evenly arcuate, strongly serrate; dorsal surface reticulate across base, rugose in ocellar area, and with irregular short transverse rugae between these areas, cheeks with short raised lines; postocular setae 65, straight, dilated at tip, interval 75, distance from eyes 17; eyes 46, strongly protruding, coarsely faceted (only 4 or 5 facets in lateral profile), width 27, interval 60. Antennal segments: I 40 (37), II 53 (30), III 77 (25), IV 76 (24), V 70 (23), VI 53 (22), VII 41 (20), VIII 49 (13); sense-cones on III 1 (1), IV 1 (2); all setae pointed. Prothorax 136, across coxae 238; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, antero-angulars 72, midlaterals 73, epimerals 80, postero-marginals 87, coxals 48, all of these last nearly straight and with dilated tips; mesothorax 196 across anterior angles; pelta of metathorax only vaguely differentiated, nearly or quite smooth; legs normal, fore tibiae strongly serrate along inner surface, fore tarsi with the usual long recurved tooth. Abdomen 353 at segment IV; median tergite of I little narrowed in anterior portion, not at all capstan-shaped, indistinctly reticulate over most of surface; most of following terga with a few mucronate lines and reticles at sides and with a few irregular anastomosing transverse striae just behind antecostal line; tube 120, across base 66, at tip 34, sides nearly straight, surface smooth, terminal setae 65; other setae long, nearly all knobbed, I on IX 99 and knobbed, II on IX 103 and rounded at tip.

♂ (brachypterous).—Like ♀ in color and general structure; prothorax and fore legs often enlarged; glandular area on sternum VIII traversing the segment just behind antecostal line and occupying about one-fourth of its length.

BRAZIL: Nova Teutonia, S. C., May 1953, February 1954, and 1954, Fritz Plaumann, 6 ♀ ♀ (including holotype taken in February 1954) and 4 ♂ ♂ (including allotype taken in May 1953), under fallen leaves.

Terthrothrips impolitus, sp. nov.

Like *irretitus*, only, in having yellow antennae, yellow second abdominal segment, and head reticulate medially throughout its length; but much smaller (head about 210, in comparison with about 258), with stouter antennae, and with anterior angles of pronotum not angulate and tooth-like.

♀ (brachypterous).—Length about 1.4 mm. (fully distended, 1.7 mm.). Color yellow, head narrowly shaded along sides, pterothorax brown, abdominal segment II pale yellow, IV-VI brown, VII-IX successively paler, III-VI with small median brown cloud on antecostal line, tube brown but paler across base and in about apical third; legs yellow; antennal segments I and II largely blackish brown, III-VIII yellow. Head 210, across eyes 128, just behind eyes 106, across cheeks 139, near base 127, across head-process 73; cheeks strongly and evenly convex, prominently serrate; surface sculptured throughout dorsally, though more weakly near postocu-

lar setae, ocellar area and base of head with all reticles complete and polygonal, those at middle less regular, sculpture of cheeks strongly elevated; postocular setae 59, straight, dilated at tip, interval 79, distance from eyes 15; some of small genal setae usually capitate; eyes 49, protruding and prominent, width 34, interval 60. Antennal segments: I 37 (37), II 52 (30), III 72 (26), IV 66 (26), V 66 (24), VI 55 (22), VII 45 (19), VIII 43 (11); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 113, across coxae 242; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, coxals 33, all others 60-66, all of these major setae straight and with dilated tips; mesothorax 207 across anterior angles; pelta of metathorax well developed but not overhanging laterally or posteriorly, prolonged nearly to posterior margin of sclerite, distinctly polygonally reticulate; legs normal, fore tibiae indistinctly serrate along inner surface, fore tarsi with the usual recurved tooth. Abdomen 319 at segment IV; median tergite of I little narrowed anteriorly, subtriangular, distinctly reticulate; most of following terga reticulate at sides and reticulo-striate across middle behind antecostal line for about half their length, many of the lateral reticles mucronate; tube 129, across base 68, at tip 32, sides nearly straight, surface nearly smooth, terminal setae 62; other setae long, mostly knobbed, I and II on IX distinctly knobbed, 99 and 109, respectively.

♂ (brachypterous).—Like ♀ in color and general structure; sternum VIII with glandular area occupying about middle half of segment, emarginate at sides.

BRAZIL: Nova Teutonia, S. C., May and November 1953, April and November 1954, Fritz Plaumann, 9 ♀♀ (including holotype taken in April 1954) and 2 ♂♂ (including allotype taken in November 1954), under fallen leaves.

Terthrothrips percultus, sp. nov.

A brilliantly-colored little species, unique in its white-tipped antennae. ♀ (macropterous).—Length about 1.5 mm. (fully distended, 1.8 mm.). Color largely yellow; head clear yellow, slightly darkened in middle of ocellar area, not darkened at sides; prothorax yellow, with bright red internal pigmentation; mesothorax, anterior half of metanotal pelta, and sides of metathorax, brown; abdomen largely bright yellow, with dark red internal pigmentation, shaded in segments II, VIII, and IX, the tube bright yellow and lightly tipped with gray; legs yellow, femora with an indistinct brown cloud at middle; fore wings pale brown, darker in anal lobe, marginally, and medially; antennae pale yellowish brown in segments I and II (II somewhat darker than I), blackish brown in III-V (III yellowish at extreme base, IV and V with a narrow black ring at extreme base followed by a broader yellowish ring), VI gray-brown in most of basal half and fading to pale whitish yellow at tip, VII and VIII pale whitish yellow. Head 210, across eyes 143, just behind eyes 123, across cheeks 141, near base 133, across basal collar 137, across head-process 79; cheeks converging to eyes and slightly toward base of head, widely and lightly serrate; surface smooth in ocellar area and medially, except for a few rows of reticles across base, sculpture of cheeks consisting of widely-spaced slightly-raised lines; postocular setae 62, straight, dilated at tip, interval 75, distance from eyes 14; eyes 56, less

protruding than usual, width 41, interval 62. Antennal segments: I 45 (39), II 55 (30), III 96 (25), IV 93 (25), V 93 (22), VI 63 (21), VII 49 (19), VIII 50 (12); sense-cones on III 1 (2), IV 1 (2); all setae pointed. Prothorax 164, longer than usual, across coxae 281; pronotum smooth except for the usual faint striae along posterior margin; fore margin and anterior angles strengthened; antero-marginal setae vestigial, antero-angulars 61, midlaterals 59, epimerals 83, postero-marginals 86, coxals 50, all of these last nearly straight and with dilated tips; mesothorax 235 across anterior angles; pelta of metathorax well developed but not overhanging laterally or posteriorly, prolonged nearly to posterior margin of sclerite, distinctly polygonally reticulate; legs normal, fore tibiae distinctly serrate along inner surface, fore tarsi with the usual long recurved tooth; fore wings 694. Abdomen 295 at segment III; median tergite of I capstan-shaped, distinctly reticulate over most of surface; most of following terga with a few mucronate lines and reticles at sides and with one irregular transverse stria just behind antecostal line; tube 129, across base 65, at tip 33, sides very slightly concave near base, otherwise about straight, surface nearly smooth, terminal setae 65; other setae long, mostly knobbed, I on IX 97 and knobbed, II on IX with modified tip, 103.

♂ (micropterous).—Like female in color and general structure; sternum VIII largely occupied by a glandular area; *heterogonic major* individuals with prothorax and fore legs greatly enlarged in comparison with those of *heterogonic minor* individuals, the length of pronotum ranging from 211 to 126, width from 308 to 225.

BRAZIL: Nova Teutonia, S. C., May 1953 and April 1954, 24 ♀♀ (including holotype taken in April 1954) and 9 ♂♂ (including allotype and morphotypes taken with holotype), under fallen leaves.

Phragmothrips, gen. nov.

(*phragmos*, a partition; *thrips*—in allusion to the pronotal apodemes)

Allied to *Terthrothrips*, but with a pair of prominent, distally-expanded, ventro-lateral setae on mesothorax and metathorax and with a pair of short apodemes at anterior angles of pronotum, these extending backwards between the antero-angular and midlateral setae. Head smooth dorsally in median area, lightly sculptured at sides; mouth-cone short and rounded; antennae 8-segmented, slender, last segment pedicellate, sense-cone formula III 1 (2), IV 2 (2), V and VI each 1 (1), all setae pointed. Pronotum almost perfectly smooth; femora and tibiae not closely covered with minute setae; fore femora without strong outstanding setae on dorsal surface; fore coxal seta relatively large, at least one-half as long as postoculars; fore wings without accessory setae on hind margin, hind wings with a minute dark dot between each two fringing hairs.

Type species: *Phragmothrips majusculus*, sp. nov.

Phragmothrips majusculus, sp. nov.

Readily known from its congeners by its much larger size and relatively longer tube, this being longer than twice its basal width and longer than the greatest width across cheeks.

♀ (macropterous).—Length about 1.8 mm. (distended, 2.2 mm.). Color chestnut brown, somewhat paler in head, across base of tube, and in apical third of latter; femora yellowish brown, yellow at either end, fore and

mid tibiae yellow but shaded with brown, hind tibiae and all tarsi yellow; fore wings brown, darkest in scale and apically, paler in about basal three-fifths save for a dark costal streak starting near last subbasal seta and for the largely dark posterior half, middle third with an evanescent pale submarginal line; posterior half of hind wings with the usual dark dot between each two fringing setae; antennae nearly uniform blackish brown, with basal fourth of segment III yellow, IV-VI with a dark ring at extreme base and abruptly yellow beyond for a short distance. Head 227, across eyes 158, just behind eyes 143, across cheeks 162, near base 150, across basal collar 160, across head-process 88; surface smooth except along cross-striate cheeks, no sculpture in ocellar area or medially in front of occipital line; postocular setae 77, expanded apically, interval 123, distance from eyes 16; eyes 76, width 52, interval 59 (in a paratype); mouth-cone rounded, 83. Antennal segments: I 51 (43), II 59 (30), III 95 (30), IV 116 (29), V 119 (26), VI 90 (23), VII 52 (19), VIII 55 (13-14). Prothorax 159, across coxae 309; pronotum smooth, without striae along posterior margin; antero-marginal setae vestigial, antero-angulars 82, midlaterals and epimerals 94, postero-marginals 101, coxals 60, all expanded at tip; mesothorax about 312 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging hook and posteriorly (usually) by two concentric elevated arcs, its surface lightly polygonally reticulate but nearly smooth between the two major setae; fore tarsi with a moderately strong recurved tooth on inner surface; fore wings 896, with the usual three strong knobbed subbasal setae. Abdomen 378 at segment III; median tergite of I reticulate in anterior half; remainder of dorsal surface almost perfectly smooth; tube 176, across base 77, at tip 40, sides straight, terminal setae 113; most setae dilated at tip, IX with I 148, II 182, both slightly dilated at tip.

♂ (macropterous).—Like female in color and structure; pronotum, fore legs, and tarsal tooth sometimes enlarged; glandular area occupying most of sternum VIII.

BRAZIL: Nova Teutonia, S. C., February 1953 to September 1955, Fritz Plaumann, 7 ♀♀ (including holotype taken in September 1955) and 3 ♂♂ (including allotype taken in October 1954), under fallen leaves.

Phragmothrips paulus, sp. nov.

Like the following species (*inuncatus*) in lacking a pale and less-sclerotized subbasal ring on antennal segments IV and V; but with the pelta of metathorax defined at sides by the usual slightly overhanging hook-shaped fold and smooth in the broad basal area, antennal segments slightly slenderer, setae shorter (I on abdominal tergum III about 60 μ long), and median tergite of I narrower, its apical portion about 50 μ wide.

♀ (brachypterous).—Length about 1 mm. (fully distended, 1.3 mm.). Color almost uniform blackish brown, with the usual red internal pigmentation; head darker than prothorax, not pale between eyes, nearly black along sides; tube paler across base and in about apical half; legs deep yellow, lightly washed with brown; antennae nearly uniform blackish brown, yellow in pedicel of segment III, IV-VI without pale subbasal ring. Head 137, across eyes 103, behind eyes 99, across cheeks 113, near base 103, across basal collar 105, across head-process 58; surface smooth except along the rather heavily cross-striate cheeks (these thus roughened

or coarsely serrate), no sculpture in ocellar area or medially in front of occipital line; postocular setae 45, expanded apically, interval 74, distance from eyes 8; eyes 40, width 27, interval 50; mouth cone rounded, 37. Antennal segments: I 30 (30), II 40 (25), III 52 (24), IV 49 (24), V 52 (23), VI 45 (19), VII 32 (16), VIII 35 (10). Prothorax 86, across coxae 179; pronotum smooth, without striae along posterior margin; antero-marginal setae vestigial, antero-angulars, midlaterals, and epimerals 45-47, postero-marginals 52, coxals 37, all slightly expanded at tip; mesothorax about 168 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging hook-shaped loop and posteriorly usually by a line or more of sculpture, its surface smooth; fore tarsi with the usual moderately strong recurved tooth on inner surface; wing-pads about attaining second abdominal tergum, with the usual three long dilated subbasal setae. Abdomen 221 at segment IV; median tergite of I relatively narrow, its apical portion about 50 wide, its surface lightly reticulate in about anterior half; remainder of dorsal surface nearly smooth; tube 88, across base 52, at tip 27, sides straight, terminal setae 47; most setae dilated at tip, I on III about 60, IX with I and II 81-83, both slightly dilated at tip.

♂ (brachypterous).—Like female in color and structure; glandular area occupying most of sternum VIII, faintly granulate.

BRAZIL: Nova Teutonia, S. C., August 1952 to September 1955, 12 ♀♀ (including holotype taken in September 1955) and 6 ♂♂ (including allotype taken in August 1952); Erechim, Rio Grande do Sul, August 1956, 2 ♀♀. All specimens were taken by Mr. Fritz Plaumann under fallen leaves.

Phragmothrips inuncatus, sp. nov.

Like the preceding species (*paulus*) in lacking a pale and less sclerotized subbasal ring on antennal segments IV and V; see above description for comparison of the two.

♀ (brachypterous).—Length about 1.1 mm. (fully distended, about 1.4 mm.). Color almost uniform blackish brown, with the usual red internal pigmentation; head darker than prothorax, not pale between eyes, not especially darkened along sides; tube paler across base and in about apical half; legs deep yellow, lightly washed with brown; antennae nearly uniform blackish brown, yellow in pedicel of III. Head 143, across eyes 114, behind eyes 107, across cheeks 122, near base 112, width across basal collar 116, across head-process 64; surface smooth except along the cross-striate cheeks (these thus rather finely serrate), no sculpture in occipital area, a few very faint striae in front of occipital line; postocular setae 52, expanded apically, interval 89, distance from eyes 10; eyes 48, width 30, interval 54; mouth-cone rounded, 50. Antennal segments: I 34 (32), II 45 (26), III 53 (27), IV 53 (26), V 53 (24), VI 49 (22), VII 36 (19), VIII 40 (12). Prothorax 100, across coxae 196; pronotum nearly smooth but with a few short striae almost behind postero-marginal setae; antero-marginal setae vestigial, antero-angulars 44, midlaterals 52, epimerals 51, postero-marginals 71, coxals 44, all slightly expanded at tip; mesothorax about 196 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging arc (rather than by a hook-like line), reticulate throughout though very faintly medially; fore tarsi with the usual moderately strong recurved tooth on inner surface; wing-

pads not attaining first abdominal tergum, with the usual three long dilated subbasal setae. Abdomen 245 at segment III; median tergite of I relatively broad, its apical portion about 70 wide, its surface smooth; tube 101, across base 57, at tip 29, sides straight, terminal setae 66; most setae dilated at tip, I on III about 80, IX with I and II 103-104, these last slightly dilated at tip.

♂ (brachypterous).—Like female in color and structure; glandular area occupying most of sternum VIII, faintly granulate.

BRAZIL: Nova Teutonia, S. C., September 1953 and April 1954, Fritz Plaumann, 22 ♀♀ (including holotype taken in April 1954) and 1 ♂ (allotype, April 1954), under fallen leaves.

Phragmothrips achaetus, sp. nov.

Recognizable at once by the vestigial antero-angular setae.

♀ (macropterous).—Length about 1.3 mm. (fully distended, 1.6 mm.). Color almost uniform blackish brown, with the usual red internal pigmentation, head darker than prothorax, yellowish between eyes, nearly black along sides, tube paler basally and in about apical half; legs deep yellow, lightly washed with brown; fore wings brown, darkest in scale and apically, paler in about basal three-fifths save for a dark costal streak starting near last subbasal seta and for a dark nearly median streak in about middle third, slightly paler for a short distance behind and beyond distal end of this streak; posterior half of hind wings with the usual dark dot between each two fringing setae; antennae nearly uniform blackish brown, paler at extreme base of segment III, IV-VI with a narrow dark ring at extreme base and an abrupt white ring immediately beyond. Head 176, across eyes 123, behind eyes 106, across cheeks 123, near base 114, across basal collar 117, across head-process 67; surface smooth except along cross-striate cheeks, no sculpture in ocellar area or medially in front of occipital line; postocular setae 61, expanded apically, interval 88, distance from eyes 11; eyes 63, width 39, interval 43; mouth-cone rounded, 64. Antennal segments: I 36 (34), II 47 (27), III 75 (23), IV 83 (24), V 84 (22), VI 60 (19), VII 40 (16), VIII 46 (10). Prothorax 103, across coxae 202; pronotum smooth, without striae along posterior margin; antero-marginal and antero-angular setae vestigial (3-5), mid-laterals 55, epimerals 66, postero-marginals 69, coxals 49, all expanded at tip; mesothorax about 195 across anterior angles; pelta of metanotum delimited laterally by a slightly overhanging hook and posteriorly (usually) by about two irregular elevated concentric arcs, its surface lightly polygonally reticulate between these arcs and basally but nearly smooth between the two major setae; fore tarsi with a moderately strong recurved tooth on inner surface; fore wings 511, with the usual three strong dilated subbasal setae. Abdomen 252 at segments III-IV; median tergite of I smooth; remainder of dorsal surface almost perfectly smooth; tube 107, across base 57, at tip 28, sides straight, terminal setae 52; most setae dilated at tip, IX with I 100, II 107, both slightly dilated at tip.

♂ (macropterous).—Like female in color and structure; pronotum, fore legs, and tarsal tooth sometimes enlarged, the femora then bent at base; glandular area occupying most of sternum VIII, faintly granulate.

BRAZIL: Nova Teutonia, S. C., September and October 1954, and August to October, 1955, Fritz Plaumann, 18 ♀♀ (including holotype

taken in August 1955) and 9 ♂♂ (including allotype taken in September 1955), under fallen leaves.

Copiothrips, gen. nov.

(*kope*, oar; *thrips*—in allusion to the four expanded setae projecting laterally from the pterothorax)

Head usually striate medially, sometimes nearly smooth except at sides, occasionally reticulate throughout, but with the polygons not equilateral and with the lines separating the reticles tending to form straight diagonal lines in the median area and behind the postocular setae; mouth-cone short and rounded; antennae 8-segmented, not especially slender, the last segment pedicellate, segment IV longer than III, sense-cone formula, III 1 (2), IV 2 (2), V and VI each 1 (1), inner apical seta on II usually broadened at tip, some apical setae on III and IV either dilated or with tips modified. Mesothorax and metathorax each with a pair of prominent, outstanding, distally-expanded setae arising from ventro-lateral surface; femora and tibiae not closely covered with minute setae; fore femora with two strong outstanding setae (usually knobbed) near middle of the morphologically dorsal surface, middle and hind femora each with one; fore coxal seta relatively small, less than one-half the length of postoculars; fore tibiae not serrate along inner surface; fore tarsi toothed; fore wings without accessory setae on hind margin, hind wings without a minute dark dot between each two fringing hairs.

Type species: *Copiothrips fuscifrons*, sp. nov.

Allied to *Eurythrips*, *Terthrothrips*, etc.; distinguished from most of these by the ventro-lateral pterothoracic setae, from the others by the sculptured head and shorter antennal segments.

Copiothrips fuscifrons, sp. nov.

Differs from *fulvescens* in that the head is much darkened between the eyes and in front, about 164 μ across cheeks; sculpture of head, thorax, and abdomen much weaker, the cheeks scarcely serrate, the reticulation of the pelta of metathorax very indistinct between the two major setae, sculpture at sides of tergum II of abdomen weak and only sparsely mucronate; postoculars and other major setae less modified and less bent at tip; sternum VIII of female with a small pair of setae between and behind the large pair at lateral thirds of posterior margin; sides of tube somewhat concave.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 1.9 mm.). Color chestnut brown, darkest between and anterior to eyes, along sides of pterothorax, and in apical abdominal segments, tube somewhat paler across base and in about apical half; legs yellow but shaded lightly with brown in femora and tibiae; fore wings brown or gray; antennae darkest and blackish in segments I and II, III largely yellow but clouded with darker beyond pedicel and again in apical third, IV and V yellow in about basal third, and shaded beyond, V darker than IV, VI-VIII dark gray-brown. Head 183, across eyes 154, just behind eyes 148, across cheeks 164, near base 145, across head-process 78; surface reticulate along cheeks, closely striate medially across base, lightly reticulate medially from there to median ocellus, cheeks not noticeably serrate; postocular setae 74, somewhat curved, asymmetrically dilated at tip, interval 130, distance from eyes 16; eyes 63, width 45, interval 63; mouth-cone

rounded, 72. Antennal segments: I 37 (39), II 51 (29), III 70 (32), IV 74 (29), V 73 (26), VI 60 (22), VII 44 (20), VIII 49 (13), sense-cones on III 1 (2), IV 2 (2). Prothorax 109, across coxae 265; pronotum with a few faint striae across posterior margin, remainder smooth; antero-marginal setae vestigial, antero-angulars 68, midlaterals 64, epimerals 87, postero-marginals 92, coxals 24, all curved and asymmetrically dilated at tip; mesothorax 279 across anterior angles; metanotum with differentiated pelta, this rounded posteriorly and reticulate, nearly smooth between the two major setae; fore wings 748, with the usual three knobbed subbasal setae; fore tarsi with a minute tooth on inner surface. Abdomen 340 at segment IV; median tergite of I lightly reticulate; II lightly reticulate laterally, the reticular lines sparsely mucronate, especially the basal ones; tube 153, across base 71, at tip 32, terminal setae 89; most setae dilated at tip, IX with I 132 and rapidly pointed, II 150 and finely pointed.

♂ (macropterous).—Like female in color and structure; glandular area occupying most of sternum VIII, its lateral edges emarginate.

BRAZIL: Nova Teutonia, S. C., May 1953 to September 1955, Fritz Plaumann, 14 ♀♀ (including holotype taken in April 1954) and 1 ♂ (allotype, taken in August 1955), under fallen leaves.

Copiothrips flaviventris, sp. nov.

The principal diagnostic characters of this species are as follows: (1) tube shorter than head, (2) antennae very slender (see measurements in following description), (3) head very long, about 1.6 times as long as width across eyes, (4) abdomen (including tube) yellow or yellowish, without dark median spots, and (5) median tergite of first abdominal segment nearly triangular and reticulate almost throughout.

♀, *forma macroptera*.—Length about 1.8 mm. (fully distended, 2.2 mm.). Color brownish yellow, thorax, sides of head, and middle of tube darkened with brown; legs about concolorous with body but with tibiae darkened; fore wings light brown, with a postmedian dark line before middle; antennae dark brown, yellow or yellowish in pedicels of III-VI. Head 251, across eyes 159, just behind eyes 138, across cheeks 159, near base 138, across basal collar 141, across head-process 86; cheeks serrate, only slightly convex, rounded to eyes and tapering toward base; surface lightly reticulate in ocellar area, more distinctly so from occipital line to occipital setae, strongly so along cheeks, the entire remainder of dorsum cross-striate with anastomosing lines; postocular setae 30, dilated and bent at tip, their interval 121, distance from eyes 10; eyes 66, width 46, interval 67, rather finely faceted. Antennal segments: I 48 (45), II 57 (33), III 90 (31), IV 114 (29), V 112 (27), VI 83 (22), VII 53 (21), VIII 54 (13); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II and several on each of III and IV dilated at tip. Prothorax 130, across coxae 279; pronotum striate except at middle; antero-marginal setae vestigial, antero-angulars 50, midlaterals 44, epimerals 81, postero-marginals 64, coxals 19, all of these strong, with dilated bent tips; mesothorax 291 across anterior angles; metanotal pelta well differentiated, reticulate, prolonged backward to margin of sclerite; fore tarsi with moderately large recurved tooth; fore wings 889, with the three subbasal setae successively larger, dilated at tip. Abdomen 377 at segment III, median tergite of I subtriangular, with rounded corners, reticulate

nearly throughout; following terga distinctly sculptured except along the smooth posterior margin, reticulate and partially mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 179, across base 69, at tip 34, sides thickened and nearly straight, surface nearly smooth, terminal setae 95; other setae long, most of them with bent dilated tips, I on IX 130 and with tip slightly dilated, II 150 and with tip rounded.

♀, *forma brachyptera*.—Like long-winged ♀ in color and structure; wing-pads about 112, with one long dilated seta.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to October 1955, Fritz Plaumann, 1 macropterous ♀ (holotype, taken in November 1954), 3 brachypterous ♀♀ (including morphotype taken in October 1955), and 4 ♂♂ (including allotype taken in May 1953), under fallen leaves.

Copiothrips fulvescens, sp. nov.

♀ (brachypterous).—Length about 1.3 mm. (partially distended, 1.5 mm.). Color brown, abdomen darkest and blackish, head pale yellowish brown but darkened along sides and nearly yellow anteriorly, pterothorax darker than prothorax and paler than abdomen; legs bright yellow; antennae brown in segments I, II, and IV-VIII, III yellow or shaded apically, base of IV yellow or at least pale. Head 170, across eyes 123, just behind eyes 115, across cheeks 132, near base 121, across head-process 69, surface deeply sculptured along cheeks, faintly reticulate in ocellar area, more distinctly so medially to occipital line and across base, cheeks strongly serrate; postocular setae 53, strongly curved (especially apically) and with an asymmetrical golf-club-shaped tip, interval 100, distance from eyes 14; eyes 49, width 35, interval 54; mouth-cone rounded, 49. Antennal segments: I 36 (35), II 46 (29), III 59 (27), IV 60 (27), V 58 (24), VI 46 (23), VII 37 (19), VIII 41 (13), sense-cones on III 1 (2), IV 2 (2). Prothorax 94, across coxae 218; pronotum with a few faint striae anterior to episterna and along posterior margin, remainder smooth; antero-marginal setae vestigial, antero-angulars 56, midlaterals 55, epimerals 91, postero-marginals 75, coxals 20, all formed and curved like postoculars, the expanded tips of epimerals about 18 μ long; mesothorax about 213 across anterior angles; pelta of metanotum reticulated throughout, to posterior margin of the sclerite; fore tarsi with a small tooth on inner surface. Abdomen 294 at segment III; median tergite of I distinctly reticulate; II distinctly reticulate laterally and lightly medially at base, the lateral reticular lines largely mucronate, even in basal part of tergum; tube 151, across base 65, at tip 30, its sides straight, terminal setae 80; most setae dilated and strongly bent at tip, IX with I 136 and dull, II 154 and finely pointed.

♂ (brachypterous).—Like female in color and structure; glandular area occupying most of sternum VIII, its lateral edges emarginate.

BRAZIL: Nova Teutonia, S. C., August 1952 to October 1955, 9 ♀♀ (including holotype taken in July 1955) and 2 ♂♂ (including allotype taken in February 1954), Fritz Plaumann; under fallen leaves.

Copiothrips subglaber, sp. nov.

Known at once from the other species in which the tube is longer than the head by the pointed antennal setae, the smooth head at middle of

dorsal surface, and the shield-shaped metanotal pelta whose reticulation is not prolonged posteriorly to the margin of the sclerite.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color chestnut brown, somewhat paler in head; tube brownish yellow in about basal fifth and pale again at tip, nearly blackish brown between; legs about concolorous with body, with tarsi and both ends of femora and tibiae yellowish; fore wings light brown, darker in scale, medially, and marginally; antennae about concolorous with body, with pedicel of III yellow. Head 203, across eyes 152, just behind eyes 136, across cheeks 156, near base 136, across basal collar 137, across head-process 79; cheeks serrate, rounded to eyes from anterior third, tapering toward base, often with a slight tooth behind eyes; surface faintly reticulate in ocellar area, reticulo-striate across base, and distinctly reticulate along sides, almost perfectly smooth at middle; postocular setae 48, slightly curved, dilated at tip, 124 apart and 16 from eyes; eyes 63, width 43, interval 67, rather finely faceted. Antennal segments: I 46 (40), II 56 (30), III 80 (33), IV 95 (30), V 83 (27), VI 68 (24), VII 44 (20), VIII 50 (15); sense-cones on III 1 (2), IV 2 (2); all setae pointed. Prothorax 117, across coxae 265; pronotum lightly striate along posterior margin, smooth elsewhere; antero-marginal setae vestigial, antero-angulals small, only 28, midlaterals 46, epimerals 67, postero-marginals 68, coxals 16, all slightly curved and slightly dilated at tip; mesothorax 269 across anterior angles; metanotal pelta well differentiated, shield-shaped, pointed behind, and reticulate, the reticulation not carried to posterior margin of sclerite; fore tarsi with the usual recurved tooth short; fore wings 770, with the usual three large somewhat dilated subbasal setae. Abdomen 321 at segment IV; median tergite of I subtriangular, with rounded corners and a darker, reticulated, oval, median portion; following terga lightly sculptured except along the smooth posterior margin, reticulate and only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 227, across base 79, at tip 36, sides thickened and straight, surface smooth, terminal setae 109; other setae moderately long, with blunt or slightly dilated tips, I on IX 142 and rounded at tip, II 216 and pointed.

♂ (macropterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying more than one half its length and most of its width, emarginate at sides.

BRAZIL: Nova Teutonia, S. C., May 1953 to October 1955, Fritz Plaumann, 60 ♀♀ (including holotype taken in April 1954) and 14 ♂♂ (including allotype taken with holotype), under fallen leaves.

Copiothrips brasiliensis, sp. nov.

Like *subglaber* and *ustulatus* in having the tube longer than the head; differing from former in having the inner apical seta on segment II and several of the dorsal ones on III and IV dilated at tip, in having the head cross-striate medially, and the metanotal pelta prolonged to posterior margin of the sclerite; agreeing with *ustulatus* in these characters, but differing in the smaller size, less slender antennae, and the less finely reticulate pelta of the metanotum.

♀ (macropterous).—Length about 1.5 mm. (fully distended, 1.9 mm.). Color chestnut brown, head a trifle darker than prothorax; tube blackish

brown, narrowly paler across base and at tip; legs somewhat paler than body, with tarsi and both ends of femora and tibiae paler, fore tibiae often darkest; fore wings light brown, darker in seale, medially, and marginally; antennae about concolorous with head in segments I and II, III dull yellow but lightly shaded apically, IV-VI successively darker but with their pedicels pale yellow, VII and VIII dark gray-brown. Head 196, across eyes 151, just behind eyes 136, across cheeks 151, near base 140, across basal collar 145, across head-process 76; cheeks serrate, rounded to eyes from anterior third, tapering toward base; surface reticulate in ocellar area, reticulo-striate across base, and distinctly reticulate along sides, the entire remaining median area striate with anastomosing lines; postocular setae 57, curved, with rather long spoon-shaped tips, their interval 119, distance from eyes 19; eyes 63, width 46, interval 59, rather finely faceted. Antennal segments: I 37 (39), II 53 (30), III 73 (31), IV 81 (30), V 79 (25), VI 58 (23), VII 47 (20), VIII 52 (15); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II and usually about two on III and IV dilated at tip. Prothorax 87, across coxae 262; pronotum lightly striate along posterior margin, nearly smooth elsewhere; antero-marginal setae vestigial, antero-angulars 60, midlaterals 64, epimerals 81, postero-angulars 97, coxals 21, all of these dilated like postoculars and with their tips bent inwards; mesothorax 276 across anterior angles; metanotal pelta well differentiated, reticulate, prolonged backward to margin of sclerite, and with about four reticles between the two major setae; fore tarsi with moderately large recurved tooth; fore wings 748, with the usual three large somewhat dilated subbasal setae. Abdomen 350 at segments III-IV; median tergite of I subtriangular, with rounded corners and a darker, reticulated, oval, median portion; following terga lightly sculptured except along the smooth posterior margin, reticulate and partially mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 210, across base 77, at tip 35, sides thickened and straight, surface smooth, terminal setae 87; other setae long, slightly curved and with bent dilated tips, I on IX 131 and very slightly dilated, II 164 and very finely pointed.

♂, *forma brachyptera* and *forma macroptera*.—Like female in color and general structure; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to October 1955, Fritz Plau-mann, 52 ♀♀ (including holotype taken in April 1954), 17 brachypterous ♂♂ (including allotype taken with holotype), and 2 macropterous ♂♂ (including morphotype taken in September 1955), under fallen leaves.

Copiothrips ustulatus, sp. nov.

See preceding species, *brasiliensis*, for separation from allies.

♀, *forma macroptera*.—Length about 1.7 mm. (fully distended, 2.2 mm.). Color chestnut brown, tube darkest and somewhat paler apically, the legs concolorous with body; fore wings brown, darkened medially and marginally; antennae about concolorous with body, pedicels of III-VI yellowish. Head 217, across eyes 161, just behind eyes 147, across cheeks 167, near base 143, across basal collar 144, across head-process 86; cheeks serrate, rounded to eyes from anterior fourth, tapering toward base; surface reticulate in ocellar area, reticulo-striate across base, and distinctly reticulate along sides, the entire remaining median area striate with

anastomosing lines; postocular setae 65, curved, with rather long spoon-shaped tips, their intervals 128, distance from eyes 20; eyes 66, width 48, interval 66, rather finely faceted. Antennal segments: I 47 (43), II 56 (35), III 83 (30), IV 93 (30), V 90 (27), VI 72 (23), VII 51 (22), VIII 56 (16); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II and 4-5 on III and IV dilated at tip. Prothorax 97, across coxae 284; pronotum lightly striate along posterior margin and in front of episterna, nearly smooth elsewhere; antero-marginal setae vestigial, antero-angulars 50, midlaterals 70, epimerals 83, postero-marginals 82, coxals 20, all of these dilated like postoculars and with their tips bent slightly inwards; mesothorax 294 across anterior angles; metanotal pelta well differentiated, reticulate, prolonged backward to margin of sclerite, and with about six reticles between the two major setae; fore tarsi with moderately large recurved tooth; fore wings 896, with the usual three large somewhat dilated subbasal setae. Abdomen 420 at segment III; median tergite of I subtriangular, with rounded corners and a darker, reticulated, oval median portion; following terga distinctly sculptured except along the smooth posterior margin, reticulate and partially mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 252, across base 88, at tip 40, sides thickened and straight, surface smooth, terminal setae 99; other setae long, slightly curved, and with dilated tips, I on IX 134 and dilated, II 185 and finely pointed.

♀, *forma brachyptera*.—Like long-winged female in color and structure; wing-pads extending to second abdominal segment.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of width of segment, emarginate at sides and in front, its median length about one-third that of segment.

BRAZIL: Nova Teutonia, S. C., November 1952, 1 macropterous ♀ (holotype); July 1955, 1 brachypterous ♀ (morphotype) and 1 ♂ (allotype); and October 1955, 2 macropterous ♀♀; all specimens taken by Mr. Fritz Plaumann, under fallen leaves.

Orthothrips divergens, sp. nov.

Readily known from *woytkowskii* (presumably the only other species of the genus which has the tube longer than the head and seta I on abdominal segment IX considerably longer than the basal width of tube) by the more slender head (nearly 1.5 times as long as width across eyes and 1.8 times as long as least width near base), and the lightly reticulate third to sixth antennal segments.

♀ (macropterous).—Length about 1.8 mm. (fully distended, 2.1 mm.). Color chestnut brown, becoming decidedly yellowish toward tip of abdomen, tube yellow at base and brown beyond; legs yellow, femora lightly shaded with brown; fore wings light brown, somewhat darkened marginally at tip and with a short dark streak at middle; antennae dark brown in most of segments I and II, all of III and pedicel of IV deep golden yellow, their remainder dark brown but usually with pedicels of V and VI yellowish. Head 234, across eyes 160, just behind eyes 140, across cheeks 160, near base 130, across basal collar 133, across head-process 87; cheeks curving abruptly to eyes in anterior fifth, remainder straight and converging to base; surface polygonally reticulate, more finely in ocellar area and along sides, the cheeks thus finely serrate; postocular setae small (14), obliquely truncate at tip, curved inward, 123 apart and 16 from

eyes; eyes 63, width 47, interval 67. Antennal segments: I 43 (40), II 60 (34), III 80 (33), IV 79 (30), V 79 (28), VI 63 (24), VII 47 (20), VIII 51 (14); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II dilated, III and IV each with about three setae whose tips are slightly dilated, blunt, or otherwise modified. Prothorax 110, across coxae 266; pronotum reticulate over most of surface, posterior margin with several raised mucronate transverse lines; antero-marginal setae vestigial, antero-angulars, midlaterals, and postero-marginals 22-30, stout, dilated at tip, and somewhat appressed, epimerals 53, much stouter, dilated, coxals 13; mesothorax 281 across anterior angles; pelta of metathorax well differentiated, extending to posterior margin of sclerite, reticulate throughout, the more posterior reticles mucronate; fore tarsi with small tooth; fore wings 781. Abdomen 351 at segment III; median tergite of I with anterior part subrectangular and reticulate; following terga reticulate (except posteriorly), the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 288, across base 89, at tip 39, sides straight, surface lightly polygonally reticulate near base, terminal setae 104; other setae short, curved, nearly all dilated at tip, I on IX 118 and knobbed, II 217 and pointed.

♂ (macropterous).—Very similar to female in color and general structure; glandular area on sternum VIII transversely elliptical, situated at middle of segment.

BRAZIL: Nova Teutonia, S. C., February 1953 to October 1955, Fritz Plaumann, 28 ♀♀ (including holotype taken in April 1954) and 6 ♂♂ (including allotype taken in April 1954), under fallen leaves.

Orthothrips saltuarius, sp. nov.

Very close to *hylaesus*, but with the first and second antennal segments yellow and about concolorous with middle of head, the head itself nearly 1.5 times as long as its width across eyes in ♀, and antennal segment IV about 2.6 times as long as wide in ♀.

♀, *forma macroptera*.—Length about 1.7 mm. (fully distended, 2.0 mm.). Color brownish yellow, with pterothorax and sides of head and of prothorax brown; tube brown, yellowish across base; abdomen with a median brown spot behind antecostal line on segments III-VII; legs deep yellow; fore wings yellowish brown; antennae with segments I-IV deep yellow, IV lightly shaded with brown beyond pedicel, V and VI yellow to first whorl of setae and brown beyond, VII and VIII gray-brown. Head 213, across eyes 145, just behind eyes 127, across cheeks 141, near base 118, across basal collar 120, across head-process 78; cheeks narrowed abruptly to eyes, slightly convex in most of their remainder; surface polygonally reticulate, more finely in ocellar area and along sides, the cheeks thus finely serrate; postocular setae small (17-21), expanded and obliquely truncate at tip, curved inward, 114 apart and 16 from eyes; eyes 60, width 39, interval 68. Antennal segments: I 43 (37), II 50 (33), III 74 (27), IV 70 (27), V 70 (24), VI 56 (20), VII 43 (20), VIII 42 (13); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II dilated, III and IV each with about four apically-dilated setae. Prothorax 123, across coxae 239; pronotum reticulate throughout except between and behind postero-marginal setae, where it is transverse striate, the striae not mucronate; antero-marginal setae vestigial, antero angulars and mid-laterals 18-19, epimerals and postero-marginals 30-31, all of these last

stout and dilated at tip, coxals minute (13) but dilated; pelta of metathorax well differentiated, extending to posterior margin of sclerite, sharply reticulate throughout, the posterior reticles not mucronate; fore tarsi with the usual recurved tooth; fore wings 840. Abdomen 336 at segment III; median tergite of I broad, trapezoidal, with rounded corners, with a reticulated median portion which is broader anteriorly; following terga reticulate (except posteriorly), the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 179, across base 61, at tip 29, sides straight, surface lightly polygonally reticulate basally, terminal setae 73; other setae short, curved, nearly all dilated at tip, I on IX 86 and knobbed, II 102 and slightly dilated.

♀, *forma brachyptera*.—Not appreciably different from long-winged form in either color or structure.

♂ (brachypterus).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of segment.

BRAZIL: Nova Teutonia, S. C., May 1953 to September 1956, Fritz Plaumann, 7 macropterous ♀♀ (including holotype taken in February 1954), 47 brachypterous ♀♀ (including morphotype taken in September 1955), and 2 ♂♂ (including allotype taken in October 1955), under fallen leaves.

Erkosothrips silvaticus*, sp. nov.

Very different from the following species (*bucca*), which is the only other South American species assigned to the genus, differing in the much longer tube, the presence of two pairs of long, knobbed, ventro-lateral pterothoracic setae, and the possession of two sense-cones on each side of the fourth antennal segment.

♀ (brachypterus).—Length about 1.6 mm. (fully distended, 2.0 mm.). Color nearly uniform brownish yellow, with dark antecostal line followed by a dark spot on abdominal segments III-VIII; legs concolorous with body; antennae with segments I-III about concolorous with head, II heavily shaded at sides, III shaded apically, IV-VIII dark blackish brown, IV and V yellow or yellowish to first whorl of setae. Head 189, across eyes 140, just behind eyes 120, across cheeks 145, near base 119, across basal collar 124, across head-process 80; cheeks hollowly narrowed to eyes from an apical tooth, roundly arched and narrowed toward base; surface polygonally reticulate throughout, more finely in ocellar area, the cheeks serrate; postocular setae 43, expanded at tip, curved inward, 123 apart and 14 from eyes; eyes 51, width 35, interval 71. Antennal segments: I 42 (38), II 53 (32), III 73 (29), IV 66 (28), V 64 (26), VI 56 (22), VII 43 (20), VIII 46 (13-14); sense-cones on III 1 (2), IV 2 (2); inner apical seta on II dilated, III and IV each with two or three setae more or less dilated. Prothorax 113, across coxae 241; pronotum striate along posterior margin, lightly reticulate elsewhere; antero-marginal setae small and pointed, all others strong, curved, and dilated at tip, coxals 18, the others 49-56; pelta of metathorax well differentiated, extending nearly to posterior margin of sclerite, reticulate throughout;

**Erkosothrips* Stannard. This generic name is apparently based on a Greek word meaning a net, and doubtless refers to the elaborate reticulation, especially of the head. The prescribed transliteration of the word is *hercos*, and the proper combination with *thrips* would result in *Hercothrips*—a name which has previously been used. (See the International Code of Zoological Nomenclature, or Ferris's *The Principles of Systematic Entomology*, or Schenk and McMasters' *Procedure in Taxonomy*.)

fore tarsi with the usual recurved tooth. Abdomen 339 at segment III; median tergite of segment I broad, reticulate, sides slightly converging anteriorly; following terga sculptured excepting along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 163, near base 69, at tip 30, sides thickened, straight beyond basal pores, surface nearly smooth, terminal setae 92; other setae long, curved, nearly all dilated at tip, I on IX 126 and knobbed, II 146 and pointed.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area on sternum VIII forming an irregular narrow band across middle of segment, occupying about one-fourth the length and two-thirds the width.

BRAZIL: Nova Teutonia, S. C., August 1952 to July 1955, Fritz Plaumann, 23 ♀♀ (including holotype taken in June 1954) and 6 ♂♂ (including allotype taken in April 1954), under fallen leaves.

Erkosothrips bucca, sp. nov.

See description of preceding species, *silvaticus*, for diagnostic characters.

♀ (brachypterous).—Length about 1.2 mm. (fully distended, 1.5 mm.). Color yellowish brown, darker in thorax and in abdominal segments III-VII, with dark antecostal lines followed by a faint dark cloud on III-VIII; legs yellow, paler than body; antennae about concolorous with body, III somewhat paler and yellow in pedicel. Head 178, across eyes 123, just behind eyes 107, across cheeks 140, near base 120, across basal collar 121, across head-process 74; cheeks swollen, evenly arched; surface polygonally reticulate throughout, more finely in ocellar area, reticles at middle transverse, cheeks serrate; postocular setae 44, expanded at tip, nearly straight, 89 apart, 18 from eyes; occipital setae 24, very slender; eyes 37, width 32, interval 59, very coarsely faceted, about three facets in lateral profile. Antennal segments: I 34 (36), II 44 (30), III 50 (30), IV 44 (30), V 47 (27), VI 46 (24), VII 40 (20), VIII 41 (13); sense-cones on III 1 (2), IV 1 (2); all antennal setae pointed. Prothorax 110, across coxae 249; pronotum striate along posterior margin, reticulostriate elsewhere, subrugose near anterior angles; antero-marginal setae 20, very slender and pointed, antero-angulars 44, midlaterals 33, epimerals 55, postero-marginals 57, coxals 31, all of these last strong, straight, and dilated at tip; mesothorax 217 across anterior angles; metathorax without well differentiated pelta, polygonally reticulate throughout; fore tarsi with a small tooth. Abdomen 318 at segment IV; median tergite of I almost semicircular, reticulate throughout; following terga sculptured excepting along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 119, across base 72, at tip 33, sides not thickened, straight, surface smooth, terminal setae 67; other setae long, straight, nearly all dilated at tip, I on IX 106 and dilated, II 110 and dull.

♂ (brachypterous).—Like ♀ in color and general structure; glandular area at middle of sternum VIII very small, circular, about 23 in diameter.

BRAZIL: Nova Teutonia, S. C., April 1954, Fritz Plaumann, 6 ♀♀ (including holotype) and 3 ♂♂ (including allotype), under fallen leaves.

Eschatothrips cerinus, sp. nov.

Separable from the other Brazilian species of the genus by the pale color, yellow second antennal segment, minute and pointed occipital setae,

and the form of the last antennal segment, which is not distinctly narrowed at base, its breadth at that point (12) nearly equal to its greatest breadth (13).

♀ (macropterous).—Length about 1.7 mm. (fully distended, 1.9 mm.). Color deep golden yellow, slightly shaded along sides of thorax; abdomen with the usual median dark cloud behind antecostal line of segments III-VIII; tube yellow, with apical fifth dark blackish brown; legs concolorous with body; fore wings light brown, with a narrow median streak near middle; antennae yellow in segments I-III, II darkest, IV largely yellow, shaded apically, V darker than III, yellow in pedicel, VI-VIII successively darker, pedicel of VI yellow. Head 218, across eyes 160, just behind eyes 137, across cheeks 163, near base 149, across basal collar 151, across head-process 93, broadest posteriorly; cheeks serrate, gently rounded to a tooth behind eyes, more abruptly rounded to near base; surface strongly polygonally reticulate, more finely at sides of ocellar area; postocular setae 30, slightly curved, somewhat broadened at tip, 136 apart, 30 from eyes; eyes 60, width 35, interval 90, coarsely faceted. Antennal segments: I 47 (43), II 58 (36), III 64 (36), IV 60 (33), V 63 (30), VI 56 (26), VII 43 (20), VIII 41 (13); sense-cones on III 1 (1-2), IV 2 (2); most of dorsal setae on II-V slightly expanded at tip. Prothorax 110, across coxae 294; pronotum reticulate throughout, the reticles along posterior margin mucronate; antero-marginal setae wanting, antero-angulars and midlaterals 19-20, epimerals 70, postero-marginals 29, epimerals much heavier than the others, all blunt and curved, coxals minute and pointed; mesothorax 294 across anterior angles; metanotal pelta reticulate to posterior margin of sclerite; fore tarsi unarmed; fore wings 823, subbasal setae minute. Abdomen 329 at segment II; median tergite of I with anterior portion rectangular and reticulate; following terga sculptured excepting along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 223, across base 93, at tip 39, sides thickened, roundly converging to slightly constricted tip, surface lightly hexagonally reticulate to near tip, lightly ridged, terminal setae 107; other setae mostly rounded at tip, those on basal segments small or minute, I on IX 96-107 and with tip rounded, II 168 and with slender pointed tip.

BRAZIL: Nova Teutonia, S. C., August 1955, Fritz Plaumann, 1 ♀ (holotype), under fallen leaves.

***Eschatothrips decoratus*, sp. nov.**

Separable from the other Brazilian species of the genus by the dark color, yellow second antennal segment, minute and pointed occipital setae, basally-narrowed last antennal segment, and the relatively long fourth antennal segment.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 1.8 mm.). Color chestnut brown, usually darkest along sides of pterothorax, head yellow in front and with a narrow median pale line, abdomen yellow in segment IX and usually with anterior angles of terga III-VIII yellow, sometimes darkest medially except for a pale whitish yellow spot in posterior half of median fourth of terga II or III-VIII; tube orange yellow, tipped with dark blackish brown; legs yellow, with mid and hind femora and tibiae heavily shaded except at either end, the shading on

hind legs darker; fore wings brown, pale at base, submarginally, and in a narrow line just in front of a dark post-median line in about second fourth; antennae with segment I brownish yellow, II and III yellow, IV and V yellow but shaded in swollen apical portion, V darker than IV, VI yellow in about basal half, its remainder and VII and VIII gray-brown. Head 203, across eyes 159, just behind eyes 143, across cheeks 158, near base 145, across basal collar 147, across head-process 76; cheeks serrate, almost straight posterior to the tooth behind eyes; surface strongly polygonally reticulate, more finely in ocellar area; postocular setae 28, slightly curved, somewhat broadened at tip, 129 apart, 22 from eyes; eyes 70, width 45, interval 69, coarsely faceted. Antennal segments: I 39 (33), II 50 (31), III 63 (27), IV 73 (27), V 73 (25), VI 60 (23), VII 40 (18), VIII 35 (13); sense-cones on III 1 (2), IV 2 (2); most of dorsal setae on II-V slightly expanded at tip. Prothorax 97, across coxae 267; pronotum reticulate throughout, the reticles along posterior margin mucronate; antero-marginal setae wanting, antero-angulars 40, midlaterals 24, epimerals 53, postero-marginals 20, epimerals heavier than the others, all blunt and curved, coxals minute and pointed; mesothorax 284 across anterior angles; metanotal pelta reticulate to posterior margin of sclerite; fore tarsi unarmed; fore wings 833, distal subbasal seta about 52 and somewhat broadened at tip, the others minute. Abdomen 321 at segment II; median tergite of I with anterior portion rectangular and reticulate; following terga sculptured except along posterior margin, reticulate but only slightly mucronate at sides, the reticles polygonal in lateral portions and largely quadrilateral in median area; tube 231, across base 74, at tip 37, sides thickened, nearly parallel in about basal half, thence roundly converging to slightly constricted tip, surface deeply hexagonally reticulate to near tip and heavily ridged, terminal setae 145; other setae mostly rounded or slightly dilated at tip, those on basal segments small or minute, I on IX 79 and slightly dilated at tip, II 182 and with slender pointed tip.

♂ (macropterous).—Like ♀ in color and general structure; glandular area on sternum VIII occupying most of its surface, roundly emarginate at sides.

BRAZIL: Nova Teutonia, S. C., July 1953 to October 1955, Fritz Plauermann, 35 ♀♀ (including holotype taken in May 1954) and 8 ♂♂ (including allotype taken in May 1953), under fallen leaves.

Apoxythrips, gen. nov.

(*apoxys*, tapering off; *thrips*—in allusion to the tapering abdomen, ending in a long, slender tube)

Allied to *Orthothrips*. Head, thorax, and abdomen polygonally reticulate; abdomen broadest in segment II or III, tapering posteriorly, the tube exceptionally long and slender, longer than head, and four to five times as long as basal width; bases of intermediate abdominal segments not modified at sides. Antennae 8-segmented; segments III and IV each with two apically-dilated setae, III with one sense-cone on either surface. Fore wings slightly curved, without accessory setae, the three subbasal setae all minute. Prothoracic epimeron not fused with notum. Setae reduced in size, the postoculars, antero-angulars, and postero-marginals very small; lateral abdominal setae and seta I on segment IX shorter than subbasal width of tube; seta III on intermediate abdominal segments not

projecting beyond sides of abdomen; posterior pair of wing-retaining setae on III-VI only slightly farther apart than their distance from sides of abdomen; seta I on these segments much closer to the wing-retaining setae than to sides of abdomen.

Type species: *Apoxythrips stilifer*, sp. nov.

***Apoxythrips stilifer*, sp. nov.**

♀ (macropterous).—Length about 1.8 mm. (nearly fully distended, 2.0 mm.). Color yellowish brown, with head nearly yellow and abdomen paling to nearly yellow in segments VII-IX, the tube dark brown; legs largely brown, with tips of femora and ends of tibiae yellowish, tarsi yellow; fore wings light brown, paler in front of anal lobe, and with a dark post-median streak ending at middle; antennae brown in segments I, II, and VI-VIII (these last darkest), III-V largely yellow, successively more heavily shaded beyond pedicel. Head 220, across eyes 161, behind eyes 148, across cheeks 166, near base 151, across basal collar 155, across head-process 87, its surface strongly reticulate; postocular setae 8, interval 125, distance from eyes 36; eyes 73, width 44, interval 73; mouth-cone normal to group, 56. Antennal segments: I 40 (40), II 50 (32), III 69 (26), IV 70 (27), V 70 (23), VI 60 (22), VII 43 (17), VIII 44 (13); sense-cones on III and IV 1 (1). Prothorax 110, across coxae 290; pronotum distinctly reticulate throughout; epimeral setae heavy, dilated at tip, 47 long, the other setae minute (about 8); mesothorax 329 across anterior angles; metanotal pelta reticulate like head; fore tarsi with a small tooth on inner surface; fore wings 836. Abdomen 356 at segment II, reticulate over most of surface; tube 294, across base 60, at tip 28, terminal setae 101; most setae stout and truncate at tip, III on intermediate segments not projecting beyond sides of abdomen, I on IX 36, II 132, the latter very finely pointed.

♂ (micropterous).—Like ♀ in color and structure; glandular area on sternum VIII of abdomen occupying about one-half the length and 0.7 the width of the segment, its lateral edges emarginate.

BRAZIL: Nova Teutonia, S. C. September and October, 1955, Fritz Plaumann, 3 ♀♀ (including holotype taken in September) and 2 ♂♂ (including allotype, also taken in September), under fallen leaves.

***Chorithrips*, gen. nov.**

(*choris*, asunder, apart; *thrips*—in allusion to the divided mesonotum)

Allied to *Orthothrips* and *Chamaeothrips*, differing from the former notably in the longitudinally divided mesonotal sclerite and from both in the presence of strong apodemes arising from the anterior margin of the second abdominal sternum. Head, thorax, and abdomen strongly sculptured, mostly by polygonal reticulation; head much longer than wide, broadest across eyes, notched behind them, heavily polygonally reticulate; mouth-cone very short, normal to group, rounded at tip. Antennae either 7- or 8-segmented, terminal segment pedicellate, III and IV with two or more thickened or apically-dilated setae. Prothoracic epimeron not fused with notum. Mesonotum divided medially by a suture. Fore wings slightly curved, without accessory setae on posterior margin, the subbasal setae all minute. Fore tarsi with a sharp triangular tooth on inner surface. Abdomen rounded apically (rather than evenly tapering); bases of intermediate segments not modified at sides; median tergite of I heavily

sclerotized, nearly or quite three times as wide as long, rounded; II with a pair of strong apodemes arising from anterior margin or sternum; tube much shorter than head, thickened, broadest at the two subbasal pores. Setae reduced in size, the postoculars and all of the prothoracics (excepting sometimes the epimerals) very small; lateral abdominal setae and seta I on segment IX shorter than subbasal width of tube; seta III on intermediate abdominal segments not projecting beyond sides of abdomen; posterior pair of wing-retaining setae on III-VII widely separated; seta I on III-VI much closer to the wing-retaining setae than to sides of abdomen.

Type species: *Chorithrips heptatoma*, sp. nov.

***Chorithrips heptatoma*, sp. nov.**

Readily known from *octotoma*, its only congener, by the 7- instead of 8-segmented antennae, and the much shorter epimeral setae on the prothorax.

♀, *forma macroptera*.—Length about 1.9 mm. (slightly distended, 2.0 mm.). Color yellowish brown to nearly yellow, with sides of head and prothorax, and all of pterothorax, darkened; tube brown, but nearly yellow basally and apically; abdominal terga III-VII each with a subrectangular dark gray median spot just behind antecostal line; legs yellow; fore wings light brown; antennae yellow in segments I-III, the following ones successively darker, shaded with brown beyond pedicel. Head 244, across eyes 168, just behind eyes 147, across cheeks 157, near base 134, across basal collar 136, across head-process 92, its surface strongly reticulate; cheeks straight; postocular setae 12, interval 135, distance from eyes 15; eyes 67, width 46, interval 77; mouth-cone normal to group, 42. Antennal segments: I 46 (43), II 53 (33), III 80 (28), IV 70 (28), V 65 (26), VI 57 (23), VII 77 (19), no suture between the morphological seventh and eighth; sense-cones on III 1 (1), IV 1 (2); two apical dorsal setae on III short and blunt. Prothorax 136, across coxae 260, pronotum reticulate throughout; epimeral seta 19, curved, slightly dilated at tip, all others pointed or nearly so, 9-16; mesothorax 276 across anterior angles; metanotal pelta with sides sharply demarcated, reticulate like head; fore tarsi with a small tooth on inner surface; fore wings 878. Abdomen 333 at segment III, polygonally reticulate throughout median tergite of I, in most of II, and in about lateral thirds of III-VII between antecostal line and first pair of wing-retaining setae, median third of III-VIII with cross-striae broken into quadrilaterals, VIII reticulate at sides, IX across base; tube 165, near base 69, at tip 28, terminal setae 70; other setae short, I on most segments blunt, II bluntly pointed, I on IX 35 and slightly dilated, II on IX 66 and pointed.

♀, *forma brachyptera*.—Like macropterous form in almost every particular; wing-pads about attaining middle of tergum II.

BRAZIL: Nova Teutonia, S. C., May 1953 to August 1955, Fritz Plauermann, 4 macropterous ♀♀ (including holotype taken in September 1954) and 12 brachypterous ♀♀ (including morphotype taken with holotype), under fallen leaves.

***Chorithrips octotoma*, sp. nov.**

Readily known from *heptatoma*, its only congener, by the 8- instead of 7-segmented antennae, and the much longer epimeral setae on the prothorax.

♀ (brachypterous).—Length about 1.6 mm. (fully distended, 1.8 mm.). Color brownish yellow, with pterothorax and tube somewhat more brownish, abdominal terga without median spots, legs concolorous with body; antennae yellow in segments I, II, and most of III, this last darkened with brown in swollen distal portion, IV-VI successively darker and less yellowish, VII and VIII dark blackish brown. Head 217, across eyes 147, just behind eyes 131, across cheeks 143, near base 116, across basal collar 117, across head-process 84, its surface strongly reticulate; cheeks nearly straight in basal four-fifths; postocular setae 22, interval 114, distance from eyes 23; eyes 47, width 38, interval 72; mouth-cone normal to group, 51. Antennal segments: I 44 (37), II 53 (32), III 70 (29), IV 58 (30), V 53 (29), VI 49 (24), VII 36 (19-20), VIII 36 (12); sense-cones on III 1 (1), IV 1 (2); about four apical setae on each of III and IV blunt. Prothorax 123, across coxae 246, pronotum reticulate throughout; epimeral seta 50, curved, slightly dilated at tip, all others (except the vestigial antero-marginals) 13-16 and blunt; mesothorax 245 across anterior angles; metanotal pelta not sharply delimited, reticulate like head; fore tarsi with a moderately strong tooth on inner surface; wing-pads about attaining posterior margin of tergum I. Abdomen 307 at segment II, polygonally reticulate throughout median tergite of I, in most of II, and in about lateral thirds of III-VII between antecostal line and first pair of wing-retaining setae, median third of III-VIII with cross-striae broken into quadrilaterals, VIII reticulate at sides, IX across base; tube 146, near base 67, at tip 24, terminal setae 67; other setae short, I and II blunt, I on IX 43 and slightly dilated, II on IX 80 and truncate.

♂ (brachypterous).—Like female in color and most details of structure; glandular area on sternum VIII occupying about one-half the length of segment at middle, emarginate laterally, not quite attaining lateral margins.

BRAZIL: Rio Caraguatá, Rio Grande do Sul, 1953, Fritz Plaumann, 3 ♀♀ (including holotype) and 1 ♂ (allotype), under fallen leaves.

Trypanothrips, gen. nov.

(*trypanon*, a carpenter's tool, a borer; *thrips*—in allusion to the long mouth-cone)

A striking genus, obviously allied to *Rhynchothrips* because of the very long mouth-cone and the general structure; but (1) with the suture bounding sides of pronotum dorsal and continued directly forward nearly to anterior margin, (2) fore coxae (in ♂) with a conspicuous dorso-lateral tooth or keel extending most of the length of the coxae, (3) fore wings abruptly pinched or constricted shortly before middle, (4) tube nearly parallel-sided, (5) terminal setae exceedingly long (more than five times the length of the tube and more than twice as long as width of mesothorax), and (6) postocular and major prothoracic setae short but with broadly-expanded tips, these tips usually constituting about one-half the length of the setae.

Head long, slender, with cheeks nearly parallel; mouth-cone very long, about attaining metasternum; maxillary palpi with very short first segment, the second segment with a terminal seta which is more than twice the length of the palpus itself. Prothorax (in ♂) long; pronotum confined to about middle half of dorsal surface, its lateral limiting sutures dorsal, concave, and extending forward to anterior margin, where its

width is about equal to that of head; fore legs of male moderately enlarged, fore coxae with a dorso-lateral tooth or keel which is higher anteriorly (shaped much like the dorsal fin of a shark), fore tibiae with a tooth on inner surface at apex, fore tarsi with a long, stout tooth; other legs normal. Fore wings constricted at basal third, where their width is about one-half that near base and near apex, the costal margin of this basal third arched forward; posterior margin with accessory hairs near tip. Abdomen with sigmoid wing-retaining setae on segments II-VII, otherwise normal, save for the nearly parallel-sided tube with its extremely long terminal setae, these fully five times the length of the tube, more than three times the length of the long head, and more than twice the width of the mesothorax.

Type species: *Trypanothrips coxalis*, sp. nov.

Trypanothrips coxalis, sp. nov.

♂ (macropterous).—Length about 1.6 mm. (fully distended, 1.9 mm.). Color gray-brown, with red internal pigmentation; abdomen paler basally, shading to dark brown in segment IX, tube dark brown across base and in about apical half, its remainder nearly black; femora about concolorous with body, fore tibiae and tarsi yellow, mid and hind tibiae yellowish at either end and shaded with brown between, their tarsi yellow; fore wings pale yellowish brown; antennae about concolorous with head, segment III yellow in pedicel and dappled with yellow, especially along outer surface, IV much darker than III but yellowish in about basal third. Head long and narrow, its length (211) about 1.5 times the width across eyes (140), width just behind eyes 136, across cheeks 144, in front of basal collar 139, across collar 141; cheeks straight and parallel except where they converge roundly to eyes; dorsal surface narrowly smooth along most of median line, remainder polygonally subreticulate; postocular setae short but unusually stout, broadly dilated at tip, 18 long, 87 apart, and 20 from eyes; eyes 75, about 45 wide and about 50 apart. Antennal segments: I 37 (33), II 55 (28), III 65 (31), IV 70 (31), V 58 (26), VI 58 (23), VII 54 (20), VIII 33 (12); sense-cones short, stout, rounded at tip, III 1 (2), IV 2 (2). Prothorax 220, across coxae 337, across front margin 188; dorsal surface subreticulate in the large lateral plates and narrowly along posterior margin, smooth elsewhere; major setae short, stout, broadly dilated at tip, antero-marginals and midlaterals 10-11, antero-angulars and coxals 20, postero-marginals 17, epimerals 28, this last pair with dilated tips about 15 long and 8 wide; armature of fore legs described under the genus; fore wings 686, only 33 wide where narrowed before middle, with seven accessory setae on posterior margin, the subbasal setae short, very stout, and with greatly expanded tips, the third one of these arising just beyond basal fourth of wing. Abdomen 262 at segment III; median tergite of I triangular, lightly reticulate except along posterior margin; tergum II with dark lines of sculpture sloping backwards toward midline, these mucronate and more reticulate-like toward sides of segment, median area smooth; III-VII very faintly cross-striate medially, mucronate and reticulate laterally; VIII and IX less distinctly sculptured; tube 127, width near base 46, at middle 37, near tip 38, at tip 37, terminal setae 658 (!); wing-retaining and terminal setae nearly black, all others pale, most of latter with broadly dilated tips, I on I-IX broadly dilated, I on the more basal segments with tip bent medially, that of seta I on IV 26,

I on IX 66 and broadly dilated, III on IX (the large lateral seta) 141 and pointed; sterna without glandular areas.

BRAZIL: Nova Teutonia, S. C., January 1956, Fritz Plaumann, 1 ♂ from dead branches.

***Polyphemothrips bursarius*, sp. nov.**

Like *tibialis* in small size, knobbed postocular and prothoracic setae, pale tibiae, and few accessory hairs on posterior margin of fore wings; but with all femora yellow, cheeks greatly swollen just behind eyes to form a pouch which is almost subangulate, rather than rounded, and eyes without enlarged facets at posterior angles.

♀ (macropterous).—Length about 1.9 mm. (fully distended, 2.1 mm.). Color brownish yellow, paler in all of abdomen; tube yellow, tipped with gray; legs concolorous with body; antennae about concolorous with head in segments I, II, and basal half of III, gray brown beyond, pedicels of IV-VII somewhat darker. Head 280, across eyes 185, greatest width across cheeks (opposite posterior margin of eyes) 224, least width near base 164, across basal collar 167; median line of head elevated and roof-like between postocular setae and base, surface almost perfectly smooth except for a few faint reticles on either side of extreme base; postocular setae 64, nearly straight, knobbed, interval 160, distance from eyes 40; mouth-cone 149, large, heavy, broadly rounded; eyes 65, width 53, interval 80, without enlarged facets posteriorly, evenly rounded. Antennal segments: I 39 (42), II 60 (32), III 63 (37), IV 64 (37), V 54 (31), VI 54 (27), VII + VIII 70 (22); sense-cones on III 1 (2), IV 2 (2). Prothorax 160, across coxae 294; pronotum without sculpture, with a small median lobe on posterior margin; epimeral setae 68, postero-marginals 63, coxals 48, others 31-40, all straight and knobbed; mesothorax 270 across anterior angles; fore wings 812, with about four accessory hairs on posterior margin, the three subbasal setae like prothoracics; pelta of metanotum not differentiated, longitudinally striate at sides of base, setae small and pointed. Abdomen 291 at segment III, surface almost perfectly smooth; tube 135, near base 69, at tip 29, sides very slightly concave, terminal setae 114; other setae moderately long, largely knobbed, I and II on IX pointed, 140 and 131, respectively.

BRAZIL: Rondon, Paraná (near Paraguay border), September, 1952, Fritz Plaumann, 1 ♀ from dead branches.

***Plectrothrips bicuspis*, sp. nov.**

Unique among the New World species in having two stout spurs, instead of one, on the middle tibiae.

♀ (macropterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color chestnut brown, yellow in basal part of head, posterior half of metathorax, and segment IX of abdomen, much darkened along sides of pterothorax; tube orange brown; legs bright golden yellow; fore wings pale brownish yellow, slightly paler subbasally; antennae largely brownish yellow, segment I brown basally and yellow across apex, II darkened in pedicel and along inner and outer surfaces, yellow at tip, III-VIII with tip and pedicel yellow, the intervening portion shaded with brown. Head 294, across eyes 196, across slight notch just behind eyes 186, across cheeks at their anterior sixth 196, across the negligible basal collar 182; surface lightly subreticulate across base, almost perfectly smooth else-

where, postocular setae 110, curved forward and finely pointed, 171 apart and 48 from eyes; mouth-cone broadly rounded, extending about 107 beyond posterior dorsal margin of head; eyes 100, width 54, interval 89. Antennal segments: I 54 (57), II 74 (43), III 83 (53), IV 71 (53), V 70 (43), VI 70 (34), VII 70 (26), VIII 76 (18); sense-cones short, conical, slightly granulate, III-V with one, only, on each side of apex. Prothorax 188, across coxae 473; pronotum lightly reticulate along sides and posterior margin, smooth elsewhere, posterior margin straight; epimeral setae 181, coxal 158, both curved and sharply pointed, the other setae small (30-58;) mesothorax 453 across anterior angles; fore wings 1360, with about 20-24 accessory setae on posterior margin; pelta of metanotum not differentiated, surface lightly longitudinally striate in about basal half, the two major setae very long (150) and pointed, about attaining first abdominal segment. Abdomen 412 at segment IV, surface largely lightly subreticulate; tube 207, across basal collar 109, at tip 59, sides nearly straight, terminal setae 165; other setae long, curved, and pointed, I on VI 241, I on IX 210, II on IX only 47 but stout and thorn-like (diameter 8), III on IX 238.

BRAZIL: Rondon, Paraná (near Paraguay border), November, 1952, Fritz Plaumann, 10 ♀ ♀ (including holotype), from dead branches.

Menothisrips, gen. nov.

(*menos*, strength, fierceness; *thrips*—in allusion to the powerful body and well-armed fore legs)

Allied to *Plectrothrips*, *Mastigothrips*, *Priesnerothrips*, etc., the head long (as in the second of these genera), but with the fore legs strongly armed, the fore femora having a prominent tooth on inner lower surface near apex (almost as in *Acanthothrips*), the fore tibiae with two parallel prominences at middle of the morphologically ventral surface and with the tip of outer surface somewhat prolonged, the fore tarsi with a very strong tooth which is about equal in size to the rest of the tarsus, the heavy apical "claw" on outer surface tridentate. Head long, broadest across eyes, not produced in front of latter, cheeks straight, postocular setae arising far behind eyes; eyes much narrower than their interval; ocelli anterior, not elevated on a prominence, the median one in advance of eyes; mouth-cone short, unusually narrow, rounded at tip, labium extending far beyond labrum, maxillary palpi short, stout, two-segmented; antennae 8-segmented, normal to group, stout, segments III-V each with two short, stout sense-cones, these on lower surface. Prothorax massive, normal to group, epimeron and coxa each with a major seta. Legs stout, especially the fore pair, which are armed as noted above; middle tibiae with one stout spur, hind tibiae with two. Wings straight, fore pair with many accessory setae on hind margin and with subbasal setae. Abdomen normal, narrower than prothorax; tube short and strongly sclerotized.

Type species: *Menothisrips ebriosus*, sp. nov.

Menothisrips ebriosus, sp. nov.

♀ (macropterous).—Length about 2.2 mm. (fully distended, 2.7 mm.). Color chestnut brown, yellowish in basal part of head and in most of pterothorax, much darkened at posterior angles of prothorax and along sides of pterothorax; tube orange brown, but yellow at tip; legs about

concolorous with body, with all trochanters, tibiae, tarsi, and tips of fore femora yellow, the mid and hind tibiae shaded at middle; fore wings brown, paler at base and in a narrow streak behind middle; antennae nearly concolorous with body in their darker portions, segment I darkest, tip of II and all of III golden yellow, IV and V yellowish but darker, VI-VIII dark brown but yellow basally. Head 304, across eyes 183, just behind eyes 170, near basal collar 153, across collar 156, just in front of eyes 122, with a narrow median suture at base, distinctly subreticulate across base, faintly so in a median area from eyes to postocular setae, nearly smooth elsewhere; postocular setae 116 (sometimes only 89), curved forward and dully pointed, 135 apart and 66 from eyes; mouth-cone extending 114 beyond posterior dorsal margin of head, 87 beyond ventral margin, basal width 77; eyes 102, width 50, interval 84. Antennal segments: I 69 (54), II 70 (45), III 53 (56), IV 47 (53), V 47 (41), VI 54 (32), VII 56 (24), VIII 74 (18), III-V (especially III) wine-glass shaped; sense-cones smooth. Prothorax 280, across coxae 433; pronotum smooth except for subreticulation across anterior margin; epimeral seta 120, coxal 103, others minute (18-28), all pointed; mesothorax 351 across anterior angles; fore wings 1110, with about 17 accessory setae on posterior margin; pelta of metanotum not differentiated, surface finely longitudinally striate, the two major setae long (120) and nearly pointed. Abdomen 389 at segment III, surface almost perfectly smooth, except for the lightly subreticulate median tergite of segment I; tube 124, width near base 82, at tip 37, sides slightly convex, terminal setae 178; other setae long, curved, and nearly or quite pointed, I on IX 109, II 100, III 134.

BRAZIL: Rio Caraguatá, Matto Grosso, August, 1953, Fritz Plaumann, 67 ♀♀ (including holotype) from dead branches.

Lonchothrips, gen. nov.

(*lonche*, a spear-head; *thrips*—in allusion to the shape of the projection on the second antennal segment)

Of the form and general appearance of the allied *Chirothripoides*, resembling that genus in most respects, such as the greatly elongated narrow body, the form of the head, and the general structure of the antennae; but differing most noticeably in the absence of tibial spurs on the middle and hind legs, the long process on the second antennal segment, the prolongation of the tip of the tube into a sharp point, and the one, instead of two-segmented maxillary palpi. Head long, greatly produced in front of eyes, the latter long and closely approaching each other medially; ocelli large, anterior, not elevated on a prominence, the median one in advance of eyes; mouth-cone short, labium broadly rounded, extending far beyond labrum; maxillary palpi one-segmented, as a result of the complete loss of the usual short basal segment; antennae 8-segmented, I long, concave on inner surface for reception of frontal costa (thus paralleling and almost touching its mate), II remarkable in having its base prolonged forward ventrally to tip of III in the form of a heavy triangular flat blade, the remainder of antenna roughly typical of group, except that the pedicels of IV-VIII are very short and barely visible, and that the sense-cones are dorsal or dorso-lateral, with none on inner surface of III. Prothorax very long, consisting of three metamere-like units (!), its surface mostly membranous but with several weakly-defined, inter-

digitating sclerites whose longitudinal inter-striae are continued as lines of stipples in the membranes, the usual sclerites not recognizable, major setae wanting; pterothorax likewise very long. Legs (especially the fore pair) short and stout; "claw" on outer surface of fore tarsi saw-like, with about seven teeth; mid and hind tibiae without enlarged spurs. Wings straight and narrow, the fore pair with accessory setae on posterior margin but without subbasal setae. Abdomen very long and very narrow, without wing-retaining setae and with major setae only on segments I, VIII, IX, and at tip of tube, the more basal terga emarginate at middle of anterior margin; tube remarkable in having ventral surface prolonged to form a stout sharp spine which over-reaches apex.

Type species: *Lonchothrips linearis*, sp. nov.

Lonchothrips linearis, sp. nov.

♀ (macropterous).—Length about 1.6 mm. (fully distended, 1.8 mm.). Color pale yellowish brown, with tube, tibiae, and tarsi paler, and front of head blackish brown; fore wings yellowish gray, with an ill-defined darker median streak except at base and apex; antennae brown, except for the pale yellow second segment and the yellow pedicel of the third. Head 170, across eyes 69, just behind eyes 50, across cheeks (at base of head) 63, length in front of eyes 53, width in front of eyes 49; cheeks membranous from base to eyes, base membranous at middle of dorsum, sclerotized portions very finely longitudinally striate, all setae minute; eyes 73, width 28, interval 13; mouth-cone to tip of labium from posterior dorsal margin of head 68, to tip of labrum 21; maxillary palpi short, one-segmented. Antennal segments: I 50 (maximum longitudinal dimension) (25), II 37 (inclusive of process 80) (22), III 43 (28), IV 32 (33), V 28 (27), VI 25 (23), VII 20 (16), VIII 35 (14); sense-cones short, stout, curved, granulate, III with one on outer surface, IV and V each with two on dorsum near apex, one on either side. Prothorax 196, across coxae 147; pterothorax 363 long; mesothorax 136 wide anteriorly, metathorax 143 wide anteriorly, 125 wide posteriorly; fore wings 700, usually with about six accessory setae; mesonotum very finely longitudinally striate, metanotum similarly striate across base and in about middle third of remainder. Abdomen 119 at segment IV, dorsal surface finely longitudinally striate in segments I-VIII; III-VIII each with a pair of foveae near anterior angles, whose inner anterior margins overhang to form a dark arc; posterior margin of VIII slightly prolonged medially into an obtuse angle; anterior margin of IX with a slight median lobe extending forward under VIII; tube 83 (total ventral length); spine-like process 30, width near base 9; greatest width of tube 53 (at basal fourth of total length), width at distal setae 24, its sides somewhat concave in apical half; terminal setae 61; tergum I with a pair of fine pointed setae (32 long) arising from posterior angles, II-VII with all setae minute, IX with seta I 61, II 73, both pointed.

BRAZIL: Rio Caraguatá, Matto Grosso, August, 1953, Fritz Plaumann, 72 ♀♀ (including holotype) from dead branches.

Preeriella macilenta, sp. nov.

Like *minuta* in having 8-segmented antennae, but with tube stouter, head nearly 2.3 times as long as width across eyes, and setae longer.

♀ (macropterous).—Length about 0.9 mm. (fully distended, 1.1 mm.).

Color pale yellow; head brown in front of eyes, lightly shaded at sides near eyes and more deeply yellow across base; prothorax shaded in epimera and mediad of them, pterothorax slightly darkened in anterior angles, femora slightly shaded on the morphologically dorsal surface; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae pale yellow in segments I and II, remainder yellowish gray, III somewhat paler and with base yellow. Head 140, across eyes 61, just behind eyes 60, behind middle 50, near base 55, across head-process 42, the cheeks concave posteriorly; surface reticulo-striate posterior to postocular setae, the cheeks thus serrate in this area; postocular setae 59, straight, swollen at tip, interval 27, distance from base of head only 40; anterior pair of genal setae 33, pointed; eyes about 44, normal in form. Antennae thoroughly typical; segment I 19 (20), II 30 (23), III 18 (17), IV 31 (24), V 32 (20), VI 29 (15), VII 17 (10), VIII 19 (6-7). Prothorax 89, across coxae 121; antero-marginal setae 24, antero-angulars 67, epimerals 47, postero-marginals 43, coxals 47, this last pair and the minute mid-laterals pointed, the others swollen at tip; mesothorax 115, fore wings 495. Abdomen 122 at segment VI, tube 52, across base 36, at tip 22, terminal setae 111; other setae long, many of them dilated at tip, I on IX 77 and slightly dilated at tip, II 71 and pointed.

BRAZIL: Belém, Pará, July 29, 1951, J.D.H., 1 ♀ (holotype), from dead vines on Papaya trees.

Preeriella marginata, sp. nov.

Like *minuta* in having 8-segmented antennae, but with tube stouter, head about twice as long as width across eyes, and antero-marginal setae minute.

♀ (macropterous).—Length about 0.9 mm. (fully distended, 1.1 mm.). Color uniform pale yellow; head not darkened in front; fore wings dark gray basally, in distal half nearly colorless and with a narrow dark post-median line; antennae pale yellow in segments I and II, remainder pale yellowish gray. Head 107, across eyes 54, just behind eyes 53, behind middle 43-44, near base 49, across head-process 39, the cheeks concave posteriorly; surface very faintly reticulo-striate basally, the cheeks scarcely serrate in this area; postocular setae 38, straight, swollen at tip, interval 25, distance from base of head only 33; anterior pair of genal setae 23, pointed; eyes about 33, normal in form. Antennae thoroughly typical; segment I 17 (20), II 27 (21), III 15 (16), IV 27 (23), V 24 (19), VI 24 (14), VII 15 (8), VIII 17 (5). Prothorax 73, across coxae 120; antero-marginal setae 5, antero-angulars 44, epimerals 37, postero-marginals 30, coxals 40, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 103, fore wings 413. Abdomen 97 at segment V; tube 50, across base 36, at tip 20, terminal setae 84; other setae long, many of them slightly dilated at tip, I on IX 40 and slightly dilated at tip, II 55 and pointed.

BRAZIL: Nova Teutonia, S. C., Fritz Plaumann, November 9-11, 1949, 1 ♀ on *Cedrella*; and December 14, 1949, 4 ♀♀ (including holotype) on either *Alchornea* or *Trichilia*.

Preeriella fumosa, sp. nov.

Like *minuta* in having 8-segmented antennae, but with tube stouter,

head about 1.7 as long as width across eyes, and antero-marginal setae large (24).

♀ (macropterous).—Length about 0.8 mm. (fully distended, 1.0 mm.). Color yellow, shaded with brownish gray in all of head, prothorax, along sides of pterothorax, in metanotum, along sides of abdomen, and in most of tube and femora; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae pale yellow in segments I-III, remainder yellowish gray, I and III usually very lightly shaded. Head 104, across eyes 62, just behind eyes 61, behind middle 50, near base 51, across head-process 39, the cheeks concave posteriorly; surface very faintly reticulo-striate posterior to postocular setae, the cheeks scarcely serrate in this area; postocular setae 40, straight, swollen at tip, interval 34, distance from base of head only 30; anterior pair of genal setae 17, pointed; eyes (of paratype) 27, width 25, interval 14, normal in form. Antennae thoroughly typical; segment I 15 (19), II 26 (19), III 13 (16), IV 23 (24), V 23 (19), VI 23 (14), VII 15 (8), VIII 19 (5). Prothorax 71, across coxae 122; antero-marginal setae 24, antero-angulars 47, epimerals 37, postero-marginals 34, coxals 36, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 108, fore wings 427. Abdomen 133 at segment V; tube 41, across base 31, at tip 18, terminal setae 68; other setae long, most of them dilated at tip, I on IX 39 and slightly dilated at tip, II 29 and pointed.

BRAZIL: Nova Teutonia, S. C., Fritz Plaumann, May 25, 1949, 7 ♀ ♀ (including holotype) from *Solanum*; October 18-20, 1949, 1 ♀ in capoeira; and May, 1952, 4 ♀ ♀ without further data.

Preeriella discors, sp. nov.

Very different from all other species of the genus in having 7-segmented antennae and a dark blackish brown head.

♀ (macropterous).—Length about 0.9 mm. (fully distended, 1.1 mm.). Color blackish brown in head, brown in prothorax and fore femora, lightly shaded with brown along sides of pterothorax, and with a pair of obscure brown spots at sides of mesonotum, the remainder of body and legs yellow except for the gray-tipped tube; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae pale brown in segment I, dull yellow in II and basal third of III, remainder yellowish gray. Head 103, across eyes 63, just behind eyes 62, behind middle 52, near base 50, across basal collar 52, across head-process 40, the cheeks concave posteriorly; surface distinctly reticulo-striate between and posterior to postocular setae, the cheeks distinctly but widely serrate in basal third; postocular setae 43, nearly straight, swollen at tip, interval 35, distance from eyes 13, from base of head 36; anterior pair of genal setae 17, pointed; eyes about 38. Antennae 7-segmented, the reduction from 8 resulting from the union of III and IV; I 15 (19), II 27 (20), III 37 (23-24), IV 23 (17), V 26 (13), VI 17 (8), VII 21 (5). Prothorax 82, across coxae 121; antero-marginal setae 21, antero-angulars 59, epimerals 46-48, postero-marginals 38, coxals 41, this last pair and the minute midlaterals pointed, the others swollen at tip; mesothorax 103 wide, fore wings 462 long, metathorax 109

wide. Abdomen 102 at segment V; tube 49, across base 33, at tip 18, terminal setae 89; other setae all long, many of them knobbed, I and II on IX 56-57, the former pair knobbed.

BRAZIL: Nova Teutonia, S. C., December, 1949, Fritz Plaumann, 1 ♀ (holotype) from *Trichilia* sp.

Hydithrips nanellus, sp. nov.

Like *tesselatus* in lacking a pair of strong setae near inner dorsal margin of eyes, but with much shorter head.

♀ (macropterous).—Length about 0.7 mm. (fully distended, 0.9 mm.). Color blackish brown, with red internal pigmentation, tube darker at middle; legs concolorous with body, tarsi and ends of tibiae paler; fore wings dark gray basally, paler in distal two-thirds, with a narrow pale median streak beyond middle, this bordered posteriorly by a narrow dark line, most of costal hairs with a dark cloud at base; antennae yellowish gray-brown in segments I and II, the former segment darker, III-VIII nearly uniform blackish brown. Head 85, across eyes 73, just behind eyes 72, across anterior end of cheeks 74, near base 66, across basal collar 66-67, across head-process 43, the cheeks thus rounded to eyes and concave posteriorly; surface polygonally reticulate with dark lines which are only slightly elevated, the reticles between postocular setae less distinct; postocular setae 44, curved strongly inward, acieulate apically, dilated at tip, interval 64, distance from eyes 7, from base of head 28; eyes about 38, normal in form. Antennae typical of genus; segment I 13 (20), II 23 (21), III 39 (26), its pedicel only 3 wide, IV 24 (19), V 27 (13), VI 16 (6), VII 19 (4). Prothorax 58, across coxae 133; pronotum transversely depressed across middle above a prominent dark apodeme, smooth, reinforced with a dark line along straight posterior margin; antero-marginal setae arising 9-10 behind the margin, 44 long and 60 apart; antero-angulars about 3 behind margin, 46 long and 72 apart, epimerals 36, postero-margins 51, all with dilated, bent, divided tips, coxals 43 but weaker, paler, and pointed; mesothorax 118, metathorax 123, wings 427 long, all normal; metathoracic pelta with elevated reticulated elliptical basal portion. Abdomen 117 at segment V; tube 41, across base 33, at tip 19, sides slightly concave, terminal setae 71; other setae long, most of them dilated at tip, I on IX 72, dilated at tip and heavy, II 63, slightly dilated at tip and slender.

BRAZIL: Nova Teutonia, S. C., November 1955, Fritz Plaumann, 1 ♀ (holotype), from dead branches.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE STATUS OF THE SEMINOLE BAT, *LASIURUS*
SEMINOLUS (RHOADS)

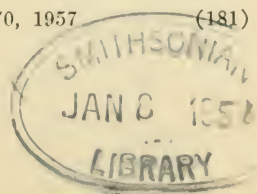
BY WAYNE H. DAVIS

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The status of the Seminole bat, *Lasiurus seminolus* (Rhoads) has been thoroughly treated, and ordinarily no further discussion of the subject should be necessary. However, Miller and Kellogg (U. S. Natl. Mus. Bull. 205, p. 105, 1955), and a subsequent worker (Sealander, Amer. Midl. Nat., 56:264, 1956) who apparently follows their treatment, have given the erroneous impression that the animal in question is a subspecies of *Lasiurus borealis* (Müller). Kellogg has since indicated (personal correspondence) that this listing was due to an unfortunate oversight.

Both Barkalow (Jour. Mamm., 29:415, 1948) and Coleman (Jour. Mamm., 31:190, 1950) have presented evidence to show that the Seminole bat is not a geographical race of *L. borealis*. Each of the two species has a definite range, and these ranges overlap broadly. The two species often utilize the same feeding territory, and in some places have been found together throughout the year. No specimen intermediate between the two forms has ever been taken. In view of such evidence, to consider the Seminole bat a race of *L. borealis* would indicate a misunderstanding of the fundamental concepts of species and subspecies.

Since a work as important as Miller and Kellogg has re-introduced an improper nomenclature for this bat, it is essential that the situation once again be brought to the attention of mammalogists.



1887-12-28

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE STATUS OF FONTARIA CORIACEA KOCH AND
OF POLYDESMUS CORRUGATUS WOOD: A MOST
REGRETTABLE TANGLE OF NAMES IN THE DIPLO-
PODA (POLYDESMIDA: XYSTODESMIDAE)

BY RICHARD L. HOFFMAN

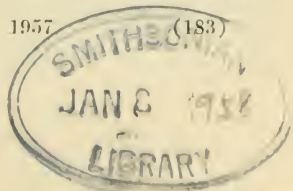
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It has been stated that, next to infallibility, an author's most prized gift is to be able to discover and rectify his own mistakes, as this somewhat ameliorates the situation in the eyes of the culprit, if no one else. Inasmuch as I became guilty, some years ago, of compounding one of the most egregious errors yet committed in the study of American diplopods, I am very grateful to have the opportunity of disclosing and uprooting this particular weed in the field of milliped nomenclature.

More than a century ago (1847) the celebrated student of arachnids and myriapods C. L. Koch described nearly a dozen species of millipeds from North America, including three referred to the genus *Fontaria*. One of these was identified with the earlier *Fontaria virginiensis* (Drury), the other two, *F. coriacea* from Virginia and *F. oblonga* from Pennsylvania, being described as new. Subsequently Koch compiled the material from his 1847 work, the "System der Myriapoden," into a sumptuous volume published in 1863 under the title "Die Myriapoden, getraut nach der Natur abgebildet und beschrieben." This work is largely a reprint of the earlier one, with the omission of classification, and with enlarged and improved illustrations and a few additional species.

Curiously enough, however, the work of Koch was unknown to Horatio C. Wood, the first prominent American student of the Diplopoda. In 1864 Wood himself named several species in *Fontaria* (which he considered a subgenus of *Polydesmus*), namely, *bifidus*, *crassieutis*, *corrugatus*, and *trimaculatus*. A year later, these were all redescribed and illustrated, along with what Wood considered to be *virginiensis*, in his classic monograph of the myriapods of North America.

The species of *Fontaria* named by Koch and Wood coexisted peacefully in the literature for more than twenty years, until they engaged



the attention of Charles H. Bollman. This worker, in attempting to work out the correct identifications of the Kochian species, unwittingly created a confusion of names which has persisted for more than 70 years!

Bollman's first reference to Koch's *Fontaria* species appeared in 1889, in a catalog of the myriapods of Indiana. Under the name *Fontaria coriacea*, he listed Wood's name *corrugatus* as a synonym, and stated that "A comparison of specimens of *corrugata* Wood with Koch's figures and descriptions shows that they are the same. Koch's figures show a broad yellow band along the posterior margin of each segment. This is a character common to the eastern specimens, but rare in the western forms." In the same paper, under the diagnosis of his new species *Fontaria butleriana*, Bollman wrote "It approaches very closely to Koch's figures of *F. virginensis*, and it is probable that he has described this species as *virginensis*."

Bollman's catalog of the North American myriapods, posthumously published in 1893 (U. S. Nat. Mus. Bull. 46), again placed *corrugatus* in the synonymy of *coriacea*, and listed *oblonga* as a valid form, but did not mention the name *virginensis*, *sensu* Koch. In the same volume, however, appeared a short paper entitled "Notes upon the North American Myriapods described by C. L. Koch" in which Bollman discussed all three of the *Fontaria* names.

For *virginensis* we have the following comments: "The specimens Koch has referred to the *Julus virginensis* of Drury do not belong to that species, but seem to be very close, if not identical, with *Fontaria butleriana* Bollman from Indiana. His figures represent a distinct narrow yellow band along the posterior margin of the segments as in the latter species."

Bollman then disposed of *coriacea* as follows: "A valid species of which *Polydesmus corrugatus* Wood is a synonym. His specimens have a yellow band along the posterior margin of the segments as is the case in the eastern specimens of *coriacea*."¹

Koch's *F. oblonga* was regarded as "A valid species belonging to the same group as *castanea*, *tennesseensis*, and *pulchra*, and perhaps closely allied to the latter, from which it is separated by the superior position of the repugnatorial pore. Koch's specimens, as indicated by the color, were probably not full grown."

These remarks so influenced subsequent workers that no one has ever seriously challenged Bollman's views. However, from time to time various misidentifications of "*coriacea*" appeared in the literature, and upon becoming interested in the genus *Apheloria*, into which *coriacea* had been subsequently placed, I felt constrained to publish a redescription of what, on Bollman's authority, appeared to be Koch's *coriacea*. Not at the time, possessing *Die Myriapoden*, I made a somewhat hurried examination of a copy at the U. S. National Museum, when it was noted that the three American species of *Fontaria* were all figured on

¹This reiterated statement is very perplexing. It is difficult to imagine what Bollman had at hand to represent "eastern specimens of *coriacea*" for I have never seen any *Apheloria* material so colored. It seems possible that he actually had no material, and relied upon Wood's notes and illustration of *corrugatus*, which in turn were made from preserved and possibly discolored specimens. What then, is the identity of Bollman's Indiana "*coriacea*" which, by implication of the earlier statement, rarely have a broad yellow transverse band across each tergite? I have so far not located this part of the Bollman Collection at the U. S. National Museum.

the same plate (XXXII) as figures 62-64, and that one of them corresponded closely to what I had come to recognize, from museum specimens and literature accounts, as *Apheloria coriacea*. Subsequently the order of the illustrations and the names became reversed in my mind, and the synonymy proposed by Bollman thereupon seemed to be entirely correct. In 1949 I became his accomplice by publishing a redescription and designating neotypes of "*coriacea*" from eastern Virginia. This was a blunder of no mean proportions, and to those who have followed the matter this far, I can only address the pretext attributed to the late Thomas Barbour, "I was very young when I wrote that paper."

Since that time several events again focussed attention upon the status of *coriacea*. A copy of *Die Myriapoden* was obtained and studied at length; several hundred specimens of *Apheloria* in full color were examined; and, most important, type material of *Polydesmus corrugatus* became available. In the U. S. National Museum are four specimens labeled—probably by O. F. Cook—as types of *corrugatus*, and, if there be any doubt about their status, there are topotypes in the Museum of Comparative Zoology which are identical with the ostensible types.

Let us start at the beginning and examine Koch's accounts and illustrations in *Die Myriapoden*. Figure 62, on Plate XXXII, depicts a large robust xystodesmid about 35 mm long, dorsally brownish-black with red or pink paranota and a narrow yellow stripe on the caudal edge of each tergite. This illustration is of *Fontaria virginiensis* (as identified by Koch) but the animal is clearly what I described in 1949 as *coriacea* and what has been going by that name ever since 1893. The identification on the basis of form and color is corroborated by the text comment which states that "Die Oeffnung der weiblichen [*sic*] Genitalien gross und oval, die Genitalien mit einer langen Zange, die Zangetheile pfriemenförmig und gleich einem Pfropfenzieher gewunden." The phrase "coiled like a corkscrew" is quite a good characterization of the male gonopod of an *Apheloria*!

On the other hand, the figure of *F. coriacea* (fig. 63) shows a smaller species, in which the dorsum is blackish, and ornamented with very broad yellowish bands which appear to occupy most of the metatergites and expand laterally upon the paranota. This coloration does not correspond to that of any species of *Apheloria* known to me, nor to any xystodesmid occurring in the Atlantic Coast region except that which I named some years ago as *Zinaria rubrilata*, so named because of the very wide chestnut colored stripes across the tergites. Unfortunately, Koch's description must have been made from a female specimen, for he made no mention whatever of "Genitalien." It seems premature to identify the name *coriacea* with one of our established species at this time, but there can be no doubt that the name is *not* a senior synonym of *corrugatus* Wood or of any other known form of *Apheloria*. Probably it might best be placed on the list of *nomina dubia* for the time being. It is a matter of regret that the location of Koch's myriapod material is unknown. My colleagues C. A. W. Jeekel and Otto Kraus have been unable to locate any definite information on the matter.

As the matter now stands, *Fontaria virginiensis* Koch 1847 (*nec* Drury 1770) seems clearly to be the oldest name definitely based upon a species of *Apheloria*. Yet, as it is preoccupied, it falls as a junior

objective homonym of *Fontaria virginensis* (Drury), a combination which dates from the use of J. E. Gray in 1832. Since *Fontaria coriacea* Koch is here considered to be not a species of *Apheloria*, it follows that the first valid name based upon a member of that genus is Wood's *corrugatus*, erected in 1864 for the large, widespread species of eastern United States ornamented with reddish paranota and yellow crossbands. The combination *Apheloria corrugata* has in fact already been established by Count von Attems (1938, *Das Tierreich*, 69:170), although Attems did not explain his usage. Perhaps his line of reasoning paralleled mine as outlined above.

Although I am unable to understand Bollman's statement that the broad yellow bands shown for *coriacea* are "... common to the eastern specimens but rare in the western forms . . .," I am in complete accord with his comment that *Fontaria butleriana* approaches very closely to Koch's figures of *F. virginensis*. I have seen the types of *butleriana* in the National Museum, and regard them as representative of a mid-western subspecies of *corrugata* in which the red pigment of the paranota is replaced by yellow which occupies a smaller portion of the surface than in the nominate form.

The correct name and skeleton synonymy for the typical subspecies of northeastern United States is as follows:

Apheloria corrugata corrugata (Wood)²

Fontaria virginensis (nec Drury 1797) Koch, 1847, *Syst. der Myriapoden*, p. 141; 1863, *Die Myriapoden*, p. 71, pl. 32, fig. 62 (type locality: North America).

Polydesmus corrugatus Wood, 1864, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 6, p. 6; 1865, *Trans. American Philos. Soc.*, vol. 13, p. 222, fig. 50, 51.

Fontaria coriacea (nec Koch 1847) Bollman, 1889, *Proc. U. S. Nat. Mus.*, vol. 11, p. 406; 1893, *Bull. U. S. Nat. Mus.*, No. 46, p. 123, 152.

Apheloria coriacea Loomis, 1939, *Bull. Mus. Comp. Zool.*, vol. 86, p. 193; Hoffman, 1949, *Amer. Mus. Nov.*, No. 1405, pp. 1-8, figs. 1-4.

Apheloria corrugata Attems, 1938, *Das Tierreich*, lief. 69, p. 170.

Apheloria adela Chamberlin, 1939, *Bull. Univ. Utah, biol. ser.*, vol. 5, No. 3, p. 10, fig. 34 (type locality: Ithaca, New York); Hoffman, 1949, *Proc. U. S. Nat. Mus.*, vol. 99, p. 372; Causey, 1955, *Proc. Biol. Soc. Washington*, vol. 68, p. 25.

Type specimens.—Four specimens (U.S.N.M. No. 2303) labeled "types" are probably part of the Wood Collection which is largely at the Academy of Natural Sciences of Philadelphia. Several other millipeds, indicated as Wood's types, have recently been discovered at Washington, and it is known that Cook had borrowed parts of the Academy's milliped collection in the 1890's. In the original description Wood cited "Michigan" and Trenton Falls, New York, as localities for the species, and of these two the latter is selected for the type locality since it is unlikely that the typical subspecies as conceived on the basis of the type material extends as far west as Michigan.

Diagnosis.—*A. corrugata* belongs in the typical section of the genus

²*Fontaria butleriana* Bollman 1889 and *Apheloria virginia* Chamberlain 1939 are regarded as recognizable subspecies, occurring respectively in the Ohio-Indiana-Kentucky region and in south central Virginia.

with *montana* (Bollman), the genotype, the two having almost identical gonopods. The coloration, however, is very characteristic, there being no other American xystodesmid known to me in which the paranota are brilliantly reddish-pink with a narrow lemon yellow strip on the caudal margin of the tergites. This color pattern is stable over the entire Appalachian region from New England to southern Virginia, but at the southwest and western edges of the range *corrugata* modifies its coloration into the patterns which represent the subspecies *butleriana* and *virginia*.

Synonymy.—The status of *virginiensis* Koch has already been discussed. I have seen a considerable number of living and preserved specimens from Ithaca, New York, the type locality of *A. adela*, and can find no characters of structure or coloration by which that local population differs from the rest of the population at large. The Virginia specimens which I tentatively referred to *adela* in 1949 have since been found to be intergrades between *corrugata* and *butleriana*, and I presume this to be the status of the material recorded from West Virginia by Causey (1955) as *adela*. These specimens are usually smaller than typical *corrugata*, and the red color of the paranota is greatly reduced and partly replaced with yellow. This sort of millipede is found in the Appalachian Plateau region from southwestern Virginia north to western Pennsylvania. Further to the west it merges into the all-yellow ornamentation of *A. e. butleriana*.

Distribution.—From southern Virginia (Nansemond, Surry, Campbell, and Bland counties) north through the Appalachians and Coastal Plain at least to the upper Adirondaek region and adjacent parts of New England. The northern limits of the range are still poorly known.

Summary

C. H. Bollman (1889) established the synonymy of *Fontaria coriacea* Koch 1847 and *Polydesmus (Fontaria) corrugatus* Wood 1864, an association which has been accepted by virtually all subsequent workers.

However, it seems apparent, on the basis of material determined as *corrugatus* by direct comparison with the original types of Wood, that those two names are *not* synonyms. Bollman did not mention the locality of the specimens which he regarded as *corrugatus* and which were said to match Koch's figure of *coriacea*; and I have never seen any material of *Apheloria* which does.

The species described by Koch under the name *Fontaria virginiensis* is not conspecific with *Fontaria virginiensis* (Drury), thereby becoming a junior primary homonym, but it is conspecific with that described by Wood as *corrugatus* and identified by Bollman as *coriacea*.

Fontaria coriacea Koch is herewith considered unidentifiable at the present; it is certainly not a species of *Fontaria* Gray (genotype: *Julus virginiensis* Drury) in the strict sense, nor of *Apheloria* Chamberlin (genotype: *Fontaria montana* Bollman).

Therefore, *Polydesmus corrugatus* is resurrected from its unwarranted relegation to synonymy, and restored as the correct name for the most abundant and widespread species of *Apheloria* in eastern North America.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

AN INNOMINATE LAUGHING-THRUSH (*GARRULAX*)
OF NORTHWESTERN YUNNAN

By H. G. DEIGNAN¹

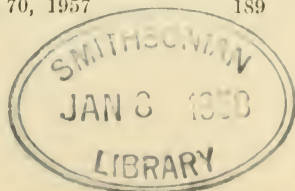
Vaurie (Amer. Mus. Novit., No. 1669, 1954, p. 6) has recently dealt with the Chinese races of *Garrulax cineraceus*, accepting the name *styani* Oustalet for the race of northwestern Yunnan (*terra restricta*: Tzeku) and *cinereiceps* Styan for the one of the Yangtze Valley, thus following the missteps of Hartert (Vögel der paläarkt. Fauna, hfa. 5, 1909, pp. 630-631), Rothschild (Novit. Zool., vol. 33, 1926, pp. 264-265), and Birkhead (Amer. Mus. Novit., No. 966, 1937, pp. 10-11). Unfortunately, no one of these authors seems to have studied carefully Oustalet's remarks at the first appearance of the name *styani*, or their treatment must have been quite different.

Oustalet (Bull. Mus. Hist. Nat. [Paris], tome 4, 1898, pp. 224-226) begins by giving the history of Styan's type of *cinereiceps* and follows with a meticulous description of the form, drawn from Styan's diagnosis and colored plate. Next, he refers to four specimens coming from Tatsienlu and three others earlier sent from Tzeku, which differed in a number of particulars from *cinereiceps*, and these differences are detailed. He emphasizes that, in these birds, "le sommet de la tête n'est ni gris, ni gris brunâtre, mais d'un brun olivâtre fortement maculé de noir, ou même, chez quatre individus, d'un noir franc, et qui dessine une véritable calotte, nettement délimitée, sauf vers la nuque où elle se fond, pour ainsi dire, en petites taches disséminées." (Italics are Oustalet's.)

In the next paragraph he continues: "Ces différences de coloration et de dimensions jointes à la différence de provenance sont-elles suffisantes pour motiver une distinction spécifique? J'hésite à le croire, d'autant plus que MM. C.-B. Rickett et J.-D. de la Touche disent que, parmi les *Trochalopteron cinereiceps* qu'ils ont obtenus à Ching Feng Ling, à 100 milles au Nord-Ouest de Fou-tchéou, . . . il y avait un spécimen chez lequel la tête était couverte d'une calotte d'un noir presque uniforme. À côté de cet individu, d'autres exemplaires, en petit nombre, avaient le vertex d'un gris foncé, avec des marques noires au centre des plumes, et beaucoup d'autres avaient le dessus du vertex d'un brun grisâtre, à peine plus foncé que la teinte du manteau."

Continuing, he proves that *Trochalopteron ningpoense* David and Oustalet, 1890, can only be the same as *Trochalopteron cinereiceps*, which is sympatric with *ningpoense* in Chekiang.

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Summing up, and assuming that the differences are due to differences of season, age, or sex, Oustalet shows that the range of *cinereiceps* must now be broadened to cover Fukien, Chekiang, Szechwan, Yunnan, and "probablement . . . les provinces intermédiaires," in which case one need no longer doubt the word of the Chinese dealer from whom Styan obtained his type specimen. "Mais alors, sous quel nom conviendrait-il de désigner un *Trochalopteron* aussi largement répandu? Évidemment, le nom de *Trochalopteron ningpoense* disparaîtrait devant celui de *Trochalopteron cinereiceps* qui aurait la priorité. Mais conviendrait-il alors d'appeler *Trochalopteron* à tête grise un Oiseau chez lequel le sommet de la tête serait d'un noir franc dans la livrée de noces, et d'un brun olivâtre, mélangé de noir et tirant à peine au gris, dans la plumage de transition? Je proposerai dans ce cas de le désigner plutôt sous le nom de *Trochalopteron styani*, en l'honneur du naturaliste anglais qui, le premier, a fait connaître l'espèce."

Somewhat later (*ibid.*, pp. 253-255), Oustalet returns to his subject. Here he says: "*Trochalopteron styani*. Sous ce nom j'ai proposé de désigner l'espèce décrite par M. Styan sous le nom de *Trochalopteron cinereiceps*, dans le cas où il serait reconnu que certains *Trochalopteron* à tête noire du Setchuan et du Yun-nan ne représenteraient que la forme adulte et en plumage de noces des *Trochalopteron* à tête grise étudiés par M. Styan. L'étude que j'ai pu faire de trois nouveaux exemplaires envoyés de Tsé-Kou par le R. P. Soulié . . . n'a fait que me confirmer dans l'idée que j'avais émise de l'identité spécifique de tous ces Oiseaux." There follows a discussion of the great variability of the several characters, and the near relationship of *cineraceus* of Manipur is pointed out.

It seems obvious that Oustalet, who was *not* working with trinomials in these papers, considered the black-headed birds of Yunnan merely representative of the nuptial plumage of the bird earlier named *cinereiceps*, and renamed Styan's *cinereiceps* because the name was hardly applicable to a species in which the crown was more often black or olivaceous brown than gray; in short, *styani* is a mere substitute name for *cinereiceps*. That the name cannot be fixed upon the Yunnan specimens is made perfectly certain by Oustalet's remarks on page 253, quoted in the preceding paragraph.

Mr. R. W. Sims has recently examined for me the type specimen of *cinereiceps* in London and reports that it is in fact representative of the race of the Yangtze Valley, "being fairly close to specimens taken at Ichang from among other Yangtze localities. It is readily distinguished from birds from Yunnan (Lichiang Range) by the grey crown, rufous ear-coverts, chestnut supraocular stripes and comparatively little black speckling along both sides of the throat and extending up to the gape."

If *cinereiceps* (with synonyms *ningpoensis* and *styani*) is the bird of the Yangtze Valley, the form of northwestern Yunnan ("styani" auctorum) is left without any available name, and I shall call it

Garrulax cineraceus strenuus, subsp. nov.

Type: U. S. Nat. Mus. No. 296779, adult male, collected in the Tschchung Mountains (Mekong Valley), northwestern Yunnan, in November 1923, by Joseph F. C. Rock; original number 1372.

Diagnosis: From *G. c. cinereiceps* of the Yangtze Valley readily separable in *adult* plumage by having the crown and nape distinctly black,

not grayish brown or deep brownish gray, and the supraocular stripe and posterior ear coverts dull olive-brown, not chestnut-rufous.

Range: Northwestern Yunnan and southeastern Hsikang.

Remarks: Vaurie (*loc. cit.*) observes that "authors have failed to realize that *styani* [auctorum] is migratory," and, farther on, "as shown by Schäfer (1938, Jour. Ornith., vol. 86, Sonderh., p. 240), *cinereiceps* is the breeding race at Tatsienlu; *styani* [auctorum] also appears in this region but only as a migrant or visitor outside of the breeding season." Since no member of the extensive genus *Garrulax* has previously been suspected of migration, and since Vaurie's statement implies migration *northward*, one could wish for documentation of the assertion. I suggest that *strenuus* misidentified as *cinereiceps* by Schäfer is the only form ever found at Tatsienlu [Kangting].

I owe thanks to R. W. Sims of the British Museum (Nat. Hist.) for his examination of the type of Styan's *cinereiceps*, and to A. L. Rand and Philip Hershkovitz of the Chicago Natural History Museum, S. Dillon Ripley of the Peabody Museum of Natural History (New Haven), and J. C. Greenway of the Museum of Comparative Zoölogy (Cambridge), for comments on my unpublished manuscript.

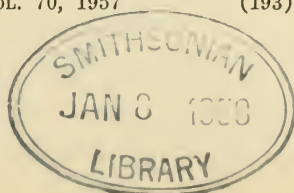
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PROCEEDINGS
OF THE
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A NECESSARY CORRECTION IN THE
NOMENCLATURE OF WATER-STRIDERS
(HEMIPTERA)

BY CARL J. DRAKE *Smithsonian Institute, Washington, D. C.*

In a recent number of the Proceedings (1957, 70:111), I proposed the name *Tachygonus* as a new genus for the reception of the American water-striders heretofore classified as members of the African genus *Tenagogonus* Stal (1855). Through the kindness of Dr. R. L. Wenzel of the Chicago Museum of Natural History, my attention has been called to the fact that *Tachygonus* is preoccupied by a genus of Coleoptera (*Tachygonus* Schoenherr 1833, Gen. et Sp. Curc. (1):6, 111), and thus is a homonym. On this account I am here substituting the name *Tachygerris*, new name for the Neotropical water-striders which I had previously assigned to to the genus *Tachygonus* Drake (not Schoenherr). The type species of the genus is *Tachygerris adamsoni* (Drake) (desc. as *Tenagogonus*). *Tenagogonus duolineatus* Kuitert is a synonym of *T. adamsoni*. In addition to *adamsoni* the genus *Tachygerris* comprises *T. celocis* (Drake and Harris), *T. opacus* (Champion), *T. quadrilineatus* (Champion) and *T. spinulosus* (Kuitert).



PROCEEDINGS
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NEW SPECIES AND RECORDS OF *STRIGIPHILUS*
(PHILOPTERIDAE: MALLOPHAGA)
FROM THAILAND¹

BY K. C. EMERSON
Stillwater, Oklahoma
and ROBERT E. ELBEL

*Department of Zoology, University of Oklahoma,
Norman, Okla.*

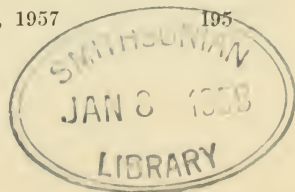
The Mallophaga described and identified in the following notes, except for those indicated as being in the British Museum (NH), were collected in Thailand by R. E. Elbel, H. G. Deignan, and Boonsong Lekagul during the period January 1952 to April 1955. Host identifications were furnished by Mr. Deignan, and are in accordance with the classification to be discussed in his forthcoming Check-list of Birds of Thailand. Skins of the birds from which the lice were collected are now in the U. S. National Museum. Collections were made possible by assistance from the U. S. National Museum and the United States Operations Mission to Thailand. The holotype and allotype of the new species described herein have been deposited in the U. S. National Museum.

Strigiphilus bramae (Qadri)

Eustrigiphilus bramae Qadri, 1935. Z. Parasitenk., 8:236, fig. 8. Type host: *Athene brama* probably *indica* (Franklin).

For comparison with the other forms discussed, illustrations of the male genitalia and outline of the dorsal view of the head of the male have been shown in figures 1 and 6. Specimens collected, in Thailand, from *Athene brama mayri* Deignan were: 21 males and 14 females at

¹This investigation was supported by research grant E-1722 from the National Institute of Allergy and Infectious Diseases of the National Institutes of Health, Public Health Service.



Ban Hua Thanon, Khlong Khlung, Kamphaeng Phet; 16 males and 8 females at Muaklek, Kaeng Khoi, Sara Buri; 9 males and 9 females on Khao Nip Mountain, Lop Buri; 4 males and 4 females at Luk Kae, Tamaka, Kanchanaburi; 2 males and 3 females at Ban Na Nong Thum, Chumphae, Khon Kaen; 2 males and 2 females on Khao Khat Mountain, Paknampho, Nakhon Sawan; 1 male and 1 female on Khao Oerawan Mountain, Lop Buri; 9 males and 6 females at Ban Lat, Ban Kaeng, Phukhieo, Chaiyaphum, and 1 female at Bo Phloi, Latya, Kanchanaburi.

Strigiphilus ketupae n. sp.

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 2. Antennae slender and filiform. Three long setae dorsally in each posterolateral angle of pterothorax. Four long setae medianly on the dorsal posterior margin of pterothorax. Seven long setae slightly posterior to the small thoracic sternal plate. Abdominal tergal plates of segments II-IX divided medianly by a wide clear area. Dorsal chaetotaxy of abdominal segments is: II, 0-10-0; III, 2-10-2; IV, 3-10-3; V, 3-10-3; VI, 3-10-3; VII, 2-8-2; and VIII, 1-0-1. Chaetotaxy of abdominal pleurites is: III, 1 short setae; IV, 1 long setae; V, 3 long setae. VI, 5 long setae; VII and VIII, 4 long setae; and IX, 2 long setae. Abdominal sternal plates undeveloped. One median row of long setae on segments II-VII. Number of setae in each row is: II-8, III-16, IV-18, V-18, VI-18, and VII-2. Dorsally, eight long setae located medianly on segment IX, and 6 long setae medianly on posterior margin of terminal abdominal segment. Ventrally, 6 short setae medianly on segment IX, and 5 long setae slightly posterior to the posterolateral angles of the genital opening. Male genitalia as shown in figure 7.

Female. Similar to the male, except in size and terminal abdominal segments. Undivided tergal plate on abdominal segment IX, possesses 1 long and 2 short setae in each posterolateral angle. Sternal plate on abdominal segment IX, small and divided medianly, with 9 long setae on posterolateral angles.

	Measurements			
	Holotype male		Allotype female	
	Length	Width	Length	Width
Head	0.75mm	0.66mm	0.83mm	0.71mm
Prothorax	0.21	0.44	0.21	0.44
Pterothorax	0.16	0.60	0.20	0.68
Abdomen	1.04	0.82	1.10	0.87
Total	2.16		2.34	

The male genitalia differ only slightly from those found in several species of the genus. The long slender dorsal anterior plate of the forehead is distinctive, and is not found on any other known species.

Type host: *Ketupa zeylonensis leschenaulti* (Temminck).

Type material: Holotype male, allotype female and 51 paratypes collected at Ban Na Nong Thum, Non Han, Chumphae, Khon Kaen, Thailand on October 27, 1953 by Robert E. Elbel and Boonsong Lekagul; and 37 paratypes collected at Huai Yang, Prachuap Khiri Khan, Thailand.

Strigiphilus siamensis n. sp.

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 3. Antennae slender and filiform. Four long setae dorsally in each posterolateral angle of pterothorax. Six long setae medianly on the dorsal posterior margin of pterothorax. Five long setae slightly posterior to the small thoracic sternal plate. Abdominal tergal plates of segments II-IX, divided medianly by a wide clear area. Dorsal chaetotaxy of abdominal segments is II, 1-8-1; III, 1-8-1; IV, 2-10-2; V, 2-10-2; VI, 2-8-2; VII, 2-8-2; and VIII, 1-6-1. Chaetotaxy of abdominal pleurites is: III, 1 short setae; IV, 1 short and 1 long setae; V-VIII, each with 4 long setae; and IX, 2 long setae. Abdominal sternal plates undeveloped, with one median row of long setae on segments II-VII. Number of setae in each row is II-6, III-12, IV-12, V-12, VI-8, and VII-2. Dorsally; 6 long setae medianly on segment IX, and 18 long setae on posterior margin of terminal abdominal segment. Ventrally; segment IX is bare, and possesses 6 long setae slightly posterior to the posterolateral angles of genital opening. Male genitalia as shown in figure 8.

Female. Similar to male except in size and chaetotaxy of terminal abdominal segments. Two rows of short setae on posterior margin of vulva. Five long setae on lateral margins of terminal abdominal segment.

	Measurements		Allotype female	
	Holotype male			
	Length	Width	Length	Width
Head	0.57mm	0.47mm	0.64mm	0.58mm
Prothorax	0.14	0.28	0.14	0.31
Pterothorax	0.14	0.47	0.17	0.52
Abdomen	0.87	0.61	1.21	0.80
Total	1.72		2.16	

This species is closest to *S. bramae* (Q.). In addition to differences in size, the male genitalia are smaller, and the dorsal anterior plate of forehead is considerably longer than in *S. bramae* (Q.).

Type host: *Glaucidium brodiei brodiei* (Burton).

Type material: Holotype male, allotype female and 6 paratypes collected at Ban Muang Khai, Tha Li, Loei, Thailand on January 29, 1955 by Robert E. Elbel.

Strigiphilus macrogenitalis n. sp.

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 4. Antennae filiform, but first segments slightly enlarged. Three long setae dorsally in each posterolateral angle of pterothorax. Four long setae medianly on posterior margin of pterothorax. Five long setae slightly posterior to small thoracic sternal plate. Abdominal tergal plates of segments II-V, divided medianly by wide clear area. Dorsally, chaetotaxy of abdominal segments is: II, 1-6-1; III, 2-6-2; IV, 4-4-4; V, 6-2-6; VI, 6-2-6; VII, 6-2-6; and VIII, 6-2-6. Chaetotaxy of abdominal pleurites is III-IV, each with 1 small setae; V, 2 long setae; VI-VIII, each with 4 long setae; and

XI, 2 long and 1 short setae. Abdominal sternal plates undeveloped. One median row of long setae on segments III-VI. Number of setae in each row is: III-6, IV-8, V-8, and VI-10. Ventrally, terminal abdominal segment with 20 long and numerous short setae irregularly spaced. Dorsally, 20 long setae on posterior margin of terminal abdominal segment, and an irregular row of 26 long setae just anterior thereto. Male genitalia as shown in figure 9.

Female. Similar to male, except for size and terminal abdominal segments. Two irregular rows of short setae on posterior margin of vulva. Eight long setae on lateral margins of terminal abdominal segment.

	Measurements		Allotype female	
	Holotype male			
	Length	Width	Length	Width
Head	0.58mm	0.55mm	0.71mm	0.62mm
Prothorax	0.15	0.36	0.17	0.38
Pterothorax	0.16	0.48	0.20	0.57
Abdomen	0.87	0.70	1.22	0.90
Total	1.76		2.30	

This species is closest to *S. heterogenitalis* n. sp. The genitalia of the two forms are similar, but differ greatly from those of the other known species in the genus. In both forms, the dorsal anterior plate is extremely long and pointed posteriorly, extending rearward beyond the mandibular region. The two forms can best be separated by comparing figures 4 and 5; and 9 and 10.

Type host: *Glaucidium cuculoides brügeli* (Parrot).

Type material: Holotype male, allotype female and 4 paratypes collected at Ban Muang Khai, Tha Li, Loei, Thailand on January 12, 1955 by Robert E. Elbel. Paratypes from the type host are: 3 males and 7 females collected at Ban Lat, Ban Kaeng, Phukhieo, Chaiyaphum; 4 males and 4 females collected at Ban Na Nong Thum, Non Han, Chumphae, Khon Kaen; 6 males and 10 females collected at Pang Nam Un, Bun Yun, Nan; 25 males and 32 females collected at Pang La, Lampang; 1 male and 1 female collected at Huai Yang, Prachuap Khiri Khan; 6 males and 10 females collected on Phu Phan Mountain, Sakon Nakhon; 1 male and 1 female collected at Ban Thung Chuak, Salokbat, Khanu, Kamphaeng Phet; 4 males and 7 females collected at Chiang Saen Kao, Chiang Rai; 4 males and 4 females collected at Hin Laem, Tha Khanum, Kanchanaburi; 1 female collected at Khlong Khlung, Kamphaeng Phet; 8 males and 9 females collected at Ban Sang Kho, Khok Phu, Sakon Nakhon; and 3 males and 4 females collected at Ban Khlua Klang, Prachuap Khiri Khan; all localities being in Thailand. The British Museum (NH) has 8 males and 7 females collected off *Glaucidium cuculoides rufescens* Baker at Oating, Assam are also paratypes.

***Strigiphilus heterogenitalis* n. sp.**

Male. Outline of head and dorsal anterior plate of forehead as shown in figure 5. Antennae slender and filiform. Thorax except for

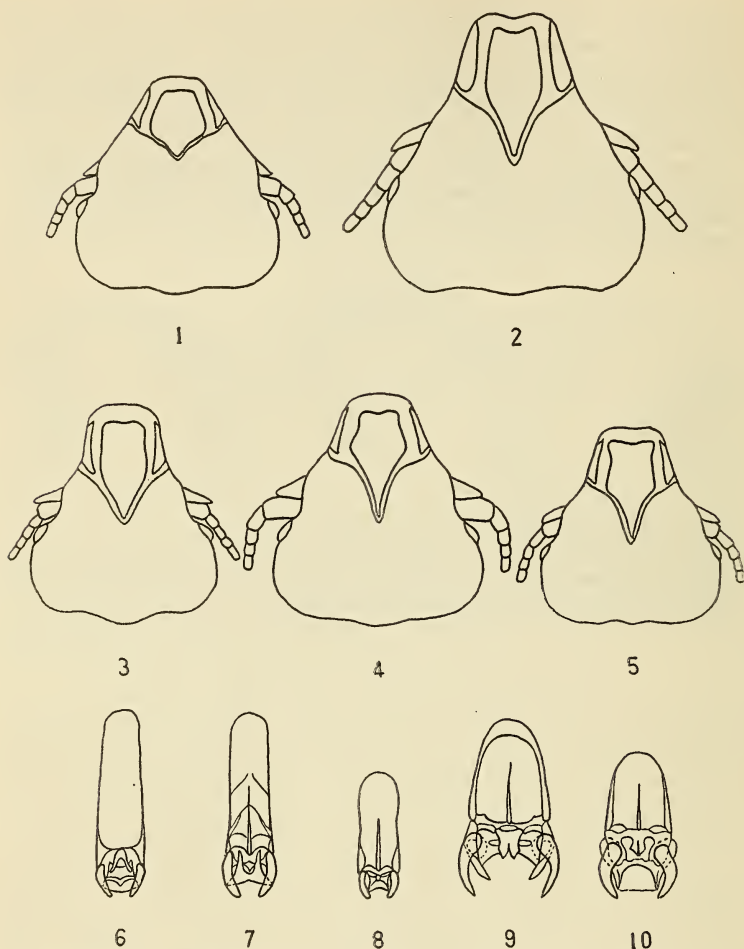
size as in *S. macrogenitalis*. Abdomen, except for size and chaetotaxy of terminal segments, as in *S. macrogenitalis*. Dorsally, terminal abdominal segment with 4 long and 6 short setae on genital flap, and 10 long setae on posterior margin. Ventrally, terminal abdominal segment with 20 long setae, irregularly spaced. Male genitalia as shown in figure 10.

Female. Similar to male, except in size and terminal abdominal segments. Posterior portion of vulva with many irregularly spaced short setae. Eight long setae on lateral margins of terminal abdominal segment.

	Measurements		Allotype female	
	Holotype male			
	Length	Width	Length	Width
Head	0.51mm	0.47mm	0.63mm	0.58mm
Prothorax	0.13	0.30	0.14	0.31
Pterothorax	0.14	0.42	0.16	0.42
Abdomen	0.69	0.57	0.88	0.66
Total	1.47		1.81	

Type host: *Otus bakkamoena lettia* (Hodgson).

Type material: Holotype male, allotype female and 11 paratypes collected at Hin Laem, Tha Khanum, Kanchanaburi on November 20, 1952 by Robert E. Elbel and H. G. Deignan.



Figures 1-5. *Strigiphilus* sp., Outline of head and dorsal anterior plate of forehead, male.

Fig. 1. *S. bramae* (Qadri).

Fig. 2. *S. ketupae* n. sp.

Fig. 3. *S. siamensis* n. sp.

Fig. 4. *S. macrogenitalis* n. sp.

Fig. 5. *S. heterogenitalis* n. sp.

Figures 6-10. *Strigiphilus* sp., male genitalia.

Fig. 6. *S. bramae* (Qadri).

Fig. 7. *S. ketupae* n. sp.

Fig. 8. *S. siamensis* n. sp.

Fig. 9. *S. macrogenitalis* n. sp.

Fig. 10. *S. heterogenitalis* n. sp.

All figures are drawn to the same scale.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE MUD TURTLE, *KINOSTERNON FLAVESCENS*
STEJNEGERI HARTWEG, IN THE UNITED STATES

PHILIP W. SMITH and M. MAX HENSLEY

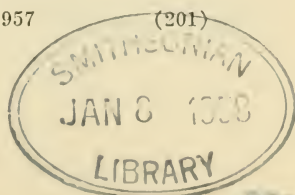
*Illinois Natural History Survey, Urbana, and Michigan State
University, East Lansing*

During the summer of 1957 we had the opportunity to collect reptiles along the Camino del Diablo and in the vicinity of the Pinacate lava in extreme northern Sonora, Mexico. Although we were primarily concerned with the fauna on the Mexican side of the International Border, we encountered a few noteworthy reptiles in adjacent Arizona. The most notable of these are a male and female mud turtle, clearly referable to *Kinosternon flavescens stejneri* Hartweg.

The two turtles were found *in copula* on July 31, 1957, in the small pond at Quitobaquito, 12 miles west of Sonoyta, Sonora, but on the American side of the Camino del Diablo. The male (Ill. Nat. Hist. Surv.) and female (Mich. State Univ.) have, respectively, carapace lengths of 155 and 142 mm., over-all plastral lengths of 137 and 123 mm., gular lengths of 28 mm., nuchal widths of 8.8 and 4.5 mm., and femoral seam lengths of 11 and 10.2 mm. When the two turtles were alive, the head and soft parts were similar in coloration to those of living *K. f. flavescens*, but the brownish olive shells of the two live *stejneri* were unlike those of any *flavescens* we have seen.

Three subspecies of *Kinosternon flavescens* are currently recognized. The nominate race occurs in the Great Plains from southern Nebraska southward into northern Mexico and from extreme eastern Kansas westward into southeastern Arizona and northeastern Sonora. The race *spooneri* occurs in scattered relict colonies in western Illinois and adjacent Iowa and Missouri. The distinctive *stejneri* has been known previously from Sonora and Durango; presumed intergrades between *flavescens* and *stejneri* have been reported from Jaral, Coahuila (Hartweg, 1938). The subjects of the present paper extend the known range of the subspecies some 160 miles to the northwest and provide the first record of *stejneri* in the United States.

The discovery of aquatic turtles in the tiny, isolated, spring-fed pond at Quitobaquito came as a distinct surprise. The nearest permanent water is the intermittent Sonoyta River which is separated from



Quitobaquito by at least five miles of Sonoran desert. According to the local residents of Sonoyta, mud turtles do occur in the river; and one form, the specifically distinct *Kinosternon sonoriense*, has been recorded from the Sonoyta River (Van Denburgh, 1922). We were unable to find any turtles in the river and thus unable to ascertain if a *flavescens*-type turtle actually does occur in the Rio Sonoyta along with *sonoriense*. In answer to our inquiry concerning other *flavescens* records for the desert portion of Arizona, Dr. Fred A. Shannon of Wickenburg kindly pointed out to us that the only record for western Arizona is one of Agassiz's cotypes of *Platythya flavescens*, said to have been collected in the Gila River at Camp Yuma, Arizona, by R. O. Abbott. The other cotypes were allegedly from Texas and the Red River of Arkansas. The specimen from Yuma is still extant in the United States National Museum, and it is remarkably well preserved for a specimen more than 100 years old. Through the courtesy of Drs. Doris M. Cochran and Remington Kellogg, we have been permitted to examine it.

Expecting that the cotype would prove to be either *sonoriense* or *stejnegeri* as ecological and geographical considerations suggest, we were surprised to learn that it shows more affinities with *flavescens* than any other member of the genus. It is aberrant in some respects, but we regard it as a *flavescens* X *stejnegeri* intergrade. In size of the gular, it resembles the geographically remote *spooneri*; in size of the nuchal, *stejnegeri*; in length of the femoral seam and coloration, *flavescens*. It differs most conspicuously from all members of the *flavescens* group by its more or less quadrangular pectoral laminae (the pectoral seam is 9 mm. in length). The principal diagnostic proportions are summarized for five samples of turtles in the following table.

Sample	Gular length/ lobe of plastron length of anterior		Length of anterior lobe of plastron/gular length + nuchal width + femoral seam length	
	Range	Mean	Range	Mean
<i>K. f. stejnegeri</i> (2 from Arizona)	.600-.640	.620	.984-1.03	1.00
<i>K. f. stejnegeri</i> (9 from Mexico)*	.600-.640	.630	1.07-1.21	1.13
<i>K. f. spooneri</i> (26 from Illinois)	.434-.557	.501	.612-.790	.724
<i>K. f. flavescens</i> (27 from western U.S.)*	.270-.500	.410	.510-.780	.635
Cotype of <i>flavescens</i> (Yuma, Arizona)	---	.478	---	1.25

*Data for the *stejnegeri* sample from Mexico and the *flavescens* sample from western United States taken from Hartweg (1938). The means for the two sexes in each sample have been estimated from the means for each sex presented by Hartweg.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FLORIDOBOLUS, A NEW MILLIPED GENUS
(SPIROBOLIDAE)

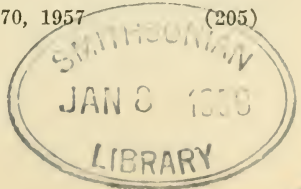
BY NELL B. CAUSEY
Fayetteville, Arkansas

A small but notable collection of millipedes from the vicinity of the Archbold Biological Station, Lake Placid, Florida, contains four species representing three genera of the family Spirobolidae. Most of the specimens were collected during June, July, and August, 1957, by Dr. L. R. Penner.

Narceus ramstadi (Chamberlin 1943) is represented by numerous specimens; one collection was made at Highlands Hummock State Park. Several large greenish females that have a width of up to 12.5 mm have been tentatively identified as *Narceus keysi* (Loomis 1944). There is one molting specimen of *Chicobolus spinigerus* (Wood 1864), a species identified from the area earlier (Chamberlin 1951). *Floridobolus penneri*, a new genus and species, which is represented by two specimens, is named for Dr. Penner, who called my attention to the undescribed genus. It is the eleventh species of the family Spirobolidae reported from Florida.

Floridobolus is the fourth genus of the Spirobolidae reported from the United States east of the Rocky Mountains. Species of *Narceus* are found from New York south into Florida and westward into Nebraska, Kansas, Oklahoma, and Texas; species of *Chicobolus* are known from South Carolina, Georgia, Florida, and the Florida Keys; and one species of the Pacific Coast genus *Californibolus* has been collected in Kansas, Nebraska, and Iowa (Causey, 1955). In the following key to these four genera the first sentence in each couplet applies to somatic characters of either sex and the second applies to gonopods and coxal processes of adult males:

- 1. Ventral margin of mandibular cheeks bears an acute triangular lobe *Narceus* Rafinesque 1820
- Ventral margin of mandibular cheeks either rounded or broadly angular, without an acute triangular lobe 2
- 2. Anal valves compressed and raised along the medial body line. Telopodite of anterior gonopods evenly subuncate at end; telopodite of posterior gonopods with a free inner piece; coxal lobe of seventh legs largest *Chicobolus* Chamberlin 1947
- Anal valves not compressed along medial body line. Telopodite of anterior gonopods not evenly subuncate at end; telopodite of



posterior gonopods with inner and outer pieces coalesced; coxal lobe of third legs largest 3

3. Ventral margin of mandibular cheeks rounded. End of telopodite of posterior gonopods divided into several short irregular lobes.

..... *Floridobolus*, new genus

Ventral margin of mandibular cheeks broadly angular. End of telopodite of posterior gonopods acute, not divided into lobes

..... *Californibolus Verhoeff* 1944

Floridobolus, new genus

Diagnosis.—Distinguished especially by the rounded rather than V-shaped apex of the sternum of the anterior gonopods and by the presence of several short lobes on the end of the telopodite of the posterior gonopods. Modification of coxal lobes of anterior legs much as in *Californibolus* and related genera.

Genotype.—*Floridobolus penneri*, new species.

Surface of body shining, very finely punctated. No scobinae. Ocelli flat, in an irregular patch. Keels of collum acutely narrowed. Apex of caudal segment flattened, shorter than valves, which do not have the medial margins inflated and raised. Third legs of male with coxae produced ventrad in blunt, anteriorly directed, closed uncate processes.

Sternum of anterior gonopods without a ventral medial projection; coxal plates contiguous; telopodites broad, the apical region not uncate. Telopodite of posterior gonopods with inner piece coalesced with outer piece; one of the several short lobes on its apical region with prickles.

Floridobolus penneri, new species

Figures 1-3

Type locality.—Ten miles west of the Archbold Biological Station, U. S. Highway 70, Lake Placid, Highlands Co., Florida, 1 ♂, Aug. 8, 1956; 1 ♂, July 19, 1957; L. R. Penner.

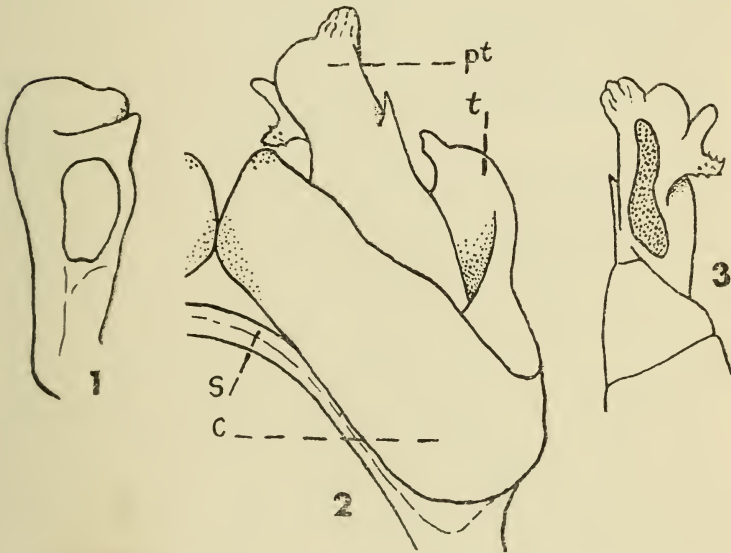
The holotype will be deposited in the American Museum of Natural History and the paratype will be retained in the author's collection.

Description.—Greatest body width 11.6 mm., length about 92 mm., body segments 49 and 50. In alcohol one specimen with black hindbelts, antennae, and legs and brown midbelts; other specimen similar but with greenish tinge. Setigerous labral foveolae 5 + 4 and 6 + 4. Ocelli black, about 65 in 9 curved rows. Ventral margin of mandibular cheeks rounded; mandibular cheeks with shallow antennal furrow. Keels of collum with a submarginal furrow that reaches from the ocelli to the posterior margin; anterior margin of collum slightly concave at level of mandibular cheeks; keels acutely narrowed. Keels of second segment broadly rounded. Segmental furrows continued faintly across dorsum, but not impressed. Hindbelts with minute serrae at ends of ventral striae. Pores in front of and almost touching segmental furrows. Caudal tergite with a slight horizontal depression; apex of tergite rounded, flattened, depressed; ratio of length of caudal tergite to anal valves, as viewed from above, less than 4/1. Anal scale with anterior margin nearly straight.

Coxal lobe of third legs reaches to about the middle of the second

segment of the legs, appearing triangular from a posterior view, but from a lateral view (Figure 1) it is seen to be an anteriorly directed, tightly closed, uncate lobe. Coxal lobe of fourth legs also appearing triangular from a posterior view, but less thickened than the third coxal lobe and not uncate. No other legs with coxal lobes. Second segment of legs with a small rounded protuberance on the distal end of the ventral surface, the protuberances becoming progressively smaller on posterior legs.

Right gonopods appear from an anterior view as shown in figure 2. Sternum of anterior gonopods narrow, the arms long, rounded at the apex, with the triangular area between the sternum and the coxal plates filled by a tough membrane. Telopodite of posterior gonopods (Figures 2, 3) almost straight, about as long as the coxal region, with one acute subterminal process and four short, blunt, terminal lobes, of which one bears prickles; cavity on its posterior surface enclosed by a membrane.



Floridobolus penneri, n. gen., n. sp. Fig. 1. Coxa of left third leg, lateral view. Fig. 2. Right gonopods, anterior view; c- coxal plate, s- sternum, t- telopodite of anterior gonopod; pt- telopodite of posterior gonopod. Fig. 3. Telopodite of right posterior gonopod, posterior view.

PROCEEDINGS
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A NEW SPECIES OF *ELEUTHERODACTYLUS*
(AMPHIBIA: LEPTODACTYLIDAE) FROM CUBA

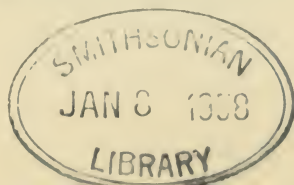
ALBERT SCHWARTZ

Department of Biology, Albright College, Reading, Penna.

Through the auspices of the National Science Foundation, the writer spent the period of June 15 to September 2, 1957, studying the Cuban herpetofauna. The major emphasis of the collections made was upon the Leptodactylid genus *Eleutherodactylus*, and a complete report upon the species of this genus will be made after the study has completed its two year course. However, rather than delay in describing new forms until the monograph is completed, it seems preferable to publish such descriptions promptly. The present paper deals with one such obviously new form.

In a recent paper, I (1957, in press) have summarized the present status of the 26 forms of *Eleutherodactylus* which are known from Cuba. These forms are conveniently, and for the most part correctly, separated into four major groups, which were originally defined by Dunn (1926, p. 210), and I (*op. cit.*) have again defined these groups and have added the forms, described since Dunn's work, in their proper places. Thus, there seems little point in restating these basic premises in the present paper, and the reader is referred to the papers mentioned above.

During the summer of 1957, the first 21 days were spent collecting in the vicinity of San Vicente, Pinar del Río Province, in the company of Messrs. John R. Feick and William H. Gehrmann, Jr.; during parts of the same period I was assisted by Mr. Dennis R. Paulson and Dr. Robert S. Howard. To all these co-workers I wish to express my sincere thanks for their gracious assistance and pleasant company. From San Vicente, several side trips to various other portions of Pinar del Río Province were made. It had been one of our objectives to visit the Cueva de Santo Tomás; this cave system is one of the largest underground systems in Cuba as well as in the New World, having seven and one half miles of explored passages, and its exploration and reconnaissance have been due principally to the efforts of Dr. Antonio Nuñez Jiménez and Ing. Kenneth R. Symington (1955). Ing. Symington agreed to take us to the cave, and a visit was made, under great difficulty because of steady downpour and very inclement weather, on June 22, 1957. The party was made up of Ing. Symington, Messrs. Feick, Gehrmann, Paulson, and myself.



The Cueva de Santo Tomás is located along the southern escarpment of the Sierra de los Organos, 10 kilometers north of the town of Cabezas, Pinar del Río Province. During the dry season it is possible to travel by car on unimproved roads to within a very short distance of the cave mouths, but this is impossible during the rainy season. The Cueva de Santo Tomás is actually a series of three cavern levels, presumably due to successive penetration of the montane mass, locally known as a *mogote*, by the Santo Tomás River. Each of these levels pierces the *mogote* and proceeds independently through it, opening into a small intermontane valley (called locally an *olla*) on one side, and then continuing out the far side of the *olla* through the remaining portion of the outlier. Although the caves penetrate two additional *ollas*, our collecting was limited to the first.

The *olla* is a very steep-sided depression, with access only from the caves; local *guajiros* have recently penned domestic animals in the valley, and these have been introduced down an excessively steep slope at the northwestern end. The maximum length and breadth of the valley are about 500 feet, with the escarpment walls rising to a height of approximately 80 feet. The bases of the walls are buried in much-weathered talus, and the vegetation, composed of deciduous trees and palms, is typical of the *mogote* section of the Sierra de los Organos. The floor of the valley is relatively smooth, somewhat rocky in portions, but principally covered with soil which supports a moderately dense growth of grasses, herbs, and shrubs.

Several species of *Eleutherodactylus* were collected in the *olla*; the weather, which was extremely wet, was especially suitable for the diurnal activity of amphibians. Reptiles did not seem to be particularly abundant, although anoles of several species, *Cadea blanoides*, and *Alsophis angulifer* were taken. Among the frogs collected is one very large individual which represents a new species, as well as being the first member of a group of *Eleutherodactylus* new to the island of Cuba. I take great pleasure in naming this species for my good friend, Ing. Kenneth A. Symington, without whose persistence and fellowship we would never have succeeded in either visiting the Cueva de Santo Tomás, nor of securing the interesting lot of material from western Pinar del Río Province, as

Eleutherodactylus symingtoni, new species

Type: American Museum of Natural History (A.M.N.H.) No. 60801, taken June 22, 1957, under a rock on the side of the first *olla*, Cueva de Santo Tomás, 10 kilometers north of Cabezas, Pinar del Río Province, Cuba, by William H. Gehrman, Jr. Original number 1799.

Distribution: known only from the type locality.

Diagnosis: A large *Eleutherodactylus* characterized by extremely rugose dorsum, absence of digital discs, short vomerine series, dark brown dorsal and ventral coloration, and orange vermiculations on anterior, dorsal, and posterior surfaces of thighs, and interior surface of crus.

Description of type: An adult male, with the following measurements (all measurements in millimeters): snout-vent length, 61.3; head length (snout to posterior border of tympanum), 24.1; greatest width of head, 26.2; longitudinal diameter of eye, 6.9; longitudinal diameter of

tympaanum, 4.4; naris to anterior corner of eye, 8.0; femur, 28.7; tibia, 30.0; length of fourth toe, 27.7. Head slightly broader than distance from snout to posterior border of tympanum; snout somewhat truncate, with nares prominent at anterior end of canthus rostralis; diameter of eye less than distance from naris to anterior corner of eye; interorbital space 7.1, a bit greater than diameter of eye, but roughly comparable; diameter of tympanum less than diameter of eye; distance from tympanum to eye equal to diameter of tympanum; tympanum oval, its vertical diameter greater (5.8) than its horizontal (4.4). Digital discs absent. Fingers slender, unwebbed, 3-4-1-2 in order of decreasing length; subarticular tubercles very well developed. Toes long and slender, unwebbed, 4-3-5-2-1 in order of decreasing length. Heels do not touch when legs are held with femora at right angles to body axis. Dorsum extremely rugose, with rugosities extending from snout, over lores, upperjaw, dorsal surfaces of forelimbs, back, ventrally on sides to a line drawn between insertions of fore- and hindlimbs, dorsal surfaces of thighs, crus, and hindfoot. Throat with many scattered rugosities, stopping at level of forelimb insertions; venter smooth with belly disc feebly developed. Dorsal rugosities largest on head and snout, forming two large and two small tubercles on canthal line, these tubercles stout and truncate; rugosities on remainder of dorsal surfaces of about equal size, more or less regularly spaced, giving a very rough appearance; upper eyelids heavily tuberculate. Posterior and ventral surfaces of thighs covered with large, flattened, pavement-like granules. Tongue oval, possibly slightly mucronate in life, free behind, its greatest width about two-thirds of that of the floor of the mouth. Vomerine teeth in two short, stout, straight series, extending from the inner margin of the choanae medially, separated from each other by a distance slightly less than the length of either of the series, and separated from choanae by a distance equal to the length of either of the series.

Coloration of type (based on color notes taken in the field and on Kodachrome photographs): dorsum dark brown (Pl. 16, A10; color designations from Maerz and Paul, 1950) with black vermiculations and reddish scapular W, outlined in black; a transverse very obscure dusky reddish scapular W, outlined in black; a transverse very obscure dusky yellowish band across dorsum anterior to hindlimbs; one pair of faintly yellow postscapular spots on each side at level of dorsolateral line; anterior, dorsal, and posterior surfaces of thighs brown with dull orange (Pl. 6, 12E) vermiculations, which occur likewise on inner face of crus; an orange V, its apex above vent, extending through groin onto sides for a very short distance, and sending also an orange line posteriorly onto dorsal surface of thigh to become mingled with orange pigment on that member. Dorsal surface of crus with three transverse, poorly defined blackish bands; dorsal surface of foot with two or three poorly defined blackish bands; ground color of crus and foot light brown. Forelimbs with one or two blackish bands on antibrachium, none on brachium; fingers mottled with dark brown and pale tan. Lips spotted with black on dark brown ground color; throat dark brown with scattered small white dots which are tips of rugosities. Venter very dark brown, with many fine white dots, giving a mottled appearance; ventral dots concentrated in groin, which appears mottled, and on sides, with a distinct break between dorsal and ventral pigmentation; ventral surfaces of fore-

and hindlimbs brown mottled with white, the white dots on the hindlimbs larger and more prominent.

Remarks: *E. symingtoni* cannot be placed in any of the known groups (*auriculatus*, *dimidiatus*, *varleyi*, *ricordi*) of Cuban eleutherodactyli. Of these groups, only *auriculatus* and *varleyi* have short vomerine series; however, the *auriculatus* group has well developed digital discs and a rugose belly (both of which *symingtoni* lacks), and *varleyi* is characterized by a pectoral vocal sac in males, and by a dorso-lateral glandular fold and rugose belly as well, all of which characters do not occur in *symingtoni*. Comparison with other members of the genus in Cuba is unnecessary; only *E. greyi* Dunn is known to be equally as large, but this species is a member of the *ricordi* group and no confusion between the two forms should be encountered.

The affinities of *E. symingtoni* with other West Indian members of the genus are unknown. There are no eleutherodactyli on Puerto Rico, Hispaniola, Jamaica, or the Bahamas which display the characters of *symingtoni*, as well as the large size. Certainly its relatives are to be looked for not in the Bahamas (which are inhabited only by *E. ricordi planirostris* Cope and *E. r. rogersi* Goin), nor in Puerto Rico. I am unable to associate *E. symingtoni* with any of the Hispaniolan species, which have been described by Cochran (1941), nor with any of the Jamaican forms, which have been worked by Lynn (1940) and others. It appears that *E. symingtoni* is a species endemic to the Sierra de los Organos in Pinar del Río, and its affinities with other species on the West Indies are unknown. Collections elsewhere in the Sierra de los Organos yielded no additional specimens of this new species, although many other frogs were taken. Since *E. symingtoni* differs so trenchantly from all other Cuban eleutherodactyli, and cannot be placed in any other of the four major groups, it is suggested that this species be made the sole member of the *symingtoni* group. It is hoped that collectors in Pinar del Río will secure additional specimens of this unique species.

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A NEW SUBSPECIES OF THE EASTERN
PIPISTRELLE FROM FLORIDA

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During a recent study of the eastern pipistrelle, *Pipistrellus subflavus*, it became evident that there exists in peninsular Florida and southeastern Georgia an undescribed subspecies of this bat.

Many of the specimens used in this study were borrowed and examined at Urbana. I wish to thank the individuals in charge of the collections for the loan of their material. Collections from which specimens were borrowed, and abbreviations used in this paper to designate these collections, are as follows: American Museum of Natural History (AMNH), University of Connecticut (UC), Cornell University (CU), Florida State Board of Health (FSBH), University of Florida (UF), University of Georgia (UG), Museum of Comparative Zoology, Harvard University (MCZ), University of Michigan, Museum of Zoology (UM), H. B. Sherman Collection (HBS), and U. S. National Museum (USNM).

The new race may be named and described as follows:

Pipistrellus subflavus floridanus new subspecies

Type.—Male, adult, skin and skull, no. 163884 American Museum of Natural History; from Homosassa Springs, at head of Homosassa River, Citrus County, Florida; collected on February 9, 1951, by W. Schaldach and J. P. Chapin; original no. 1474.

Range.—Peninsular Florida and southeastern Georgia. Known from as far south as Bassenger, Okeechobee County, Florida, and ranging northward at least to five miles west of Ludowici, Long County, Georgia. This is the pipistrelle found commonly outside the caves in peninsular Florida.

Diagnosis.—A race of *Pipistrellus subflavus* characterized by complete absence of reddish tones to the fur. Color varies from a pale yellow to chocolate brown and silvery-gray. Base of hair brown or black; subterminal band yellowish or gray; terminal band chocolate brown or black; tips of guard hairs silvery. Size large.

Comparisons.—Since the range of this race borders upon only that of *P. s. subflavus*, it needs comparison with that form only. As compared with a series of 24 specimens taken from Waterfall Cave, 7 mi. N Cairo, Grady County, Georgia, on February 5, 1955, *floridanus* differs

markedly in color. The basal band of the hair is similar in the two races. The subterminal band in *subflavus* is a light orange or reddish in color, whereas in *floridanus* it is white to a pale yellow, and lacking entirely in reddish hues. The terminal band is a dark reddish brown in *subflavus*; in *floridanus* this band ranges from brown to black in color. The tips of the guard hairs of *subflavus* are orange in color in contrast to the pale yellow or silver of *floridanus*.

In size *P. s. floridanus* does not differ from *P. s. subflavus* from the Atlantic seaboard, but is slightly larger than those from the Ohio River Valley. Compared with large series (30 or more) from the vicinity of Huntington, West Virginia; Carter Cave, Kentucky; Rosiclare, Illinois; and Adair County Bat Cave, Oklahoma, it is slightly larger in all measurements except length of the tooththrow. It is not larger than the average of a large series from the vicinity of Washington, D. C.

Remarks.—Since the type locality of *Pipistrellus subflavus* is known only as Georgia (“de Géorgie”), and two subspecies occur within the state, we are faced with the problem of determining which is the nominal form. In Cuvier’s (1832) original description he states that, “Les parties supérieures du corps sont d’un blond gris clair, légèrement ondulées de brunâtre; les parties inférieures d’un blanc jaunâtre; les poils des parties supérieures sont noirs à leur base, blanchâtres dans la plus grande partie de leur longueur, et brunâtres à leur pointe; . . .”. Although this description seems best to fit that race which inhabits the Okefenokee Swamp (in that the colors of gray, brown, and yellow, but not red, are mentioned), one cannot be sure which form Cuvier has described, since the type has apparently been lost (Rode, 1941, does not list it in the catalogue of types in the National Museum of France). A specimen from the locality from which the type of *P. s. subflavus* most likely came (the LeConte Plantation, 3 mi. SW Riceboro, Liberty County, Georgia; University of Illinois, Museum of Natural History no. 16177; taken by W. L. Jennings, July 4, 1957) more closely resembles the reddish form (*subflavus*) than it does that race found in peninsular Florida (*floridanus*). Unfortunately, the LeConte Plantation seems to be an area of intergradation between the two subspecies.

The race *P. s. floridanus* seems to be partially separated ecologically from *P. s. subflavus*. The former apparently does not inhabit caves. A series of 11 specimens taken from Old Indian Cave, Jackson County, in northwestern Florida, is separable one hundred per cent from *floridanus*. These are typical *subflavus*, and none approaches the color characteristic of *floridanus*. Five of these specimens were taken on May 9, and six on December 11, 1954. Of the 24 specimens taken from Waterfall Cave, which is in extreme southwestern Georgia, in February, only two show any approach to the color of *floridanus*. These two are separable from this race, however, in that they have more reddish tones to the fur than any of the *floridanus* examined.

It would be interesting to study specimens from the caves of Alachua County, Florida, to determine which race occurs there. Pipistrelles are common winter residents in these caves. This is within the range of *floridanus*, which can be found in an active state in winter in the same region. It is quite possible that those wintering in the caves of the southern United States have moved in from the north, and both races might occur in the same region at that time.

The summer range of *floridanus* is not well defined. One specimen shot at Birdsong Plantation, 4 mi. S Beachton, Grady County, Georgia, on May 6, 1954, is typical *subflavus*. This locality is in extreme southwestern Georgia, Only 130 miles from Gulf Hammock, Florida, where *floridanus* is a common permanent resident. Apparently intergradation must take place somewhere between these localities, although the specimen from Birdsong Plantation may have been a transient.

A specimen of a pipistrelle taken from Roswell, Gwinnett County, Georgia, north of Atlanta, and one from St. George Island, St. Marys County, Maryland, are inseparable from *floridanus*. These were the only specimens examined (out of more than 1000) from outside the range of this race which were not recognizable as being distinct and separable. Typical *subflavus* were taken from both localities at the same time. Since both of the above were taken in August, at which time it is known that some birds, and perhaps also bats, wander northward, it could well be that these two specimens are *floridanus*.

Measurements.—Average measurements in millimeters of three adult males from the type locality are: total length 86; length of tail 39; length of foot 9.7; length of ear 13; length of tibia 13; length of forearm 33; length of third metacarpal 32; length of fifth metacarpal 31; greatest length of skull 13.1; zygomatic breadth 7.9; breadth of cranium 6.6; height of cranium 6.0; and alveolar length of maxillary toothrow 4.1.

Specimens examined.—Total number 164, from the following localities: GEORGIA: *Long County*: 5 mi. W Ludowici, 1 (UG); *county unknown*: Okefenokee Swamp, Billy's Island, 5 (CU); Okefenokee Swamp, Chesler's Island, 1 (CU); FLORIDA: *Hamilton County*: 1 (FSBH); *Columbia County*: 4 (FSBH); *Baker County*: 1 (FSBH); *Taylor County*: 6 (FSBH); *Bradford County*: 1 (FSBH); *Clay County*: 6 (FSBH); *Dixie County*: 2 (FSBH); *Gilchrist County*: 1 (FSBH); 4 mi. E Trenton, 2 (UF); *Alachua County*: 30 (FSBH); 8 mi. NW Gainesville, 10 (UF); 2 mi. E Gainesville, 1 (UC); 5 mi. E Gainesville, 5 (HBS), 3 (UF); 6 mi. E Gainesville, 1 (UM); *Putnam County*: 6 (FSBH); *Levy County*: 9 (FSBH); Gulf Hammock, 1 (UF); Waccasassa River, 2 mi. N Gulf Hammock, 2 (AMNH); *Marion County*: 20 (FSBH), Blitche's Ferry, 10 mi. E Ocala, 2 (MCZ); *Citrus County*: 1 (FSBH); Homosassa Springs, at head of Homosassa River, 3 (AMNH); *Sumter County*: 36 (FSBH); *Orange County*: 1 (FSBH); Lake Underhill, Orlando, 1 (USNM); *Pasco County*: 1 (FSBH); *Polk County*: Winterhaven, 1 (UF); *Okeechobee County*: Bassenger, 1 (AMNH).

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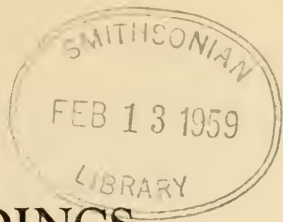
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Errata Slip

This is to call attention of librarians and others intending to bind this volume eventually that inadvertently page numbers 43 and 44 have been duplicated, as well as paper No. 9 for two papers, as follows:

paper No. 9, pp. 43-44, by F. C. Hottes, issued April 11, 1958
 paper No. 9, pp. 43-48, by M. S. Wilson, issued May 9, 1958

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

The two meetings during 1958 were held in Room 43 of the United States National Museum.

1025th Meeting — May 13, 1958

SEVENTY-NINTH ANNUAL MEETING

President Friedmann in the chair; 20 persons present.

New members elected: R. E. Elbel, K. C. Emerson, J. P. Kramer, K. V. Krombein, Paul J. Kruse, R. J. Marsh, G. W. Mead, Richard Thomas, and George Zug.

The reports of the Corresponding Secretary and Treasurer were presented.

The following officers and Members of Council were elected: President: Howard B. Owens; Vice Presidents: David H. Johnson, A. C. Smith, Allen J. Duvall, C. F. W. Musebeck; Recording Secretary: S. F. Blake; Corresponding Secretary: J. L. Paradiso; Treasurer: B. R. Feinstein; Members of Council: M. K. Brady, C. O. Handley, Jr., L. M. Russell, V. S. Schantz, and Henry W. Setzer.

After the business meeting adjourned, President Friedmann gave a talk on wax digestion in the honey-guides.

1026th Meeting — December 4, 1958

President Owens in the chair; 22 persons present.

New members elected: F. H. Berry, D. K. Caldwell, J. R. Dixon, Edward Ferguson, Jr., K. I. Lange, R. H. Manville.

Formal communications: J. F. Gates Clarke, The Smithsonian-Bredin Caribbean Expeditions—1956 and 1958.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

ADDITIONAL SUBSPECIES OF BIRDS FROM
COLOMBIA

BY ALEXANDER WETMORE

The two races of Colombian birds described herewith have come to attention during study of the collections made in that country for the Smithsonian Institution by the writer and M. A. Carriker, Jr.

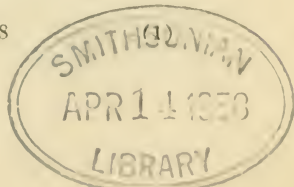
Family Rallidae

Laterallus albigularis cerdaleus subsp. nov.

Characters.—Similar to *Laterallus albigularis albigularis* (Lawrence),¹ but more reddish brown on the crown and sides of the head, and on the hindneck; deeper reddish brown on the upper breast; throat washed with reddish brown, so that the white prominent in this area in the typical race is much restricted or absent; black barring on posterior ventral surface continued evenly across the abdomen, producing a much blacker appearance.

Description.—Type, U.S. National Mus. no. 386782, male, from Mamatoco, 4 miles east of Santa Marta, Magdalena, Colombia, collected January 3, 1946, by M. A. Carriker, Jr. (original number 7374): Crown and hindneck Mars brown, washed with russet on the forehead; back, tertials, and wing coverts bister, the wing coverts tipped lightly with mikado brown; rump, upper tail coverts and longer secondaries blackish brown, washed with Vandyke brown; rectrices blackish brown internally, bordered prominently with Vandyke brown; outer secondaries and primaries Chaectura drab, edged lightly with drab; loreal feathers hair brown basally, tipped with Mikado brown; feathers on lower eyelid drab; remainder of side of head between Mikado brown and Verona brown, changing to tawny on throat and foreneck, and to russet on sides of neck and across upper breast; feathers of chin and center of throat white basally, washed with tawny; rest of lower surface, including sides and under tail coverts, black, barred narrowly with white; shorter under wing coverts black, barred narrowly with white, longer ones broadly white, with restricted black markings. Distal third of maxilla fuscous; gonys dull honey yellow; remainder of bill black, with a wash of olive on the base of the mandibular rami; crus, tarsus and toes fuscous, becoming fuscous-black on the tarsal joint (from dried skin).

¹*Corethrura albigularis* Lawrence, Ann. Lyc. Nat. Hist. New York, vol. 7, 1861, p. 302. (Atlantic side of the Isthmus of Panamá along the line of the Panama Railroad.)



Measurements.—Males (6 specimens), wing 67.6-74.3 (71.8), culmen from base 17.5-19.2 (18.6), tarsus 27.6-30.8 (29.3) mm.

Females (4 specimens), wing 69.0-77.8 (72.3), culmen from base 16.6-17.8 (17.0), tarsus 27.3-30.4 (28.3) mm.

Type, male, wing 72.2, culmen from base 19.2, tarsus 30.8 mm.

Range.—The lower Magdalena Valley from eastern Bolívar (Norosí) and Atlántico (Laguna de Guájaro) eastward, and around the Sierra Nevada de Santa Marta (Hacienda La Esperanza on Río Cesar; Mamotoco, and La Concepción, east of Santa Marta).

Remarks.—Direct comparison of the form here described has been made with a series of 18 males and 17 females from the entire range of the typical subspecies in Panamá. The nominate race extends through Darién and western Colombia (6 males, 5 females examined from Chocó, Antioquia and Nariño) into western Ecuador (5 males, 4 females seen from Esmeraldas, Pambilar, San Javier and Manaví).

All of the specimens of *Laterallus melanophaius* that I have seen have the under tail coverts plain cinnamon brown, while in all of the long series of *albigularis* examined this area is barred black and white. Occasionally there is one that has a few of the under tail coverts tipped with brown, but this marking is casual in occurrence, being found at random through the entire range of *albigularis* (including the subspecies *caniceps*) north to Nicaragua. It can not therefore be considered an indication of integration. I can see no reason for uniting the *albigularis* group and the *melanophaius* complex in the same species.

***Troglodytes aedon effutitus* subsp. nov.**

Characters.—Similar to *Troglodytes aedon atopus* Oberholser,² but paler above and below; dorsal surface in general more grayish brown, with the rump and upper tail coverts lighter brown, and the light bars on the rectrices less rufescent; throat and forehead averaging whiter; sides, flanks and under tail coverts brighter, being pinkish buff to clay color instead of sayal brown; under tail coverts usually less barred, in numerous specimens immaculate.

Description.—Type, U.S. National Museum no. 369759, male adult, from Maicao, Comisaría de la Guajira, Colombia, collected April 15, 1941, by A. Wetmore and M. A. Carriker, Jr. (original number 11414). Forehead drab, changing to pale hair brown toward center of crown, this continuing over pileum and hindneck; back and lesser wing coverts hair brown, washed with buffy brown; rump and upper tail coverts between sayal brown and snuff brown; tertials, outer webs of secondaries, and middle and greater wing coverts somewhat brighter than wood brown, barred narrowly with dusky neutral gray, the barring less definite on the wing coverts; inner webs of secondaries and both webs of primaries fuscous-black; outer webs of primaries marked with small, angular spots of light vinaceous-buff; lateral rectrices sayal brown, changing centrally to snuff brown, barred narrowly with dusky neutral gray; lores dull white; superciliary stripe pale pinkish buff, this color extending narrowly forward across upper margin of lores; feathers of auricular region tiller buff edged with hair brown, producing a mottled appear-

²*Troglodytes musculus atopus* Oberholser, *Poc. U. S. Nat. Mus.*, vol. 25, January 23, 1904, p. 207. (Cacagualito, about 12 miles east of Santa Marta, Magdalena, Colombia.)

ance; central area of under surface from throat to abdomen white, with a faint wash of pale pinkish buff that is more pronounced across the breast; sides pinkish buff, changing to dull clay color on flanks and under tail coverts; central under tail coverts with two narrow bars of dusky neutral gray; edge of wing and under wing coverts dull white with a faint wash of pale pinkish buff. Maxilla and tip of mandible fuscous; base of mandible drab; tarsus hair brown; toes fuscous (from dried skin).

Measurements.—Males (11 specimens), wing 48.6-54.0 (51.1), tail 33.5-37.2 (35.4), culmen from base 15.4-17.8 (16.6), tarsus 17.5-18.7 (18.2) mm.

Females (7 specimens), wing 46.5-51.5 (48.8), tail 31.2-34.9 (33.5), culmen from base 14.4-16.3 (15.7), tarsus 16.8-18.6 (17.7) mm.

Type, male, wing 48.8, tail 33.7, culmen from base 16.0, tarsus 17.9 mm.

Range.—The Guajira Peninsula, and the middle and lower valley of the Río Ranchería in extreme northeastern Magdalena, Colombia; intergrading with *T. a. atopus* toward the eastern base of the Sierra Nevada de Santa Marta, and in the valley of the Río Cesar.

Remarks.—Todd³ remarked 35 years ago on the apparent paler color of House Wrens from Riohacha on the Guajira boundary, but it is only with larger series, including birds from farther out in the Guajira, that the differences which establish this race have become evident. In April and early May, 1941 house wrens were common at Riohacha, particularly near the Río Ranchería. Farther west I found them near Maicao and also in the hills around Nazaret, where they ranged in the green forest along the base of the Serranía de Macuire, as well as in the drier areas. In the scrub growths near Puerto Estrella on the coast they were more common than in the interior. Fully grown immature birds have a stronger wash of brown on the under surface than adults. Males from the outer end of the peninsula are slightly larger than those from Maicao westward. Though I did not see house wrens at Puerto López it is probable that this race enters Venezuela around the base of the low hills of the Montes de Oca, southwest of Maicao.

Birds from the lower valley of the Río Ranchería are fairly typical, but there is intergradation with *Troglodytes aedon atopus* in the upper part of this drainage as well as in the low hills that lead back to the west toward the base of the Sierra Nevada. Two males from El Conejo, in the valley 10 miles east of Fonseca, are intermediates, while one from Tierra Nueva, at 4,000 feet elevation in the Sierra Negra, only a short distance to the southeast is definitely *atopus*, as is one from the little settlement of Distracción, 3 miles southwest of Fonseca. One from La Cueva, at 1800 feet in the eastern foothills of the Sierra Nevada, to the northwest of Fonseca on the old trail crossing to Riohacha, also is *atopus*.

The race *atopus* differs from *T. a. inquietus*, its neighbor to the west, by being brighter brown below, with the white of the lower surface restricted to the throat and abdomen, and grayer above, with the sides, flanks, and under tail coverts brighter brown. The maximum development of these markings, and of the barring on the under tail coverts, is found in the Department of Bolívar, there being a slight change toward lighter color through northern Magdalena. Though birds from the Santa Marta region thus show a hint of the paler garb of the new form here

³In, Todd and Carriker, Ann. Carnegie Mus., vol. 14, October, 1922, p. 419.

described, they are well within the boundaries of individual variation of the race *atopus*, which has its type locality in this area. The range of the subspecies extends across northern Colombia from the Río Sinú, and the lower Cauca valley in northern Antioquia through the Department of Magdalena, including the drainage of the Río Ariguani and the Río Cesar, to the slopes of the Sierra Nevada de Santa Marta, and the western base of the Sierra Negra, the northern extension of the Sierra de Perijá.

In connection with this brief outline of the range of *atopus* it is of interest to report specimens of *Troglodytes aedon inquietus* from Acandí, in the north of the Department of Choecó, and from Nicoelí, in the far northwest of Antioquia, these being the first records of this race in Colombia. The two localities are on either side of the broad Gulf of Urabá. The race *inquietus* enters this area from Panamá, where it ranges along the north coast except in the northwestern area. It is common in the interior of Darién, but is not yet reported from near the Pacific coast south of the Gulf of San Miguel. I did not find house wrens at Jaqué, nor along the Río Jaqué in Panamá, immediately to the north of the Colombian boundary, in 1946 and 1947, nor have I seen records to the southward along the Pacific coast of the Department of Choecó in Colombia.

In this study, as in another recent one dealing with the birds of Isla Coiba, Panamá, I have treated the house wrens of Central and South America as conspecific with *Troglodytes aedon* of the North. There is evident no clear cut line of demarcation by which to separate the subspecies that have been grouped under the specific name of *musculus*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF SOME CONIFER FEEDING
APHIDS FROM NEW ENGLAND

BY F. C. HOTTES

The aphids described in this paper were sent me for determination by A. E. Brower of Augusta, Maine and Louise M. Russell of the United States National Museum.

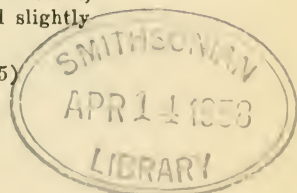
Cinara rigidae n. sp.

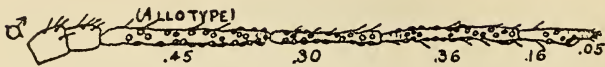
Alate viviparous female.

Length from vertex to end of cauda varying from 1.50-2.40 mm. Color notes taken from living specimens not available. When alive most likely black, at least very dark. Color as indicated from cleared mounted specimens as follows: head and thorax deep brownish-black, abdomen brown with the cornicles slightly darker than the abdomen, distinctly dusky. Cauda with outer margin blackish, anal plate black. First and second antennal segments concolorous with head, third antennal segment with basal one fourth pale remainder of segment dark brown, remaining antennal segments quite similar. Segments of all legs a uniform dark brownish-black. Third segment of rostrum spotted except for apical region which is brown, remaining segments of rostrum brownish-black.

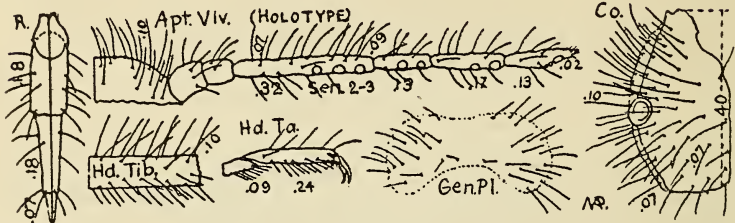
Head and thorax.—Ocular tubercles present, small, difficult to differentiate. Median transverse suture well developed, black. Hairs on vertex of head about .07 mm. in length. Hairs on dorsum of head extending to posterior margin, becoming progressively shorter front to rear, all arising from clear areas around base, which makes the dorsum appear to be covered with small light spots. Antennal segments with the following lengths: III .24-29 mm., IV .14 mm., V .17-20 mm., VI .13-.15 + .04 mm. Sensoria distributed as follows: III two to four secondary plus primary, IV one to two secondary plus primary, V one secondary plus primary. All sensoria arranged in a straight row. Hair on antennae fine, set at an angle of about forty-five degrees or slightly more, about .05 mm. in length. Hairs on fourth, fifth and sixth antennal segments slightly longer than those on the third. Rostrum extending beyond apex of abdomen, in one case segments three four and five doing so. Lengths of last three segments of the rostrum as follows: .21, .23 and .10 mm. The fourth segment of the rostrum is quite narrow.

Metathoracic femora varying from .60-.75 mm. Metathoracic tibiae varying from 1.16-1.28 mm. Hairs on metathoracic tibiae fine, numerous, set at an angle of about forty-five degrees on inner margin and slightly

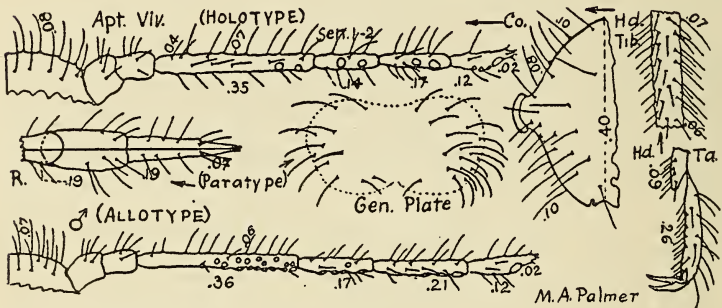




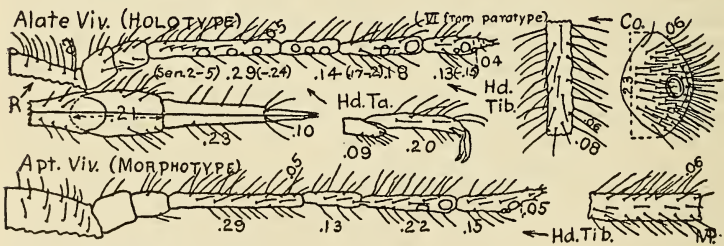
Cinara soplada H.



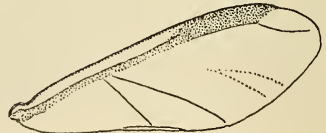
Cinara atripes n.sp.



Cinara pallidipes n.sp.



Cinara rigidae n.sp.



more on outer. The inner margin of the tibiae has the hairs slightly more numerous than the outer, where the hairs are from .06-.08 mm. in length. Length of metathoracic tarsal segments I and II .09 and .20 mm. The first metatarsal segment has about nine hairs on its ventral surface. The media is once branched, the branch being far removed from the margin of the wing.

Abdomen.—Cornicles not always easy to differentiate from abdomen because of similarity of color in some cases, and never differing greatly. Width of cornicles from front to rear varying from .20-.30 mm. the outer margin being quite regular. Hairs on cornicles evenly spaced and of about the same length, being .06 mm. long. Genital plate visible in only one case, and almost totally free from hair. Pigment spot anterior to cauda most likely entire but extremely difficult to differentiate. Cauda pale except for outer margin which is dark due to blackish setulae, the dark portion of the cauda has long hairs.

Apterous viviparous female.

Length 2.40 mm. Length of metathoracic femora .75 mm. Length of metathoracic tibiae 1.07 mm. Cornicle very difficult to differentiate from abdomen because of similarity in color, possibly .18 mm. in diameter. Length of antennal segments as follows: III .29 mm., IV .13 mm., V .22 mm., VI .15 + .05 mm. Third antennal segment without sensoria, fourth antennal segment with only the primary sensorium, fifth antennal segment with one secondary sensorium and the primary. Color in life probably black. Femora and tibiae dark with the basal portions not quite as dark as the apical portions. Hairs on tibiae quite similar to those of the alate viviparous female except for the fact that the hairs on the inner and outer margins are set at the same angle, and are of about the same length. Ventral surface of first metatarsal segment with about nine hairs. Mesosternal tubercle not present.

Hairs on dorsal and ventral surfaces of the abdomen about the same as to length and number, numerous on both surfaces. Pigmented spot anterior to cauda difficult to differentiate, probably divided, in either case with a single row of hairs on the posterior margin.

This species may be easily distinguished from *C. strobi* (F) by the much shorter femora and tibiae, by the hairs on the tibiae being finer, shorter and more upstanding, differently shaped cornicles, and shorter antennae.

Holotype atate viviparous female, morphotype apterous viviparous female. Both types deposited in the United States National Museum. Host *Pinus rigida*. Durham, New Hampshire. July 23, 1921. Collected by Philip R. Lowry and presented to the United States National Museum by Doris Gallup Lowry in 1932.

Cinara atripes n. sp.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 1.67-2.25 mm. Color notes taken from living specimens not available, probably black or blackish-brown. Mounted and cleared specimens indicate the head and thorax as dark dusky-brown. First and second antennal segments concolorous with head, third segment light dusky on basal half, remainder of segment and remaining segments dark dusky, growing pro-

gressively darker towards the apex of the antennae. Femora tibiae and tarsal segments of all legs, with the exception of a short distance near the base of the metathoracic femora which is pale, a uniform very dark brownish-black. Cornicles brownish-black. Cauda and anal plate the same.

Head and thorax.—Median transverse suture well developed, black. Ocular tubercles not discernable. Hair on vertex of head .10 mm. in length. Length of antennal segments as follows: III .32 mm., IV .13 mm., V .17 mm., VI .13 + .02 mm. Secondary sensoria distributed as follows: III 0-2 secondary plus primary, IV and V one secondary plus primary. Hair on antennae sparse upstanding, on third segment varying from .07-.09 mm. much more numerous on anterior margin than on posterior margin. Rostrum in larger specimens reaching to orifice of cornicles, in smaller specimens reaching end of abdomen, last three segments of rostrum with the following lengths: .18, .18 and .07 mm. The third segment of the rostrum is free from spots, its basal region is pale, its apex brown, which color continues to the end of the rostrum. The metathoracic femora vary from .75-.78 mm. in length, the hairs on the anterior margin of this segment are about .075 mm. in length, they are quite numerous and upstanding. The metathoracic tibiae vary in length from 1.08-1.17 mm. the hairs on the outer margin of this segment are .10 mm. in length, they are upstanding. The hairs on the inner margin of the metathoracic tibiae are about as long as those on the outer margin but more numerous, and somewhat more inclined. First metathoracic tarsal segment .09 mm. in length, the hairs on ventral surface of this segment number about nine, they are about as long as the width of the segment.

Abdomen.—Cornicles with the diameter measured front to rear .40 mm. orifice near center, outer margin irregular, but not distinctly broken. Hairs on cornicles not numerous but covering entire surface. Hairs on dorsal surface of abdomen not as numerous as those on ventral surface. Pigmented spots anterior to cauda with hairs scattered over all of surface. Anterior to these spots there are two pigmented areas. Cauda and anal plate with numerous hairs.

Holotype apterous, viviparous female deposited in the United States National Museum. Host *Picea glauca* (white spruce) Topsfield, Maine July 8, 1956. Collected by A. E. Brower.

This species differs from *C. soplada* H. by having longer hairs on the tibiae and antennae, darker pro and mesothoracic legs, larger cornicles. From *C. acadiana* H. this species differs by having longer hairs on the tibiae, more rounded cornicles with the margin less broken.

Cinara pallidipes n. sp.

Apterous viviparous female.

Length from vertex to end of cauda 2.18 mm. Color notes taken from living specimens not available. As present in cleared mounted specimens as follows: Head and thorax dark dusky brown. First and second antennal segments concolorous with head. All of third antennal segment except the extreme apex light dusky, apex of third and all remaining antennal segments dusky. All femora with basal portions much lighter than apical portions which are brown. Tibiae with knees brown, this region followed by a wide pale band which shades into dark brown slightly beyond the middle of the segment on the metathoracic pair of

legs, this band is much wider on the mesothoracic tibiae. Tarsal segments brown. Apex of second rostral segment brown, remaining segments of the rostrum the same. Basal portion of second rostral segment not spotted. Cornicles dusky black, cauda and anal likewise.

Head and thorax.—Median suture of head hardly apparent, not dark. Hairs on vertex of head .08 mm. long, fine. Ocular tubercles poorly developed. Rostrum extending to point just beyond posterior margin of cornicles. Length of antennal segments as follows: III .35 mm., IV .14 mm., V .17 mm., VI .12 + .02 mm. Secondary sensoria distributed as follows: Third and fourth antennal segments with one secondary sensorium plus primary, fifth antennal segment with two secondary sensoria and primary. Antennal hair sparse, fine, upstanding varying in length from .04-.07 mm. Sixth antennal segment slightly imbricated. Mesosternal tubercle absent. Metathoracic femora .93 mm. in length, provided with numerous fine upstanding hairs on the anterior margin which are about .06 mm. in length. Metathoracic tibiae 1.40 mm. in length. Hairs on outer margin of metathoracic tibiae varying from .06-.07 mm. in length, fine, upstanding, remaining hairs on metathoracic tibiae not quite so long less upstanding, more numerous. Hairs on inner apex of metathoracic tibiae abundant. First metatarsal segment .09 mm. in length, ventral surface of this segment with about fourteen hairs. Second metatarsal segment .26 mm. long.

Abdomen.—Cornicles with margins slightly irregular with the width .40 mm. Hairs on cornicles not numerous, varying in length from .08-.10 mm. fewer hairs near margin than on restricted area. Hairs on dorsum of abdomen not numerous, similar to those on the cornicles, hairs on ventral surface of abdomen more numerous than those on the dorsum, but only about half as long. Pigmented areas anterior to cauda with similar pigmented areas anterior to them. Hairs on pigmented spots irregular in distribution. Cauda and anal plate with setulae very well developed, both structures with many hairs.

Apterous male.

Length 1.87 mm. Length of antennal segments as follows: III .345 mm., IV .17 mm., V .21 mm., VI .12 + .02 mm. Length of metathoracic femora .81 mm. Length of metathoracic tibiae 1.25 mm. Length of metathoracic tarsal segments .075 and .22 mm. Width of cornicles front to rear .30 mm. Length of hairs on outer margin of metathoracic tibiae .045 mm. Lengths of last three rostral segments .18, .15, .06 mm. Sensoria on antennal segments distributed as follows: III 13-16, arranged on apical half of segment, irregularly spaced, small, tuberculate. IV 5 arranged on posterior margin. V 3. Hairs on antennal segments few, upstanding, varying in length from .04-.06 mm. Median transverse suture of head well developed, brown, much darker than head. Rostrum extending almost to pigmented spots anterior to cauda. Hairs on cornicles evenly distributed similar in length and character to those on dorsum of abdomen. Hairs on ventral surface of abdomen more numerous than hairs on dorsum, somewhat shorter and finer. Harpagones with a few short hairs at the apex but with numerous hairs elsewhere, all of which arise from clear areas. Hairs on tibiae similar to those of apterous viviparous female.

Holotype, apterous viviparous female, allotype apterous male. Host,

Picea glauca (white spruce). Collected at Topsfield, Maine July 8, 1956 by A. E. Brower. Both types deposited in the United States National Museum.

This species appears to be allied to *Cinara atripes* described herewith, but differs from that species by having shorter less numerous hairs on the antennae and tibiae, by having the tibiae banded with a pale area, and by having fewer hairs on the cornicles, which are also quite similar in color to the abdomen. July eighth would appear to be very early for the taking of a male, a fact which indicates that few generations of this species are produced in a season in the type locality, and which may also explain why this species has not been observed and described before now.

Cinara soplada H.

Alate male.

Length from vertex to end of cauda 1.92 mm. Length of antennal segments as follows: III .45 mm., IV .30 mm., V .36 mm., VI .16 + .05 mm. Length of metathoracic femora 1.20 mm. Length of metathoracic tibiae 1.98 mm. Length of metathoracic tarsal segments .105 and .27 mm. Width of cornicles .12 mm. Last three segments of the rostrum with the following lengths: .225, .18 and .06 mm. Sensoria distributed as follows: III 39-48, IV 36-46 V 29-33 VI 6. All of the sensoria are tuberculate and vary in size. Primary sensoria on the third and fourth segments similar to the secondary sensoria on these segments. Antennal hair sparse, most likely due to the excessive amount of surface taken up by the sensoria, most numerous on the fifth segment. All antennal hairs fine and about .03 mm. in length. First and second antennal segments dark dusky, third antennal segment with the base pale, remainder of segment dusky, all remaining antennal segments dusky becoming progressively darker towards the apex. Surface of antennae not taken up by sensoria rough, with the sixth segment distinctly imbricated, and the surface of the fifth slightly so. Rostrum extending beyond the body. Media of fore wings twice branched, the second branch far removed from the margin of the wing. All tibiae uniformly dark dusky. Metathoracic tibiae with the hairs set at an angle of about forty-five degrees, fine, about .045 mm. in length, the same on the outer and inner margins. Hairs on ventral surface of first metatarsal segment numerous, extending throughout most of length. Cornicles with comparatively few hairs. Cauda triangular. Harpagones with a few short hairs near the ends, remainder of harpagones with long hairs.

Allotype alate male, deposited in the United States National Museum. Host, *Picea glauca* (white spruce), Bar Harbor, Maine December 9, 1956 Coll. A. E. Brower.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW GRAY-CROWNED ROSY FINCH FROM
NORTHERN ALASKA

BY BERNARD FEINSTEIN*

A comparison of a series of twelve May and June specimens (7 males, 5 females) of *Leucosticte tephrocotis* collected in the Brooks Mountains of Alaska for, and by, Dr. L. Irving show distinct characteristics by which these northern Alaskan specimens can be separated from their closest (in appearance) relatives, *Leucosticte tephrocotis tephrocotis*. The Brooks Mountains specimens possess a brighter tone to the brown coloration found above and below. This brown apparently contains more of a reddish color, which is best noted on the under surface, than *L. t. tephrocotis*. The extent of red coloring on the rump, uppertail coverts and abdomen is of a deeper quality (quite similar in appearance to that found in *L. t. littoralis*), and on the under surface it covers a more extensive area than in *L. t. tephrocotis*. In addition the Brooks Range specimens possess a distinct gray occipital band which separates the black of the pileum from the brown of the back. This character is more noticeable in the males than in the females.

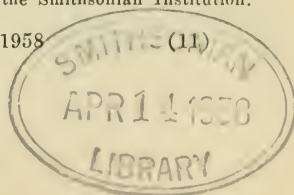
The differences stated above were first noted by Drs. Friedmann and Irving. Sometime before these specimens were given to me to examine another group of three July specimens were sent to Dr. Friedmann by Dr. Brina Kessel of the University of Alaska for positive identification. These specimens were collected in the mountains at the head of the Sheenjek River, Yukon Territory and Dr. Friedmann noted that "these agree with Irving's series in having more and deeper pink on the lower underparts and the rump . . . are worn . . . but they go together with the Anaktuvuk series."

On the basis of a definite distinction of the twelve summer specimens from the Brooks Range and the three specimens from the Sheenjek River, a new race is to be named, in honor of Dr. Laurence Irving, and described as follows:

Leucosticte tephrocotis irvingi subsp. nov.

Subspecific characters.—Differs from *L. t. tephrocotis* in averaging brighter colored above and below. The feathers of the dorsal tract having

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their web color, aside from the dark median streak, close to cinnamon brown with light edges rather than Saccardo's umber with light edges as found in *L. t. tephrocotis*; the pileum averaging and appearing blacker; a definite gray occipital band separating the pileum from the back color; the red feather edging of the rump and uppertail coverts averaging a deeper red, more purplish; the malar and auricular regions darker; tertial edgings a deeper red, more purplish; the abdominal red-edged feathers are also a deeper red and are more extensive in their distribution.

Type.—U. S. Nat. Mus. no. 435409, adult male taken June 29, 1949 at Anaktuvuk Pass, Alaska by T. Brower with an original no. A493a.

Measurements.—Male (7 specimens), wing (chord), 104.4-110; (average 106.9); tail, 63.8-70 (66.8); culmen, 11.0-12.2 (11.5); tarsus, 19.3-20.4 (19.9); middle toe without claw, 14.0-15.2 (14.1) mm. Female (5 specimens), wing, 100.5-102.5 (101.8); tail, 62.0-65.2 (64.2); culmen, 11.2-11.8 (11.6); tarsus, 19.0-20.7 (19.8); middle toe without claw, 14.0-14.3 (14.2) mm.

Range.—Known only from the Brooks Mountains and immediate vicinity.

Remarks.—A comparison of the Brooks Range series with *L. t. littoralis*, which is its nearest relative geographically, shows a slight inclination towards *littoralis* in coloration. However, the series of *irvingi* lacks the gray malar area and auricular region. *L. t. littoralis* is a smaller form than either *irvingi* or *tephrocotis*. There are no mensural differences by which *irvingi* can be distinguished from *tephrocotis*. The following measurements of the comparative breeding series of *tephrocotis* and *littoralis* are given to show the size variation and as an aid in comparing the three forms. *L. t. tephrocotis*: male (5 specimens), wing, 104.5-108.2 (105.7); tail, 62.5-67.1 (64.6); culmen, 11.0-11.6 (11.3); tarsus, 19.3-20.7 (19.9); middle toe without claw, 14.5-15.2 (14.8) mm. Female (6 specimens), wing, 100.0-104.1 (101.4); tail, 56.7-65.3 (61.8); culmen, 11.2-11.8 (11.5); tarsus, 18.2-19.3 (19.0); middle toe without claw, 14.1-15.0 (14.3) mm. *L. t. littoralis*: male (8 specimens), wing, 99.0-105.8 (103.1); tail, 58.2-66.7 (63.2); culmen, 10.5-11.1 (10.9); tarsus, 19.1-20.4 (19.9); middle toe without claw, 14.0-14.8 (14.3) mm. Female (6 specimens), wing, 94.0-100.2 (95.8); tail, 57.2-61.0 (58.5); culmen, 10.2-11.6 (10.9); tarsus, 19.0-20.4 (19.6); middle toe without claw, 14.0-15.0 (14.3) mm.

The comparative breeding material was selected from the northern portions of the United States and all localities to the north. This will explain why the *tephrocotis* series measured is so small. The large Californian breeding series in the U. S. Nat. Mus. collection was measured and compared and was found to agree with the more northern representatives of *L. t. tephrocotis*. The northernmost record for the nominate race is from Mountains near Eagle, Alaska. An attempt was made to borrow material from the intervening area, that is, from Eagle to the Brooks Range, but no other institutions were found to possess specimens from this questionable area. In the U. S. Nat. Mus. collection there are four winter specimens from this area; the area to the south of the Brooks Range. Two specimens are from Bettles and two are from Boulder Creek, a tributary of the Cheena River. All four specimens were collected in the month of October and were referred to *Irvingi*. It appears that *irvingi* is geographically isolated from the other races of the species by hundreds of miles of terrain apparently unsuitable for a rosy finch.

PROCEEDINGS
OF THE
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TECHNICAL NAMES OF THE SOUTH AMERICAN
MARSH DEER AND PAMPAS DEER

BY PHILIP HERSHKOVITZ

Curator of Mammals, Chicago Natural History Museum

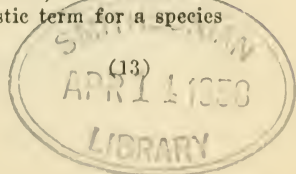
The generic name *Edocerus*, with type *Cervus dichotomus* Illiger, was proposed by Avila-Pires (1957) for the South American marsh deer currently known as *Blastocerus*. According to Avila-Pires the name *Blastocerus* is based on the pampas deer and should, therefore, displace *Ozotoceros* Ameghino. The arguments raised for the nomenclatural changes do not take into account all the known facts.

Ameghino (1891:243) proposed *Ozotoceros*, with type the pampas deer (*Ozotoceros campestris* authors, not Cuvier = *bezoarticus* Linnaeus), to replace "*Blastoceros* [*sic* = *Blastocerus*, not *Blastoceros* Fitzinger] Gray, 1872," erroneously held to be pre-occupied by *Blastocera* Gerstaecker, 1856, a genus of Diptera. In this particular case, the designated type species of *Ozotoceros* automatically becomes the type of "*Blastocerus* Gray, 1872." Both the pampas deer and the marsh deer, *Cervus paludosus* (= *C. dichotomus*) were included in "*Blastocerus* Gray, 1872." Under no circumstances, however, can it be assumed, as Avila-Pires does, that the type of *Ozotoceros* becomes, *ipso facto*, the type of *Blastocerus* as proposed by any author prior to Gray, 1872. Indeed, *Blastocerus*, as understood and constituted by earlier authors is not the same as "*Blastocerus* Gray, 1872."

The first use of *Blastocerus* as a valid generic name dates from Gray, 1850. The type and only species of *Blastocerus* Gray, 1850, is the marsh deer, *Blastocerus paludosus* Desmarest, with the *guazu-pucu* of Azara and *Cervus dichotomus* Illiger included as absolute synonyms. Patently, *Ozotoceros* Ameghino and *Blastocerus* Gray, 1850, are not synonymous.

In erecting the genus *Blastocerus* for the marsh deer, Gray (1850:68) cited Wagner and Sundevall as authorities for the name. However, neither author employed the term in any form that could be accepted as a generic or subgeneric taxon.

Wagner's classification of deer in the fourth supplement to Schreber's "Säugethiere" published 1844, and in the fifth supplement published in 1855, leaves no room for equivocation. The deer in question are here actually contained within the genus *Cervus*, subgenus *Elaphus* (cf. 1844: ix, 339, 341, 348, 367, 368; 1855: xv-xvi, 352, 367, 368). "*Blastocerus*" is introduced by Wagner (1844: 366) as a diagnostic term for a species



group contained within the subgenus *Elaphus*. The group consists of the marsh deer (*Cervus paludosus* [= *dichotomus*]), the pampas deer (*C. campestris* [= *bezoarticus*]) and the mule deer *C. macrotis* (= *hemionus*). At the same time, Wagner (1844:384) uses the term "Furcifer" for another superspecific category of subgenus *Elaphus*. This subdivision held only the Peruvian taruga (*Cervus antisensis* I. Geoffroy and Blainville).

In 1855, Wagner (p. 346) reviewed the taxonomic literature on deer contributed since 1844. He acknowledged Gray, 1850, as author of several generic names, including *Blastocerus* and *Furcifer*. In his own classification, however, Wagner (1855:349-350) kept "Blastocerus" in its original status as a diagnostic term for a species group within the subgenus *Elaphus*. *Furcifer*, on the other hand, was removed from *Elaphus* and given equal rank as a subgenus of *Cervus* (op. cit., pp. 350, 380).

In his arrangement of the Pecora, Sundevall (1846: 182-183) used the plural form "Blastoceri" as the term for a division of *Cervus*. It contained only the marsh deer, *Cervus paludosus*. The pampas deer, *C. campestris*, was referred to the "Furciferes" division of *Cervus*.

Admission of the terms "Blastocerus" and "Furcifer" from Wagner, 1844, "Blastoceri" and "Furciferes" from Sundevall, 1846, as valid generic or subgeneric names is not in harmony with their authors' concepts of classification or with the binomial system of nomenclature. A number of other Latin terms used by Wagner in the diagnoses of special species groups have crept into the literature as generic and specific taxa. They need not be exposed at this time.

The above conclusions are in agreement with those presented by Cabrera in 1943 (pp. 14-15). Avila-Pires cites Cabrera's paper but, it appears, has grossly misrepresented its meaning. Simpson (1945: footnote 5, p. 154) likewise failed to grasp the significance of the difference between "Blastocerus" Wagner, 1844, and *Blastocerus* Gray, 1850. His suggestion that *Dorcelaphus* Gloger, 1841, an absolute synonym of *Odocoileus* Rafinesque, could be the correct name for the marsh deer, cannot be taken seriously.

Another name for marsh deer that must be reckoned with is *Bezoarticus* Marelli. The name was erected in 1931 (p. 57) as a subgenus of "Blastocerus Wagner, Proc. Zool. Soc. London, 1850, p. 237." Its type by monotypy is the marsh deer, *Blastocerus paludosus* Desmarest. Marelli also listed the pampas deer, *Blastocerus campestris*, with synonym *Blastocerus bezoarticus*. It would seem that Marelli might have included this tautonymic species in his *Bezoarticus* but this is not evident from the text. In any case, the pampas deer becomes, by elimination, type of the nominate form of the genus *Blastocerus* as understood by Marelli.

Turning now to the pampas deer, the earliest generic name based on it is not *Ozotoceros* Ameghino. In 1860, Fitzinger (p. 176) proposed *Blastoceros* exclusively for this animal. There is no indication in the text of his work that Fitzinger adopted the name from either Wagner, 1844, or Gray, 1850. Whether or not it should be regarded as an invalid emendation, *Blastoceros* Fitzinger as a name is valid, and no more a homonym of *Blastocerus* Gray, 1850, than is *Blastocera* Gerstaecker, 1856.

Some confusion may result from the near identity of the generic names for marsh and pampas deer. This problem may eventually be resolved within the scope of a taxonomic revision of all Neotropical

cervids. For present purely nomenclatorial purposes, however, the available names for the deer in question may be summarized as follows:

Blastocerus Gray (Marsh deer)

Blastocerus Gray, 1850, Gleanings Knowsley Menag., p. 68—type *Blastocerus paludosus* Desmarest [= *Blastocerus dichotomus* Illiger] by monotypy; generic name derived from "Blastocerus" Wagner, 1844 (Schreber's Säugethiere, Suppl. 4:366), a term for a species group of subgenus *Elaphus*, genus *Cervus*. Lydekker, 1915, Deer of all lands, p. 282—name erroneously attributed to Sundevall (1846, K. Vet. Akad. Handl., 1844:182) where only the plural Latin term "Blastoceri" is used.

Blastoros Knottnerus—Meyer, 1907, Arch. Naturg., Berlin, (73), 1:19—misprint for *Blastoceros* [sic] Gray.

Bezoarticus Marelli, 1932, Mem. Jardin Zool. La Plata (1930-1931), 4:57—subgenus of "*Blastocerus* Wagner [Gray], Proc. Zool. Soc. London, 1850, p. 237"; type by monotypy, *Blastocerus paludosus* Desmarest [= *Blastocerus dichotomus*].

Edocerus Avila-Pires, 1957, Bol. Mus. Nac. Rio de Janeiro, n.s., no. 153, p. 5—type *Edocerus dichotomus* Illiger, by original designation.

Dorcelaphus Knottnerus—Meyer (Not Gloger, 1841), 1907, Arch. Naturg., Berlin, (73), 1:19, 98—included species, *D. dichotoma* Illiger; offered as substitute for *Blastoceros* [sic] Gray, 1850.

Blastoceros Fitzinger (Pampas deer)

Blastoceros Fitzinger, 1860, Naturg. Säugeth., 3:176—type, *Blastoceros campestris* [= *Cervus bezoarticus* Linnaeus], by monotypy.

Ozotoceros Ameghino, 1891, Rev. Argentina Hist. Nat., 1:243—type, *Ozotoceros campestris* [not Cuvier = *Cervus bezoarticus* Linnaeus]; name proposed as a substitute for "*Blastoceros* [sic] Gray, 1872" [not *Blastocerus* Gray, 1850] erroneously regarded as preoccupied by *Blastocera* Gerstaecker, 1856, a genus of Diptera.

Ozotoceras [sic] Palmer, 1904, Index Gen. Mamm., N. A. Fauna no. 23:492—lapsus for *Ozotoceros* Ameghino.

Ozelaphus Knottnerus—Meyer, 1907, Arch. Naturg., (73), 1:19, 98, 110—included species: *azarae* Fitzinger [= *bezoarticus* Linnaeus], *bezoarticus* Linnaeus [= type, by virtual monotypy].

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE TAXONOMIC STATUS OF PEROMYSCUS
ALLEX OSGOOD

BY ROBERT L. PACKARD

Museum of Natural History, University of Kansas

Peromyscus [= *Baiomys*] *allex* Osgood was regarded as a synonym of *Baiomys taylori paulus* J. A. Allen, 1903, from 1909 to 1952. Since 1952 *allex* has been a synonym of *Baiomys taylori analogous* Osgood, 1909. In 1904 Osgood described *allex* (Proc. Biol. Soc. Washington, vol. 17: 76-77) on the basis of ten specimens from the city of Colima, Colima, Mexico. According to the original description *allex* resembled *Baiomys musculus musculus* in color, but differed from it in the smaller size of the body and skull. Osgood noted (*loc. cit.*) that *allex* was almost equal in size to *Baiomys taylori taylori*. However, *allex* differed from *taylori* in having a narrower and more elongate braincase. Osgood indicated that *allex* was like *paulus* in size of body and shape of cranium, but differed from it in color. In his "Revision of the mice of the American Genus *Peromyscus*" (N. Amer. Fauna, 28: 255, April 17, 1909) Osgood chose to synonymize *allex* with *paulus*. This choice in the assignment of *allex* to *paulus* produced a hiatus in the known geographic range of *paulus*. Furthermore, this hiatus was occupied by a part of the geographic range of another named subspecies of *Baiomys taylori*, *B. t. analogous*. In 1952 Hall and Kelson (Univ. Kansas Publ. Mus. Nat. Hist., vol. 5: 368, Dec. 15) synonymized *allex* with *analogous*. Their decision was based upon comparisons of topotypes of *allex*, *analogous*, and *paulus*; two specimens of equal age and the same sex of *allex* and *analogous* were almost equal in size. In color, topotypes of *analogous* averaged darker than those of *allex*. One specimen of *analogous* (120267 BS) was seemingly indistinguishable from the paratypes of *allex*. On the basis of their report the correct name for this population should have



been *Baiomys taylori allez* Osgood, 1904 (they failed to realize that *allez* had priority over *analogous* and used the latter name).

Examination of all of the original materials (holotypes and paratypes) pertinent to this problem in the course of my present study of the Genus *Baiomys* leads me to the opinion that Osgood's *allez* should not be synonymized with either *paulus* or *analogous* (both of these are distinct subspecies of *Baiomys taylori*), but instead, that *allez* should be recognized as another distinct subspecies of *Baiomys taylori*. The name applicable to this population is *Baiomys taylori allez* Osgood, 1904. From paratypes of *Baiomys taylori paulus*, *B. t. allez* differs in: Unicolored instead of bicolored tail; belly paler; feet more sooty dorsally; 9 of 13 external and cranial measurements averaging smaller (see table 1). Owing to the small size of the sample the differences in measurements may not be significant. From paratypes of *Baiomys taylori analogous*, *B. t. allez* differs in: Ventral part of forelegs and belly whitish, instead of gray; dorsum fawn colored with gray overtones, instead of blackish-sepia; external and cranial measurements averaging smaller throughout (see table 1), but as previously mentioned the size differences may not be significant owing to the small size of the sample. The several differences in color of *allez* are alone sufficient to separate it from either *analogous* or *paulus*.

B. t. allez is known only from the type locality but may occur in northern Colima, the western part of Jalisco, and the southern part of Nayarit.

I am grateful to Mr. George G. Goodwin, the American Museum of Natural History, for permission to examine the holotype and paratypes of *Baiomys taylori paulus*, and to Dr. David H. Johnson, United States National Museum, for permission to examine the other mentioned material.

Transmitted December 16, 1957.

Table 1. Average and extreme measurements, in millimeters, of three subspecies of *Baiomys taylori*

	Total length	Tail vertebrae	Length of body	Hind foot	Occipitonasal length	Zygomatic breadth	Postpalatal length	Least interorbital breadth	Length of incisive foramina	Length of rostrum	Breadth of braincase	Depth of cranium	Alveolar length of maxillary tooth-row
<i>Baiomys taylori allex</i> , Colima, Colima													
Number of specimens ..	9	8	9	9	6	9	6	9	9	8	8	7	9
Average	105.5	42.0	63.1	13.3	17.8	9.3	6.5	3.4	3.7	5.7	8.5	6.4	3.0
Minimum	100.0	38.0	58.0	13.0	17.5	8.8	6.2	3.2	3.5	5.4	8.3	6.1	2.8
Maximum	113.0	47.0	68.0	14.0	18.4	9.7	6.7	3.5	3.8	6.0	8.8	6.6	3.0
<i>Baiomys taylori pautus</i> , Rio Sestín, Durango													
Number of specimens ..	6	6	8	9	5	5	5	6	6	5	5	5	6
Average	109.0	44.5	63.0	13.1	17.5	9.3	6.6	3.5	3.8	5.9	8.6	6.6	3.2
Minimum	106.0	43.0	57.0	12.7	17.4	9.1	6.2	3.4	3.6	5.7	8.5	6.2	3.1
Maximum	117.0	48.0	69.0	14.0	18.0	9.5	6.9	3.6	4.1	6.0	8.8	6.9	3.4
<i>Baiomys taylori analogus</i> , Zamora, Michoacán													
Number of specimens ..	9	9	9	9	8	9	8	9	9	9	9	8	9
Average	109.7	43.8	65.9	14.4	18.0	9.5	6.6	3.5	4.0	6.0	8.7	6.5	3.1
Minimum	100.0	36.0	60.0	13.5	17.6	9.1	6.3	3.3	3.6	5.6	8.4	6.3	3.0
Maximum	123.0	53.0	72.0	15.0	18.6	9.9	6.9	3.8	4.2	6.6	9.0	6.8	3.2

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

MISCELLANEOUS PREY RECORDS OF SOLITARY
WASPS. III* (HYMENOPTERA, ACULEATA)

BY KARL V. KROMBEIN

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Almost all the biological observations reported here were made at Plummers Island, Maryland, and at my home in Arlington, Virginia. At Plummers Island observations were made on several species of ground-nesting wasps, and on some wood-nesting species that utilized the abandoned frass-filled burrows (2-3 mm. in diameter) of anobiid beetle larvae in steps and rafters of the cabin porch. All the species observed in Arlington were nesting in abandoned anobiid borings in the wooden wall of an old, disused cowshed.

The opportunity is also taken to present some brief descriptive notes of the hitherto unknown male of the rare sphecoid wasp, *Xysma ceanothae* (Viereck).

I am indebted to the following specialists for the identification of prey or parasites of the wasps: H. C. Hockett (Muscidae), B. J. Kaston (Araneae), P. W. Oman (Cicadellidae, in part), K. O'Neill (Thripidae), L. M. Russell (Aphididae), W. W. Wirth (Tendipedidae), and D. A. Young, Jr. (Cicadellidae, in part).

Pompilidae

Calicurgus hyalinatus alienatus (Smith)

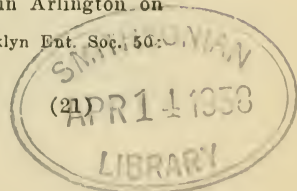
A female (61157 J), 9.7 mm. long, was captured with her paralyzed spider prey on June 11, 1957, on Plummers Island. She was dragging the spider over leaf litter near the cabin woodpile. The spider was a female epeirid 6.7 mm. long and about three-fourths grown, belonging to a species of *Neoscona*.

Sphecidae

Trypoxylon (Trypoxylon) backi Sandhouse

Two females (92157 B and C), 4.9 and 6.3 mm. long, were collected with their paralyzed spider prey on the cowshed wall in Arlington on

*Preceding parts of this series were published in Bull. Brooklyn Ent. Soc., 50: 13-17, 1955, and 51: 42-44, 1956.



September 21, 1957. The spiders were specimens of the linphyiid, *Tennesseetum formicum* (Emerton), 1.1 and 1.7 mm. long, a penultimate instar male (92157 B) and adult female (92157 C). This wasp is multivoltine in Arlington.

Diodontus (Diodontus) atratus parenosus Pate

A female (92157 A), 5.7 mm. long, was taken on the cowshed wall in Arlington at the entrance of her burrow, September 21, 1957. She was carrying a paralyzed aphid nymph, 1.5 mm. long, of a species of *Drepanaphis*. This wasp is multivoltine in Arlington.

Mimesa (Mimesa) basirufa Packard

One female (61157 K), 9.2 mm. long, was taken June 11, 1957, on Plummers Island near the outdoor fireplace. She was flying with her paralyzed prey, an immature leafhopper, 3.2 mm. long. The cicadellid was probably a fourth-instar nymph of a species of *Idiocerus*.

Xylocelia virginiana Rohwer

I have made limited observations on several colonies of this species. Members of the earliest colony were nesting in pockets of soil formed between the roots of some uprooted tree stumps in Forest Lawn Cemetery, Buffalo, New York. Ten females and two males were taken between June 20 and July 13, 1934. One female on June 21 was transporting her prey, a paralyzed adult leafhopper, 4 mm. long, of a species of *Typhlocyba*. There was one generation a year at Buffalo, for no specimens were taken the rest of the summer of 1934. This colony was active again in June 1935.

There are two colonies located about 10 meters apart on the flat ground behind the cabin on Plummers Island. No observations were made on the nesting activities in 1956, but three females and four males were taken June 29 and July 11. In 1957 the larger colony consisted of about 50 females nesting in an area somewhat over 2 square meters. Adults were active from at least June 11 to July 2. Both sexes were flying low over the ground or alighting on the ground at 10 a.m., June 11. Several of the males attempted unsuccessfully to mate by pouncing on females on the ground. The females were digging burrows or provisioning their nests. The individual burrow entrances resembled small anthills, the fine grains of excavated soil being around the entrances in spoil heaps about 25 mm. in diameter and 3 to 6 mm. in height. The burrows penetrated the soil at an angle of 35° to 45° and varied considerably in the details of construction. Some went downward for 25 to 30 mm., then turned at right angles and continued down for another 25 mm. at the same angle. Others had an angulation only 10 mm. from the entrance and an additional angulation in another 20-25 mm. One was a straight shaft 32 mm. long.

All wasps at Plummers Island were provisioning with nymphs of *Prociphilus tessellatus* (Fitch), the woolly alder aphid. Nine aphids taken with or from wasps or found in burrows on June 11 (61157 A and C-I) ranged from 3.1 to 4.6 mm. in length (female wasps were 6.9 to 7.7 mm. long). I did not observe prey capture, but most of the woolly bloom is rubbed off the aphids during the process. The aphids are almost bare when they are brought into the burrows, and the head and thorax of the wasps are coated with the pale bluish bloom from the aphids. Members of

the colony in 1956 probably stored the same aphid, for female wasps taken on June 29 and July 11 were similarly coated. The prey is held in the mandibles during transport. Provisioning continued from 10:15 a.m. until 3:55 p.m., and wasps were still flying about when I left at 4:10. The burrow entrance is left open when the wasp departs on a provisioning flight. After returning with prey, the wasp pushes up a plug of loose soil from within (based on one observation).

An attempt was made to rear the contents of two cells found 25-30 mm. below the surface. These were the only completely provisioned cells that I found. The other burrows that I excavated contained only one or two aphids at the most and no eggs. Each of the completely stocked cells held five aphids, and one contained a newly hatched wasp larva, the other a wasp egg. The egg was 1.5 mm. long and 0.45 mm. wide at the middle, and the head end was a little broader than the tail end. It was attached to one of the aphids at the base of the second abdominal sternum along the midline and extended forward between the coxae to the hind margin of the anterior pair. The egg hatched between 9:30 p.m., June 12, and 6 p.m., June 13, and the newly eclosed larva began to feed through the middle of the thoracic sternum between the fore and mid coxae with its tail still attached to the second sternum. This larva was killed by mold on the following day. The older larva was larger but still feeding on the original aphid at 9:30 p.m., June 12. It finished its allotment of aphids by noon of June 15 and was then preserved for taxonomic study.

Many females of an Holarctic muscid *Leucophora sociata* (Meigen) were active on the ground in both nesting sites of *Xylocelia* at Plummers Island on June 11. Some of the flies seemed to be interested in the burrow entrances, though no oviposition was noted nor were any flies seen entering the burrows. Others dashed aggressively at wasps bringing in prey. Although additional observations are needed to determine the precise relationship between *Xylocelia virginiana* and *Leucophora sociata*, the following observations made in Scotland on the relationship between the bee *Andrena analis* Zett. and *Leucophora grisea* (Fall.) are rather illuminating. Huic (Scottish Naturalist, No. 49, pp. 13-20, 1916) found these two species in association. The flies remained in the nesting area and showed an interest only in those bees bringing in a load of pollen. After the bee had deposited her pollen load in the cell in the ground and departed on another provisioning flight, the fly might back into the burrow and deposit an egg about 10 mm. from the entrance and some distance from the cell. Huic found maggots, from which *L. grisea* emerged subsequently, feeding on the stored pollen, one to a cell, but never any bee larva, alive or dead, in such a cell. Her observations, however, do not rule out the possibility that the newly hatched maggot might destroy the host egg before beginning to feed on the stored pollen. Such an act would parallel the behavior pattern of newly hatched larvae of such diverse social parasites as the Miltogrammini in the Sarcophagidae, the Chrysididae, *Coelioxys* in the Megachilidae, as well as other genera of parasitic bees.

Another possible parasite of *X. virginiana* is the mutillid *Ephuta scrupea* (Say). One female was crawling over the ground in a nesting area on June 11. It feigned death when disturbed.

I was unable to visit Plummers Island between June 12 and July 1, 1957, but my colleague, G. B. Vogt, was kind enough to make some

observations on the colony during my absence. On June 16 he saw three wasps bring in aphids during a 15-minute period; several specimens of *Leucophora* were present in the area but no *Ephuta* were seen; several wasps engaged in excavating burrows had no aphid bloom on head and thorax. On June 23 he saw several *Xylocelia*, two of them engaged in excavation, and two *Leucophora*; no aphids were brought in during a 15-minute observation period. There was no activity on June 25 after a heavy rain, nor was there any on June 28. I looked intermittently for *Xylocelia* between 8:30 a.m. and 1:30 p.m. on July 2 without success. At 1:40 I captured one female on the ground without prey or aphid bloom—its mandibles were very worn. I saw another female at 1:45, likewise without prey or aphid bloom. Apparently this wasp is univoltine on Plummerville Island as in Buffalo, New York, for no specimens were seen during the rest of the summer.

Stigmus americanus Packard

This species was nesting in large numbers in my cowshed wall during the entire summer of 1957. Females ranged from 4.0 to 4.7 mm. in length, and their aphid prey from 1.6 to 2.0 mm. All aphids taken with wasps during the latter part of the season were nymphs, except 91557 B which was an adult. The aphids were identified as follows:

9157 B, September 1, with *Drepanaphis* sp.

9257 A, September 2, with *Drepanaphis* sp.

91557 B, September 15, prey belonging to Panaphini (?)

91557 C, September 15, with *Drepanaphis* sp.

92257 A, September 22, with *Drepanaphis* sp.

This species was also nesting in the porch beams of the cabin at Plummerville Island. Three wasps (83157 B-D), 4.8-5.4 mm. long, were taken with paralyzed nymphs of *Drepanaphis* 1.2-1.9 mm. long, August 31, 1957. This wasp is multivoltine in the metropolitan area of Washington.

Stigmus fraternus Say

Two females (91457 A and 92257 B), 4.7 mm. long, were captured September 14 and 22, 1957, on the cowshed wall in Arlington. The prey of 91457 A was an aphid nymph 0.9 mm. long belonging to a species of *Therioaphis*, and the prey of 92257 B was an aphid nymph 1.4 mm. long of a species of *Monellia*.

Passaloecus annulatus (Say)

This species nested both at Arlington and at Plummerville Island in the habitats noted under *Stigmus americanus*. Two wasps (9157 C and 92157 D), 4.6 and 5.1 mm. long, were captured in Arlington, September 1 and 21, 1957, with paralyzed aphid nymphs 2 mm. long belonging to a species of *Macrosiphum* and to a species of *Drepanaphis*. Another (9257 C), 5.0 mm. long, was taken on Plummerville Island, September 2, 1957, with an aphid nymph 1.4 mm. long belonging to a species of *Drepanaphis*. This species is multivoltine in the metropolitan area of Washington.

Passaloecus mandibularis (Cresson)

Two females (53057 A and C) 5.9-6.1 mm. long, were taken on my cowshed wall in Arlington, May 30, 1957. Each was clutching a paralyzed

wingless aphid by the neck. The aphids were 2.2-2.3 mm. long, 53057 A an adult and 53057 C a nymph, and belonged to *Macrosiphum rosae* (L.). This wasp is univoltine in Arlington.

Passaloecus relativus Fox

This species was nesting in the same habitat as *P. mandibularis*. One female (53057 B), 5.0 mm. long, was taken May 30, 1957, with a wingless aphid nymph, 1.7 mm. long. Another (6157 B), 4.5 mm. long, was captured June 1, 1957, with a wingless aphid nymph, 1.3 mm. long. This wasp also carried its paralyzed prey by clutching its mandibles around the aphid's neck. Both specimens of prey belonged to a species of *Aphis*.

Xysma ccanothae (Viereck)

This tiny wasp (females are 2.2-2.5 mm. long) is one of our rarest species, and through 1945 was known from just a very brief series of females. In 1954 I was fortunate enough to find a thriving colony nesting in my cowshed wall in Arlington, and I collected 27 females and 3 males between May 31 and June 13. Females were entering deserted anobiid borings, where presumably they nested in tiny galleries excavated in the anobiid frass as do some species of *Spilomena*. Nine of the females taken between June 2 and 12 were engaged in prey transport. Each carried a tiny, pale green thrips larva, venter to venter, its mandibles clutched around the neck of the thrips. The thrips larvae ranged from 0.84 to 1.01 mm. in length. Prey-laden wasps were taken from 10:15 a.m. to 4:15 p.m.

The species is nesting in much smaller numbers in rafters of the cabin porch on Plummers Island. Two females (62956 A and B) were taken June 29, 1956. Each was carrying a second-instar thrips larva 0.89 mm. long of a species of Thripinae (?). Another female (61157 L) was collected June 11, 1957, carrying a thripine (?) larva 0.80 mm. long. Miss O'Neill states that this is likely to be a flower thrips.

Since the male has never been described, it seems desirable to add a few descriptive notes detailing its differences from the female as re-described by Pate (Trans. Amer. Ent. Soc. 63:97-98, 1937).

Length 2.1-2.3 mm. Black and shining; the following ivory—mandible except apex which is light red, clypeus, subquadrate spot on front on either side of median lobe of clypeus which extends upward one-third of distance to anterior ocellus, scape beneath, malar space, anterior third of head beneath including mouthparts, proepisternum, fore coxa and trochanter; the following light fulvous—scape above, flagellum, foreleg except coxa and trochanter, mid leg and hind tarsus.

Head circular in frontal aspect, strongly arched behind eyes; malar space longer than in female, length at anterior condyle equal to length of antennal pedicel; antennal flagellum rather short and stout and with dense, short, suberect setae, the apical segment 0.8 times as long as preceding three segments combined; third and fourth abdominal sterna with posterior third or half with an arcuate band of dense, appressed setae; fifth and sixth sterna with shorter and more scattered, appressed setae; seventh sternum bare; exerted part of hypopygium narrow and acute, the sides converging toward apex, vestiture similar to that of fifth and sixth sterna.

Euplilis (Corynopus) rufigaster (Packard)

This species was first noted August 22, 1957, nesting in the porch of the cabin at Plummers Island. This fairly populous colony probably had been active for a period prior to the 22nd, for no males were taken between that date and September 20, the latest date on which females were active. Twenty-seven females captured during this period ranged from 4.6 to 6.0 mm. in length. All females captured with prey were carrying paralyzed, adult male and female tendipedid midges, varying in length from 1.5 to 4.0 mm. Provisioning of the nests was taking place as early as 10:30 a.m. and as late as 3:55 p.m.

Eleven midges taken from wasps were identified as follows:

82257 A, ♀ *Tendips* sp., probably *nervosus* (Staeger), 3.1 mm.

82257 B, ♀ of unknown genus and species, 1.8 mm.

82257 C, ♀ *Cricotopus* species, 1.5 mm.

82257 D, ♂ *Tendipes nervosus* (Staeger), 2.8 mm.

83157 A, ♀ of unknown genus and species, 1.7 mm.

9257 B, ♀ ditto, but a different species, 4.0 mm.

9257 D, ♂ ditto, but a different species, 1.9 mm.

9657 A, ♂ *Calopsectra* species, 2.8 mm.

9857 A, ♂ *Procladius culiciformis* (Linnaeus), 3.8 mm.

9857 B, ♀ probably *Calopsectra* species, 1.5 mm.

92057 B, ♀ *Calopsectra* species, 1.8 mm.

When I reached the cabin at 9 a.m., September 20, a female *rufigaster* (92057 A), 5.1 mm. long, was excavating her burrow in an old frass-filled anobiid boring in the porch steps. At that time there was a circle of excavated particles of anobiid frass 5 to 15 mm. distant from the boring entrance. I was absent for the next hour and a half checking some other field work. At 10:32 the wasp flew in with a large pale green midge, holding it beneath her thorax, venter to venter, and head end forward. She left the boring two minutes later and returned with another midge at 10:37. Half a minute later she left the burrow and returned in another half minute with another midge. At this point I split open the boring with a knife and found that the wasp had excavated the anobiid frass from a section about 20 mm. long. The cell contained eleven midges and was not completely stored, for there was no wasp egg or closing partition. The midges ranged from 2.3 to 3.8 mm. in length, and comprised seven males of a species of *Calopsectra*, one female and two males of *Tendipes modestus* (Say), and one male of *Tendipes neomodestus* (Malloch).

Crossocerus (Blepharipus) ambiguus (Dahlbom)

On March 5, 1956, I split a section of board from the cowshed wall in Arlington. There were two cells in one of the abandoned anobiid borings, one of them containing a cocoon with some leafhopper fragments, the other containing adult leafhoppers, thirteen females and one male. The male leafhopper was a specimen of *Empoasca pergandei* Gill. and the females were probably the same species. The leafhopper fragments on the cocoon also appeared to be of this same species. The cocoon was kept in a heated room and on April 12 a male of *C. ambiguus* emerged.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW GECKO OF THE *SPHAERODACTYLUS*
DECORATUS GROUP FROM CUBA

BY ALBERT SCHWARTZ
Albright College, Reading, Penna.

The geckonid lizards of the genus *Sphaerodactylus* are represented in Cuba by six forms: *Sphaerodactylus decoratus torrei* Barbour, *S. cinereus* Wagler, *S. notatus* Baird, *S. scaber* Barbour and Ramsden, *S. oliveri* Grant, and *S. argus* Gosse. The name *S. nigropunctatus* Gray has been shown recently by Grant (1957) to be only uncertainly applicable to any Cuban sphaerodactyl. In addition, *S. gibbus* Barbour has been reported; according to Grant (1956, pp. 247-248) the Cuban records of *gibbus* refer to male *S. d. torrei*, and thus *S. gibbus* is not part of the Cuban fauna. Of these lizards, some are known only from rather restricted areas: *oliveri* from the vicinity of Soledad, Las Villas Province, *scaber* from two isolated mountain ranges in Camagüey Province, and *argus* from the vicinity of Soledad, where it may have been introduced from Jamaica. On the other hand, *notatus* is widespread throughout the entire island, *cinereus* occurs from Pinar del Río Province to Camagüey Province, and *torrei* appears to be widespread in Oriente.

During the summer of 1957, herpetological collections were made in the provinces of Pinar del Río, Habana, Las Villas and Camagüey. Sixty-three *Sphaerodactylus* were collected, most of which are the widespread *S. cinereus*. In addition, seven individuals were taken in Habana Province which prove to be an undescribed form of the *S. decoratus* group. Barbour (1921, pp. 227-231) arranged as full species *decoratus*, *gibbus*, and *torrei*; these three forms are characterized by having granular dorsal scales which are not sharply keeled, these granules becoming enlarged on the flanks. Hecht (1954, p. 133) proposed that *gibbus* and *torrei* be regarded as subspecies of *S. decoratus* Garman (type locality, Rum Cay, Bahamas), so that the subspecies of *S. decoratus*, as presently defined, have the following distribution:

S. d. decoratus Garman—Bahama Islands—known from Rum Cay;



Mangrove Cay, Andros Island; and Andros Island. That it is more widespread than these records indicate is shown by specimens in the American Museum of Natural History and Museum of Zoology, University of Michigan, from the following localities: Bimini, South Bimini, Cat Island, New Providence, Rose Island and Eleuthera, in the Bahamas.

S. d. torrei Barbour—western Cuba (Province of Oriente)—known from the type locality (Santiago de Cuba, Oriente Province), Cabo Cruz, Guantánamo (all from Barbour, *op. cit.*, p. 278); Banés (Grant, *loc. cit.*); Río Puerco, Boqueron, Puerto Portillo, and Río Yaleritas (Cochran, 1934, p. 12).

S. d. gibbus Barbour—known at present only from the type locality, Stocky Island, Exuma Cays, in the Bahamas. Grant (*loc. cit.*) has documented the erratic history of the recording of this species from Cuba, and, as presently understood, this subspecies does not occur on the large island. Alayo (1955, p. 4) records the taking of a specimen of *S. gibbus* among rocks on the beach at Allende, Matanzas Province. As will be shown below, this specimen is in all probability not *S. gibbus* but rather a representative of the form described herein.

To this complex may well be added in the future *S. stejnegeri* Cochran from Hispaniola (type locality, San Michel, Departement du Nord, Haiti). Barbour (*op. cit.*, p. 230) regarded one specimen from Thomaizeau, Haiti, as representing *S. torrei*, and Cochran (1941, pp. 111-12) remarked on the similarity between this species and *S. torrei*. Grant (1949, pp. 74-5) demonstrated that *S. stejnegeri* was sexually dimorphic in pattern, and thus resembles *torrei* and *decoratus*. Six specimens of *S. stejnegeri* from Haiti have been available to me for study; this species is certainly closely related to *S. decoratus*, but I am reluctant to regard them as conspecific at the present time.

I have examined 21 adult specimens of *S. decoratus* from the Exuma Cays, Bahama Islands, B.W.I., recently collected by the Van Voast-American Museum of Natural History Bahama Islands Expedition, as follows (details of these localities may be found in Rabb and Hayden, 1957): Big Farmer's Cay, four males, six females; Warderick Wells Cay, one female; Leaf Cay, one male, one female; Darby Island, two males, six females. The type of *S. gibbus* is undoubtedly a male, although Barbour did not mention this fact. Of the seven males from the Exuma Cays, three agree in pattern with the plate and description of *S. gibbus* given by Barbour (*op. cit.*, p. 229 and pl. 1, fig. 2). The remaining four specimens show gradation from a well spotted dorsum to an unspotted, uniform tan dorsum; this situation is strongly reminiscent of the condition in males of *S. d. torrei* as demonstrated by Grant (1956, *loc. cit.*). Male *S. d. decoratus* do not appear to show the same change in pattern nor the same variation; Barbour had described *S. flavicaudus* on the basis of a male *S. d. decoratus*, and noted (*op. cit.*, pp. 225-6) that males of *decoratus* are pale cream, with the skin showing darker between the scales, giving a reticulate appearance, and having a yellow tail. I have examined four male *S. d. decoratus* (including a paratype of *S. flavicaudus*). Three of these are unicolor; the fourth, the largest of the lot (snout-vent length 32 mm.), has faint indications of transverse banding, typical of females of this subspecies. None has the prominent spotting of male *S. d. gibbus*. After examination of long series of *S. d. decoratus* and *S. d. gibbus*, I am unable to differentiate between

the banded females of these two forms. Likewise, there appear to be no constant scale differences, and the acceptance of *S. d. gibbus* seems to rest entirely upon the boldly spotted condition in the males.

On the north coast of Habana Province, with the assistance of Messrs. John R. Feick, William H. Gehrmann, and Sr. Aurelio Sanchez Agramonte, three adult males, two adult females, and two juvenile *Sphaerodactylus* were collected. These specimens, obviously representatives of the *S. decoratus* complex, are strikingly different from *S. d. torrei* from Cuba, as well as from the two Bahaman subspecies. This new subspecies may be known as

***Sphaerodactylus decoratus drapetiscus*, new subspecies**

Type: American Museum of Natural History, No. 77759, an adult female, taken July 15, 1957, two miles east of Playa de Guanabo, Cueva de Rincon de Guanabo, Habana Province, Cuba, by W. H. Gehrmann, Jr., A. Sanchez Agramonte, and A. Schwartz. Original number 2771.

Paratypes: A.M.N.H. Nos. 77760-61; same data as type; A.M.N.H. Nos. 77762-65, same locality as type, but taken August 8, 1957, by J. R. Feick and A. Schwartz; A.N.S.P. No. 16359, Matanzas, Matanzas Province, Cuba, July 28, 1904, by H. A. Pilsbry.

Distribution: Known from the type locality and Matanzas; a specimen of *S. gibbus*, reported by Alayo (*loc. cit.*) from Playa de Allende in Matanzas, probably represents this form, rather than *S. d. gibbus* (which is now assumed not to occur in Cuba), or *S. d. torrei* which, as far as known, occurs only in Oriente.

Diagnosis: A sexually dichromatic *Sphaerodactylus* with granular dorsal scales becoming larger on sides, characterized, in females, by four transverse black bands with light center between the limbs, a black band with a light center on neck anterior to forelimbs, and a single black line just behind ear opening; snout and head longitudinally striped with no black band at level of eyes; in males, dorsum unicolor tan with relatively large, prominent, black spots from level of eyes posteriorly to dorsal three-quarters of dorsum of tail; snout longitudinally striped; juveniles patterned like adult females (see fig. 1).

Description of type: An adult female with the following measurements (all measurements in millimeters): snout-vent length, 31.4; tail absent; distance from snout to center of eye, 4.3; distance from center of eye to tympanic opening, 4.2; width of head, 5.5; dorsal scale rows in snout-eye distance, 19; ventral scale rows in snout-eye distance, 8; fourth toe lamellae, 9 plus terminal enlarged scale; supralabials, 4/4; infralabials, 4/3. Dorsal scales granular, not sharply keeled, enlarging on the sides between the limbs; dorsal surface of head with granular scales of same size as dorsal scales, slightly larger and more flattened on snout; rostral with a median groove, bordered posterior by the two supranasals and a central smaller azygous scale; enlarged supralabials 4/4, the first the longest; mental large, followed by three subequal scales; infralabials 4/3, the first the longest; superciliary spine relatively small, stout, and truncate, especially on left side; ventral scales smooth, large and imbricating on belly, becoming smaller and less imbricating on neck and throat, and gradually grading to non-imbricating granular lateral scales on sides of venter; scales on anterior faces of fore and hind limbs large,

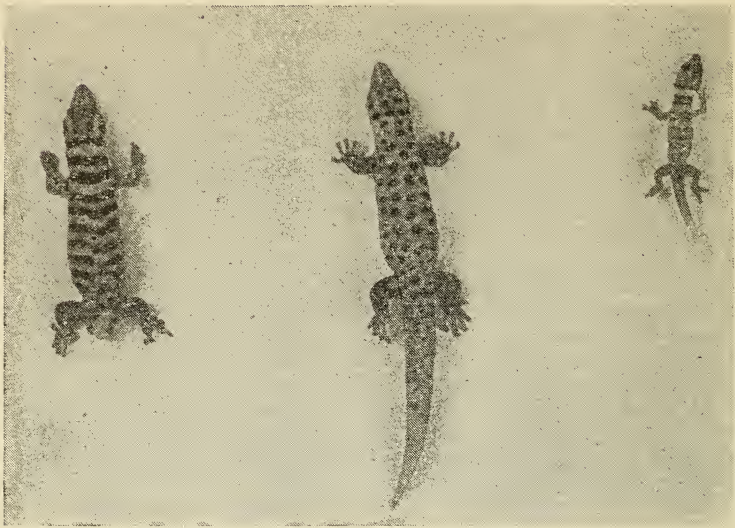


Figure 1. Adults and juvenile of *Sphaerodactylus decoratus drapetiscus*. Left to right; adult female, type (A.M.N.H. No. 77759); adult male, paratype (A.M.N.H. No. 77762); juvenile, paratype (A.M.N.H. No. 77764). Photography by Gary Stone.

smooth, imbricating; scales on posterior surfaces of limbs smaller and granular, comparable to lateral body scales; escutcheon absent.

Coloration of type (based on field notes and Kodachrome photographs): Dorsal ground color yellowish gray, brightest on neck and shoulders; ground color of dorsum of head pale yellowish gray; tail missing. Head with a black band, beginning on sides of neck and passing just posterior to tympanic opening, separated from next black band by a clear yellowish collar. A median black longitudinal stripe, beginning on rostrum, ending on forehead just posterior to orbits, with a central pale yellow enclosed diamond-shaped spot at level of anterior edge of orbits; a second black line, beginning on snout, passing dorsomedially through upper edge of eye and ending just anterior to transverse black band; a third black line on upper labials. Cheek with a gray patch, sending a gray line anteriorly to posterior edge of orbit, bounded ventrally by a yellowish gray band from posterior of eye to ventral side of neck; none of these black or gray head bands confluent with the first transverse black band. A pair of black transverse bands, enclosing a narrow yellowish gray band just anterior to forelimbs, the lighter enclosed band having a few scattered yellow dots just posterior to the anterior of the black bands. Four pairs of bands, black anteriorly grading to gray posteriorly, between limbs, the posterior two pairs incomplete dorsally; the light areas between these bands always with a few scattered yellow dots. Dorsal surface of limbs with yellowish gray ground color, much flecked and mottled with tan, giving a distinct spotted appearance. Venter grayish, with gray flecking on infralabials and on throat. Pre-

forelimb black bands continuous almost to ventral midline but not meeting. Scales of ventral surfaces of fore- and hindlimbs with black edges, giving a flecked or "dirty" appearance.

Variation: There are two females (A.M.N.H. No. 77763; A.N.S.P. No. 16359) which have the following measurements: snout-vent length, 33.9, 28.8; tail absent or broken on both; distance from snout to center of eye, 4.4, 4.5; distance from center of eye to tympanic opening, 4.0, 3.6; width of head, 5.5, 4.7; dorsal scale rows in snout-eye distance, 18, 17; ventral scale rows in snout-eye distance, 7, 10; fourth toe lamellae, 7, 13, plus terminal enlarged scale; supralabials, 4/4, 4/4; infralabials, 4/3, 4/4. The coloration and pattern of the larger female were much as those described for the holotype, except that both the sides of the body and the dorsal surfaces of the limbs were more yellowish. In all other details these two females agree; there seems to be a somewhat stronger tendency for the two posterior pairs of transverse body bands to be disrupted. Unfortunately, the tails of both fresh females were lost so that no statement of the coloration and pattern of this member can be made. The smaller female paratype, insofar as can be determined because of its time in preservative, possesses the identical pattern of the two fresh specimens. The tail is present but broken, and appears to be indistinctly banded proximally, these bands not extending onto the ventral surface of the tail.

Three of the paratypes (A.M.N.H. Nos 77760, 77762, 77765) are adult males; data on these specimens follow: snout-vent length, 34.9, 31.6, 30.9; length of tail, —, 28.7, 31.0; distance from snout to center of eye, 4.5, 4.1, 4.1; distance from center of eye to tympanic opening, 4.0, 4.0, 4.0; width of head, 6.5, 5.5, 5.5; dorsal scale rows in snout-eye distance, 18, 16, 16; ventral scale rows in snout-eye distance, 8, 10, 8; fourth toe lamellae, 7, 9, 9, all plus enlarged terminal scale; supralabials, 4/4, 4/5, 4/4; infralabials, 4/4, 4/3, 4/3. All the males are heavily spotted with very dark brown above, on a light yellowish tan ground color. The head is distinctly more yellowish than the body, and the ground color of the tail is bright yellow. The head pattern is reminiscent of that of the females; the same longitudinal lines are present, but a bit more obscure, and in the largest male these lines have become obsolete, being reduced rather to a series of dark brown dots. The hindlimbs are pale yellow, and both fore- and hindlimbs are dotted with brown; the dorsal surface of the tail is also spotted with individual brown scales, sometimes arranged in discrete groups, the coloration becoming fainter toward the tip of the tail, which is immaculate yellow. Although not perceptible in life, after preservation there is a faint indication of transverse banding on the dorsa of the two smaller males, corresponding, as nearly as can be determined, to the banding in the females. An escutcheon is present, and restricted to the abdomen anterior to the vent, with no branches extending onto the legs. The ventral sculation of the tail has no transversely elongate median scales, but rather is made up of rounded scales about the size of those covering the belly.

The two juveniles (A.M.N.H. Nos. 77761 and 77764) are very small with snout-vent length of 17.9 and 16.6. The pattern is an intensification of that described for adult females, and is exactly similar except for the absence of yellow dots within the light areas. The ground color of the juveniles is pale yellowish gray dorsally, with the head dull yellow,

somewhat lighter on the snout. The light interbands on the dorsum are much grayer than in the adult females, and thus the four pairs of black transverse bands between the limbs are more pronounced. The tail is vivid yellow with a completely white tip; one juvenile shows a faint indication of three transverse gray bands on the proximal half of the dorsum of the tail. The belly is grayish, and the first yellow transverse band behind the tympanic openings continues ventrally as a yellow collar onto the neck.

Comparisons: *S. d. drapetiscus* requires comparison principally with *S. d. torrei* from western Cuba. The females of the two subspecies are readily separable on the basis of pattern. *S. d. torrei* typically has two or three wide transverse black bands on the dorsum between the legs; with increasing size of the lizard, these bands become lighter centrally, forming two or three pairs of transverse bands. *S. d. drapetiscus* has four pairs of transverse dark bands between the limbs. Even more striking is the head pattern. All females of *torrei* have a black band immediately posterior to the eyes, and this band is joined to the longitudinal lines on the head and snout; such a postocular black band is absent in *drapetiscus*. There is likewise a black band, in larger individuals lighter centrally, in the center of which lies the tympanic opening. This condition in *torrei* differs from that of *drapetiscus*, where this wide tympanic band is absent, being replaced rather by a narrow band lying just posterior to the ear opening. The postocular, tympanic, and pre-forelimb bands of *torrei* continue ventrally onto the throat and neck as well defined units, whereas the neck and throat of *drapetiscus* are devoid of such continuations of the dorsal bands. These comments on females of the two races are equally applicable to the juveniles, which possess the adult female pattern.

I have examined five adult male *Sphaerodactylus* which, on the basis of scalation, I refer unquestionably to *S. d. torrei*; these are U.S.N.M. No. 81727 (Puerto Portillo, Oriente); A.M.N.H. Nos. 61604-05 (Marcane, Oriente); U.M.M.Z. No. 90725 (La Socapa, Santiago de Cuba, Oriente); and U.M.M.Z. No. 90726 (Castillo del Morro, Santiago de Cuba, Oriente). There are other specimens from Oriente in these collections which are identified as *torrei*, but for various reasons I doubt that they are correctly assigned to this form. Of the five males under consideration here, four resemble males of *S. d. drapetiscus*, except that No. 81827 is more densely spotted than its fellows or the extant male *drapetiscus*. The fifth male (No. 90725) has the head densely spotted, but the dorsum of the body is completely unicolor. All differ from male *drapetiscus* in having the throat heavily punctate with discrete brown spots. Grant's (1956, p. 247) plate of 12 male *torrei* shows a ventral view of one individual; this specimen appears to lack throat spots; it is possible that throughout the range of *S. d. torrei* this character is not constant. The nine females likewise figured in this plate show very well the pattern variations typical of their sex.

From the two Bahaman subspecies, *S. d. drapetiscus* females differ strikingly. Females of both *decoratus* and *gibbus* are characterized by having four pairs of transverse bands between the limbs, and in this character resemble the new Cuban subspecies. But both demonstrate postocular and tympanic transverse bars as well, and in this character resemble *torrei* rather than *drapetiscus*. The pre-forelimb band in both

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decoratus and *gibbus* typically has also a pair of light ocelli in its center; so far as known, this does not occur in *drapetiscus*.

I have examined seven male *S. d. gibbus* (A.M.N.H. No. 76240, from Leaf Cay, Exuma Cays; four A.M.N.H. untagged specimens (field nos. 1254-57) from Big Farmer's Cay, Exuma Cays; U.M.M.Z. No. 117017 and one untagged specimen (field no. 1284) from Darby Island, Exuma Cays). The Big Farmer's Cay specimens show the transition from an almost unicolor dorsal pattern with a very few, widely scattered dorsal brown dots, to one individual which is typical of the race *gibbus* as described by Barbour (*op. cit.*, pp. 228-9), displaying coarse large brown dots over the dorsum. The single individual from Leaf Cay is darker in preservative than the Big Farmer's specimen, and is entirely dark tan dorsally, without any indication of dorsal spotting. The two specimens from Darby Island are heavily spotted. As noted previously, no male *S. d. decoratus* show the bold dots of *gibbus*.

If *S. stejnegeri* is regarded in the future as a subspecies of *S. decoratus*, females of this species and *S. d. drapetiscus* are readily separable on the basis of the former having but two transverse dark bars, rather than four as in *drapetiscus*, and the patterns of the two are thus quite distinct. However, *stejnegeri* has the single posttympanic dark transverse bar which is typical of *drapetiscus*, and lacks the postocular bar of *decoratus*, *gibbus*, and *torrei*. Males of *S. stejnegeri* are apparently unicolor light to medium brown (Grant, 1949, p. 74).

Three specimens (U.M.M.Z. Nos. 117019 and one untagged specimen; U.M.M.Z. No. 117020) from Long Island in the Bahamas deserve special mention. Long Island lies off the eastern end of the Exuma Cays, between Exuma, and North and Fish Cays. I have seen no *Sphaerodactylus* from the latter localities (which I presume are inhabited by *S. d. decoratus*) nor from Exuma itself (which I presume to be inhabited by *S. d. gibbus*). The three Long Island individuals are one female and two males; the female resembles closely occasional females of *decoratus* (i.e., U.M.M.Z. No. 79444 from Cat Island) in having the dark edges of the transverse bands much fragmented. A poorly defined ocellus is present on the left side. The two males are banded, the smaller (snout-vent length 26.8 mm.) distinctly so, the larger (snout-vent length 30.8) indistinctly, with a strong tendency for the edges of the transverse bands to form large dark spots over the entire dorsum except on the snout. Neither male is unicolor (as are males of *decoratus*) and they more closely resemble male *gibbus* except that no other male *gibbus* examined shows the presence of transverse banding. I cannot allocate these specimens with any security; the spotted male is smaller than the large male *decoratus* (U.M.M.Z. No. 79444), which shows faint traces of transverse banding and no spotting, from Cat Island. It seems preferable at this time, pending the collection of more sphaerodactyls from the Bahaman area, to hold the subspecific determination of the Long Island populations in abeyance.

In summary, the females of the four races of *S. decoratus* show varying degrees of differentiation. The races *torrei* and *drapetiscus* are easily distinguished from each other, and from *decoratus* and *gibbus* treated together. Female *decoratus* and *gibbus* appear to me to be indistinguishable from each other on the basis of pattern. The females of these four races are all readily distinguishable from female *S. stejnegeri* from

Hispaniola. Males of *torrei*, *drapetiscus*, and *gibbus* are all strikingly alike, except that male *torrei* may have a heavily punctate throat, and even this character is open to doubt. Male *decoratus* are poorly known, but are usually considered unicolor (or possibly faintly banded), as are males of *S. stejnegeri*; if this is true, males of these two forms can be distinguished from adult males of the three heavily spotted forms.

Scale characters (see Table 1) of the four races of *S. decoratus* show that *drapetiscus* differs from the remaining three subspecies in average lower number of dorsal and ventral scales in the snout-eye distance, as well as a lower average number of fourth toe lamellae. Differences between *torrei*, *gibbus*, and *decoratus* are not striking; the two Bahaman forms average less ventral scales than the Cuban *torrei*, but the difference is likewise not trenchant.

Remarks: The type locality of *S. d. drapetiscus* is an exposed limestone outcropping along the north coast of Habana Province. The cliff is penetrated by one large and two smaller caves, all locally known as the Cueva de Rincon de Guanabo; however, none of the geckoes was taken within the caves. All were found under rocks on the ground at the base of the cliffs, and in cavities on the cliff face itself. The lizards were extremely agile, seeking escape by running into the many solution holes in the fallen pieces of rock, which were often sponge-like in appearance, and offered an excellent asylum for the lizards. At least three other individuals were seen at the type locality, but all escaped in rocky piles or holes in the fallen rocks. The cliff area is readily visible from the La Habana-Matanzas superhighway which is presently under construction; the vegetational cover is typical tropical deciduous woods with scattered palms. The Matanzas specimen is recorded as having been taken "under a rock."

Alayo's (*loc. cit.*) record of *S. gibbus* from Matanzas should almost certainly be referred to *drapetiscus*. This specimen probably represents a male of the latter race, since the males of *gibbus* and *drapetiscus* are very similar; likewise, there is no evidence that *gibbus* occurs in Cuba, and the Matanzas specimen would thus be assignable either to *drapetiscus* or *torrei*. Since *torrei* is at present unknown from the provinces of Camagüey and Las Villas, provinces which lie between Oriente and Matanzas, it is much more probable that the Matanzas specimen is referable to *drapetiscus* than to *torrei*. The paratype from Matanzas tends to confirm this supposition.

I have had the opportunity to examine material for comparison of the races of *S. decoratus* from several collections. For their courtesies in allowing me to borrow specimens for the present study, I wish to thank

Table 1. Scale counts (means and extremes) of four races of *Sphaerodactylus decoratus*

	Number and sex	Dorsal scales	Fourth-toe lamellae	Ventral scales
<i>torrei</i>	3 ♂, 7 ♀	21.4 (17-26)	12.1 (9-15)	11.6 (8-15)
<i>drapetiscus</i>	3 ♂, 3 ♀	17.3 (16-19)	9.0 (7-13)	8.5 (7-10)
<i>gibbus</i>	5 ♂, 8 ♀	19.7 (16-26)	11.8 (9-13)	9.4 (7-11)
<i>decoratus</i>	1 ♂, 5 ♀	21.7 (15-29)	11.2 (8-14)	9.6 (8-12)

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the following: Dr. Doris M. Cochran, United States National Museum (U.S.N.M.); Dr. Norman E. Hartweg and Mr. Richard Etheridge, Museum of Zoology, University of Michigan (U.M.M.Z.); Dr. Richard G. Zweifel and Mr. Charles M. Bogert, American Museum of Natural History (A.M.N.H.); Dr. James Boehlke, Academy of Natural Science of Philadelphia (A.N.S.P.).

Specimens examined: *S. d. decoratus*: Bahamas, B.W.I., Bimini, 5 (A.M.N.H. Nos. 73489, 73493-96); South Bimini, 7 (A.M.N.H. Nos. 75873, 68806 (2), 68807 (2), 68808 (2)); Hatchet Bay, Eleuthera, 3 (A.M.N.H. Nos. 69245-46, 69249); Mangrove Cay, Andros Island, 5 (A.M.N.H. No. 24715; U.S.N.M. No. 62344; U.M.M.Z. Nos. 107614; 117022 (2)); Andros Island, Driggs Hill Shore, 2 (U.M.M.Z. No. 117023 (2)); Rose Island, near New Providence, 1 (U.M.M.Z. No. 117021); Nassau, New Providence, 1 (U.M.M.Z. No. 100741); Cat Island, Orange Creek, 1.5 miles northwest Arthurs Town, 9 (U.M.M.Z. Nos. 79444 (5), 79445 (4)).

S. d. gibbus: Bahamas, B. W. I., Big Farmer's Cay, Exuma Cays, 13 (A.M.N.H. Nos. 76232-36, plus eight untagged specimens); Leaf Cay, Exuma Cays, 6 (A.M.N.H. Nos. 76238-43); Warderick Wells Cay, Exuma Cays, 1 (A.M.N.H. No. 76237); Darby Island, Exuma Cays, 8 (U.M.M.Z. Nos. 117017, 117018 (7)).

S. d. torrei: Cuba, Oriente Province, Marcane, 7 (A.M.N.H. Nos. 61604-10); Belig, near Manzanillo, 1 (A.M.N.H. No. 32301); Santiago de Cuba, 11 (A.M.N.H. Nos. 42546, 42583-90; U.M.M.Z. Nos. 90725-26); Boqueron, 1 (U.S.N.M. No. 81822); Puerto Portillo, 2 (U.S.N.M. Nos. 81827-28).

S. d. drapetiscus: Cuba, Habana Province, two miles east of Playa de Guanabo, Cueva de Rincón de Guanabo, 7 (A.M.N.H. Nos. 77759-65, type and paratypes); Matanzas Province, Matanzas, 1 (A.N.S.P. 16359, paratype).

S. decoratus incertae sedis: Bahamas, B. W. I., Long Island Clarence Town, 2 (U.M.M.Z. No. 117019); Long Island, Deadman's Settlement, 1 (U.M.M.Z. No. 117020).

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PROCEEDINGS
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ANOTHER NEW LARGE *ELEUTHERODACTYLUS*
(AMPHIBIA: LEPTODACTYLIDAE) FROM
WESTERN CUBA

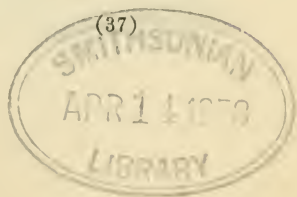
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During the Christmas holiday season of 1956, a small obviously immature *Eleutherodactylus* was collected by Messrs. John R. Feick, William H. Gehrmann, Jr., and the writer at San Vicente, Pinar del Río Province, Cuba. Other leptodactylid material in the same collection has been reported upon (Schwartz, 1958). During the summer of 1957, under a National Science Foundation grant, three weeks were spent at San Vicente, in the hope that additional and adult specimens of this frog might be obtained. Such was indeed the case; on the night of June 18, a large gravid adult female was taken by Mr. Feick and during the following weeks, additional adult and subadult specimens were collected. There are thus at hand 11 specimens of this remarkable new species.

I wish to thank Mr. Dennis R. Paulson, as well as Messrs. Feick and Gehrmann for their assistance in the pursuit of amphibians in the San Vicente region. Without their cordial assistance, such a series of the new form would certainly not have been taken. Dr. Richard G. Zweifel of the American Museum of Natural History has offered me advice from his knowledge of Central American eleutherodactyli, and I am grateful to him for this assistance.

The Cuban *Eleutherodactylus* have been summarized by myself (*op. cit.*); since the time of my summary, a new species, *E. symingtoni*, has also been described from Pinar del Río Province. The Cuban leptodactylids are presently separated into five groups, each with its own combination of characteristics; these groups are the *auriculatus*, *varleyi*, *ricordi*, and *dimidiatus* (all *sensu* Dunn, 1926, p. 210), and the *symingtoni* group (Schwartz, 1957). The new large species is not assignable with certainty to any of the five existing species groups. Its affinities are close to the *auriculatus* group, but it differs from that assemblage of five species (*auriculatus*, *sonans*, *eileenae*, *varians*, *gehrmanni*) by absence of a rugose belly. It may be placed with equal propriety in the *symingtoni* group, although the new species has enlarged digital discs and *symingtoni*



lacks them. Insofar as known, all members of the *auriculatus* group are arboreal, and all have enlarged digital discs; although the new species possesses very large digital discs, it is not known to be a tree climber, and is, on the other hand, petricolous and clivicolous in its activities. The new species may be called

***Eleutherodactylus zeus*, new species**

Figure 1

Type: American Museum of Natural History (A.M.N.H.) No. 60791, taken 0.5 miles south of San Vicente, Pinar del Río Province, Cuba, by John R. Feick, on June 18, 1957. Original number 1627.

Paratypes: A.M.N.H. No. 60792, same data as type, A. Schwartz; A.M.N.H. No. 60793, cliffs at Cueva del Río, San Vicente, Pinar del Río Province, J. R. Feick, June 20, 1957; A.M.N.H. Nos. 60794-96, cliffs at Cueva del Río, San Vicente, Pinar del Río Province, J. R. Feick, W. H. Gehrmann, A. Schwartz, June 23, 1957; A.M.N.H. No. 60797, cliffs at Cueva del Río, Pinar del Río Province, D. R. Paulson, June 26, 1957; A.M.N.H. No. 60798, cliffs at Cueva del Río, San Vicente, Pinar del Río Province, J. R. Feick, July 1, 1957; A.M.N.H. Nos. 60799-800, cliffs at San Vicente, Pinar del Río Province, J. R. Feick, W. H. Gehrmann, July 7, 1957; A.M.N.H. No. 59829, San Vicente, Pinar del Río Province, J. R. Feick, W. H. Gehrmann, A. Schwartz, December 21, 1956.



Figure 1. *Eleutherodactylus zeus*, adult female, paratype, A.M.N.H. No. 60792, snout-vent length 79.8 mm. taken in life by William H. Gehrmann, Jr.; specimen from 0.5 miles south of San Vicente, Pinar del Río Province, Cuba.

Distribution: Known only from the type locality and its environs, in the vicinity of San Vicente, Pinar del Río Province, Cuba.

Diagnosis: An *Eleutherodactylus* characterized by very large size, greatly enlarged digital discs, smooth belly, finely rugose or shagreened dorsum, two enlarged canthal tubercles, short vomerine tooth series, and olive green to brown dorsum with a pair of pale yellow postscapular spots.

Description of type: An adult female, with the following measurements (all measurements in millimeters): snout-vent length, 83.0; head length (snout to posterior border of tympanum), 34.2; greatest width of head, 36.7; longitudinal diameter of eye, 8.9; longitudinal diameter of tympanum, 5.9; naris to anterior corner of eye, 11.7; femur, 40.2; tibia, 42.0; length of fourth toe, 37.7. Head slightly broader than distance from snout to posterior border of tympanum; snout decidedly truncate, with nares prominent at anterior end of canthus rostralis; canthus rostralis with two large, and one to three smaller, pronounced pointed canthal tubercles; diameter of eye somewhat less than distance from naris to anterior corner of eye; interorbital space 11.7, greater than diameter of eye; diameter of tympanum much less than diameter of eye, distance from tympanum to eye about equal to diameter of tympanum; tympanum oval, its vertical diameter greater (7.9) than its horizontal (5.9). Digital discs present, large, that on fourth toe largest, equal to about one half size of tympanum. Fingers extremely long and slender, unwebbed, 3-4-2-1 in order of decreasing length; sub-articular tubercles well developed. Toes long and slender, unwebbed, 4-3-5-2-1 in order of decreasing length. Heels barely touch when legs are held with femora at right angles to body axis. Dorsum extremely and minutely rugose, rugosities extending from snout over lores, dorsal surface of head and body, thigh, crus, and hindfoot, those on head and in area of eyes somewhat larger and more prominent; a raised fine median middorsal line. Dorsal tubercles small and evenly spaced, with those on canthal line especially large and prominent; general aspect of dorsum a finely shagreened appearance; upper eyelids minutely tuberculate. Throat smooth; venter smooth with belly disc feebly developed. Posterior and ventral surfaces of thighs covered with large, flattened, indistinct pavement-like granules. Tongue oval, free behind, its greatest width about half of that of floor of mouth. Vomerine teeth in two short, stout, slightly curved series, that on the right side much shorter than that on left; vomerine teeth extending medially from just within the level of the interior edge of the choanae, and widely separated from each other by a distance equal to that of the larger left series, and separated from choanae by a distance equal to about half the length of the larger series.

Coloration of type (based on color notes taken in the field and on Kodachrome photographs): Dorsum olive green (Pl. 16, H10; color designations from Maerz and Paul, 1950), more brown than green, and faintly mottled with black; snout darker brown; poorly defined black interocular bar; a postscapular faintly yellowish spot on each side; tips of dorsal rugosities greenish or yellowish, giving a somewhat speckled and mottled appearance; arms and thighs with lichenous grayish markings; concealed surfaces of thighs dull brownish purple; dorsum of thighs mottled brown; digits pale dusky green; venter dusky, especially on throat, which possesses a raised median midventral line from mandibular symphysis to pectoral girdle; all subarticular tubercles gray.

Variation: Of the series of paratypes, there are three adult females, two adult males, one subadult female, three subadult males, and one juvenile (snout-vent length, 15.9). The adult males (A.M.N.H. Nos. 60794, 60798) have the following measurements: snout-vent length, 63.7, 62.4; head length, 25.9, 25.2; greatest width of head, 25.5, 24.5; diameter of eye, 7.9, 7.6; diameter of tympanum, 5.5, 4.8; naris to eye, 9.3, 8.2; femur, 28.2, 28.2; tibia, 30.2, 27.9; length of fourth toe, 26.7; 26.9. The three adult females (A.M.N.H. Nos. 60792, 60796-97) are all somewhat smaller in snout-vent length than the type, but numbers 60792 and 60796 are both gravid, and thus can be considered fully adult. The measurements on these three specimens are: snout-vent length, 79.8, 74.3, 69.2; head length, 31.4, 30.3, 28.1; greatest width of head, 33.0, 31.3, 28.3; diameter of eye, 8.2, 8.3, 7.3; diameter of tympanum, 5.1, 5.4, 5.0; naris to eye, 10.5, 10.5, 9.6; femur, 33.5, 35.0, 33.6; tibia, 36.0, 36.0, 35.1; length of fourth toe, 32.7, 31.5, 32.0. The subadult specimens of both sexes range in snout-vent length between 37.4 and 47.0. I can determine no sexual dimorphism in this lot of specimens, other than the smaller adult size of the males. The tympana do not appear to be smaller in either sex, and both sexes are colored alike.

The coloration of *E. zeus* is remarkably constant for an *Eleutherodactylus*. All were colored olive brown in life with a mottled black dorsum. Although not specifically noted on the type, the upper eyelids of most specimens were recorded as being clear green (Pl. 16, L3 in number 60793). The postscapular spots are yellowish, varying from a very pale yellow to a more intense pigment, but never bright. In one adult female (A.M.N.H. No. 60797), the pale yellow postscapular spots were more extensive and pale yellow dorsolateral fields were apparent, but obscure. This female also has a more definite interocular bar and a dusky V on the snout, the apex of the V almost merging with the interocular bar. Ventrally, both adult males and females have a brownish throat, and a lighter dusky brownish smooth belly.

The subadults are colored much as the adults, except that there is a rather well defined dark brown interbrachial bar, and the remainder of the dorsum appears more heavily mottled with black or brown. The crus is occasionally transversely banded with dull brown, the bands separated by faint whitish rows of dots. The juvenile individual has a dark brown interocular bar and a dark brown interbrachial bar, outlined anteriorly with dirty white; the crus is prominently transversely banded with three or four light tan bands separated by fine white lines.

Structurally, the paratypes agree closely with the type. The vomerine series is always short and stout, and the digital discs are always large. The dorsum is shagreened and there are two canthal tubercles in all specimens except the juvenile, which lacks them and also has an almost smooth dorsum. The canthal tubercles are better developed in adults, but are nonetheless indicated in subadult specimens.

Comparisons: *E. zeus* requires comparison with no other Cuban *Eleutherodactylus* by virtue of its very distinctive combination of canthal spines, large size, and very large digital discs. The only other Cuban leptodactylids which are large (yet, so far as known, do not reach the maximum known size of *zeus*) are *E. greyi* Dunn and *E. symingtoni* Schwartz. Of these, the former is not known from Pinar del Río Province; it also is a member of the *ricordi* group, and thus has the digital discs

feebly developed or restricted to the outer two fingers, and a long vomerine series. *E. symingtoni*, on the other hand, is known only from one specimen from Pinar del Río Province; although this specimen is close to the size of *zeus*, *symingtoni* differs in having a very rugose, rough dorsum, orange vermiculations on the hindlimbs, absence of digital discs, and dark brown venter. Both resemble each other in large size and presence of canthal tubercles, although these are much more prominent in *zeus* than in *symingtoni*. In the latter species, the canthal tubercles are not only less strikingly developed, but are more or less obscured by the heavily rugose dorsum.

Remarks: *E. zeus* is typically a petricolous or clivicolous species. Only one specimen was taken on soil, the remainder being collected from rocks or cliffs, and, in one instance, from a fallen decaying log in deciduous woods. The combination of rocky or cliffy areas with dense deciduous growth is the precise niche which this frog inhabits, and the *mogote* section of Pinar del Río is typified by this association. The mottled coloration blends well with the irregular rocky surfaces which *zeus* inhabits. The Sierra de los Organos, in which mountain range *zeus* is found, is the area with the highest rainfall in Cuba. Conditions are always very mesic, and the humidity at night is consistently high. Even after a dry day, which is unusual in summer in these mountains, the leaf litter and rocks are extremely moist, and, in sheltered areas and solution holes in the limestone, small quantities of rainwater persist from the last rain. No specimens of *E. zeus* were collected during the day, despite persistent overturning of logs and limestone chunks; I suspect that the diurnal retreat of these frogs is in the deep crevices in the high cliffs of the *mogotes* in this region. In affirmation of this postulation, one individual was collected in a narrow but deep crevice on the cliff face at night; in the same crevice was a large roach (*Eurycotis*). *Eleutherodactylus zeus* feeds upon these large roaches; the type specimen disgorged a recently taken roach when it was collected. Although there are no evidences of predation upon *zeus*, the cliffs are inhabited by a large tarantula and by the arachnid *Phrynus*, and almost certainly these arthropods capture and eat the frogs. At Soroa, in Pinar del Río Province and in the Sierra de los Organos, I witnessed the capture of a small *Eleutherodactylus* by *Phrynus*, and this lends credence to the supposition that this arachnid feeds at least in part on frogs which inhabit cliffs along with it.

In disposition, *E. zeus* is lethargic, and allows the collector's approach without alarm. Once disturbed, it shows itself to be a powerful jumper, and invariably escapes capture by leaping away among the rocks which it inhabits. One specimen, when disturbed, escaped by ascending a vertical cliff face with ease.

The assignment of *E. zeus* to one of the five recognized groups of Cuban eleutherodactyli is difficult. It appears to be related to the *auriculatus* group in possessing all the features of that assemblage of species except a rugose belly. On the other hand, it resembles the *symingtoni* group in all characteristics except that *zeus* possesses digital discs which are absent in *symingtoni*. *E. zeus* thus seems to bridge the gap between the *auriculatus* and *symingtoni* groups, and its precise affinities are problematical. I regard it however as being closer to the latter than to the former; both *zeus* and *symingtoni* are large frogs

with short vomerine series, canthal tubercles, shagreened or heavily rugose dorsa, smooth bellies, and mottled dorsal coloration. They differ in degree of development of the canthal spines, color of concealed surfaces of thighs, presence of digital discs in *zeus*, and degree of development of dorsal rugosities. Of these differences, only the digital discs present a serious problem, and for the moment it seems satisfactory to regard *zeus* as a specialized climbing derivative of the same stock to which *symingtoni* is also related. Thus, I regard *zeus* as a member of *symingtoni* group.

The degree of endemism in amphibians and reptiles in the Sierra de los Organos is interesting. Aside from these two strikingly different species of *Eleutherodactylus*, the montane areas of Pinar del Río are inhibited by other endemic species; among them may be mentioned the lizards *Deiroptyx vermiculatus* and *D. bartschi*, and the snake *Tropidophis feicki*. The distribution of *Cadea blanoides* and *Eleutherodactylus ghrmanni* are poorly known, but the former appears to have had the western mountain mass as a center of dispersal, and the latter is probably restricted to the montane areas of Pinar del Río Province.

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PROCEEDINGS
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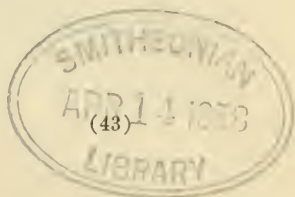
APHTHARGELIA NOM. NOV. FOR *THARGELIA*
OESTLUND (APHIDAE)

F. C. HOTTES

The new name proposed herewith is made necessary because the name *Thargelia* erected for a genus is the family Aphidae by Oestlund is a homonym.

In 1922 Oestlund proposed the name *Thargelia* for a new genus in the family Aphidae, not knowing that Puengeler had made use of this name for a genus of Lepidoptera in 1899. I have known of the homonymy of *Thargelia* for many years, and was reminded of this fact recently, when D. Hille Ris Lambers, in a publication by G. F. Knowlton made use of it. The genus *Thargelia* of Oestlund has been little used in America, but its type species has been placed in a number of genera. It is suspected that it will come into general use when the system of classification used in Europe comes into more general use.

I propose the name *Apthargelia* nom. nov. for the *Thargelia* of Oestlund and select as type (monotypical) *Aphis symphoricarpi* Thomas. Oestlund's type for the genus *Thargelia* was his species *Aphis albipes* which Hottes and Frison have shown to be a synonym of the species described by Thomas as *Aphis symphoricarpi*.



PROCEEDINGS
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NORTH AMERICAN HARPACTICOID COPEPODS
4. DIAGNOSES OF NEW SPECIES OF FRESH-
WATER CANTHOCAMPTIDAE AND CLETODIDAE
(GENUS *HUNTEMANNIA*)

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Diagnoses of new species are presented here so that they may be included in the key to the Harpacticoida in the forthcoming revised edition of Ward and Whipple's Fresh-water Biology. All types are deposited in the United States National Museum.

Grateful acknowledgment is expressed to the various persons who have kindly made collections for me.

FAMILY CANTHOCAMPTIDAE

Canthocamptus robertcokeri, new species

Canthocamptus staphylinoides Pearse, Davis 1954: 398, Table 3.

Canthocamptus sinuus Coker, McKee and Coker 1940: 179, 185.

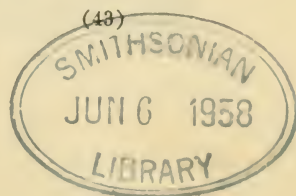
Specimens examined: Lake Erie, off Cleveland, Ohio, C. C. Davis, collector: *Type lot*, 51 ♀, 5 ♂, surface tow, Nov. 8, 1956. 3 ♀, 12 M depth, same date. 4 ♀, 1 ♂, May 26, 1951 (published as *C. staphylinoides*, Davis 1954).

North Carolina: 1 ♀, Garner's Lake No. 2, Carteret Co., Jan. 15, 1938, P. McKee, collector (published as *C. sinuus*, McKee and Coker 1940).

Louisiana: 1 ♂, seasonal ditch pond, south of Lebeau, St. Landry Par., Dec. 27, 1951, W. G. Moore, collector. Natchitoches Par., J. E. Sublette, collector: 4 ♀, 3 ♂, ditch pond, 4 miles w. of Natchitoches, Apr. 15, 1956; 2 ♀, swamp pond, 3.7 miles w. of Mora, Mar. 28, 1956; 2 ♀ borrow pit, Red Dirt Game Preserve, Mar. 31, 1956, occurring with *C. assimilis* Kiefer.

Utah: 3 ♀, 1 ♂, Bear Lake, Oct., 1956 and July, 1957, W. J. Clark, collector.

Diagnosis: Distal membrane of body segments coarsely serrate to smooth. Anal operculum with 7-9 stout spinules. Caudal ramus of both sexes elongate and narrow, length 4-5 times its own greatest width and about 2 times that of the anal segment (outer margin); with narrow sclerotized ridge on dorsal face; without or with a few spinules on



inner margin. Outer caudal seta extremely slender, subequal to or a little longer than ramus, jointed near base; middle seta very stout, unjointed, about 5 times length of outer seta. Leg 2 of both sexes with 1 inner seta on distal segment or portion of endopod. Leg 4 of female with middle apical seta of endopod slender but longer than outer spine. Leg 3 of male with 2 well developed setae on apex of endopod, the outer about twice the length of endopod. Leg 5 of female with prominent production of mid portion of basal expansion, and gap between setae 3 and 4. Leg 5 of male, exopod segment with 5 setae. Spermatophore flask-shaped. Total body length: ♀ 0.65-0.78 mm. ♂ 0.54-0.62 mm.

Remarks: Specimens from Lake Erie, North Carolina and a part of those from Louisiana, have extremely coarse serrations of the distal membrane of the body segments, but some of those from Louisiana and the specimens from Utah have smooth membranes. The presence or absence of spinules on the inner margin of the caudal ramus was not correlated with that of the serrations. All of the males examined had only five setae on the exopod of leg 5, lacking the usual seta at the inner base of the segment. This character, combined with those of the caudal ramus and its setae, and the setation of leg 2, distinguish this from other North American species of *Canthocamptus*.

***Attheyella alaskaensis*, new species**

Type lot: 2 ♀, margin of Lake Tikehik, Bristol Bay region of southwestern Alaska (about lat. 60°N., long. 159°W.), Aug. 18, 1954, O. A. Mathisen, collector.

Diagnosis: Subgenus *Attheyella*; allied to *A. idahoensis* (Marsh). Body segments coarsely serrate distally. Genital segment divided at middle by complete, heavy sclerotization produced laterally into stout spinous processes like those of segmental divisions. Anal operculum unarmed. Caudal ramus, length greater than anal segment (36:26) and more than twice its own greatest width (36:14); somewhat flattened and broad throughout, the distal part hardly constricted, with rounded apex; heavy sclerotized ridge running nearly entire length of mid dorsal face; distal groups of spinulose hairs on both ventral and dorsal faces; outer marginal setae placed below middle of ramus, not longer than width of ramus; only middle caudal seta well developed and longer than ramus (about 60:36), swollen at base, unjointed, with fine marginal spinules; outer seta about one-third length of ramus, swollen at base and densely plumose. Antennule 7-segmented, the usual apical segment fused with 7. Leg 1 with 3-segmented endopod, first segment reaching to about middle of exopod segment 3. Legs 2-4: exopod segment 3 with 3 outer spines, the total number of spines and setae: 6,7,6; endopods 2-segmented, first segment of legs 2-3 with inner seta, apical segment with total number of setae: 3,4,3. Leg 5 like that of *A. idahoensis*; exopod elongate, its length about 5.5 times its greatest width; basal expansion prolonged into similar narrow portion that reaches to near the end of the exopod; both armed with 6 short setae, ranging in length from less than to a little more than width of segment. Total body length about 1.0 mm.

Remarks: Although only two specimens of one sex are available,

there is no question about the specific status of this copepod. The fifth leg cannot be distinguished from that of *A. idahoensis*, but the two species have strikingly different caudal rami. Coker (1934) has clarified some of the confusion in Marsh's (1903) description of *idahoensis*, but comparison with Alaskan specimens indicate that the type form of the species is still inadequately defined as regards the spinal formula of legs 2-4. *A. idahoensis* has been collected in Alaska near Anchorage, from moss on a roadside cliff over which a melt water stream from the Chugach Mountains was flowing.

***Bryocamptus washingtonensis*, new species**

Specimens examined: Type lot, 13 ♀ (7 ovigerous), 2 ♂, pond, 1 mile north of Kent, King Co., Washington, Feb. 1 and Mar. 14, 1954, J. E. Lynch, collector. 1 ♀, ovigerous, from among weeds of seasonal roadside ditch pond, about 3 miles south of Corvallis, Benton Co., Oregon, Mar. 8, 1954, M. S. Wilson and A. R. Roth, collectors.

Diagnosis: Subgenus *Bryocamptus*; with characters of *B. minutus* group (as defined, Lang 1948). Anal operculum with 8 large, non bifid spinules. Caudal ramus of female longer than anal segment and about 2.3-2.8 times its own greatest width, outer apex without distal spinous process; inner margin with distal group of stout spinules arranged in 2-3 rows. Caudal setae inserted at apex of ramus, both outer and middle setae jointed at bases. Caudal ramus of male like that of female but shorter (about 2-2.3 times width). Antennule of female 8-segmented. Mandible palp 2-segmented. Legs 2-4: exopod segment 3 with 3 outer marginal spines, the total number of spines and setae: 6,7,7; apical segment of endopod with total of 4,5,5 setae in female, that of leg 4 with 4 setae in male. Leg 5 of female, exopod with 5 setae, of which the second is extremely long, being more than 2 times the length of the first seta which is placed at the middle of the segment; basal expansion produced beyond middle of exopod segment, with 6 setae of which the fifth is the longest. Leg 5 of male, exopod with 6 setae, basal expansion produced to near end of exopod, with 2 very stout, subequal spines. Total body length of both sexes: 0.68-0.77 mm.

***Bryocamptus umiatensis*, new species**

Specimens examined: Arctic slope of Alaska, E. B. Reed, collector: Type lot, 11 ♀, 3 ♂, seep water on terrace above Seabee Creek, Umiat, June 18, 1955; 1 ♂, lake at Umiat, June 19, 1955; 1 ♀ and 1 ♂, separate pools in area of junction of Kurupa and Colville Rivers, July 1 and 3, 1955.

Diagnosis: Subgenus *Bryocamptus*. Caudal ramus of both sexes with length subequal to anal segment and about equal to its own width, without ornamentation; outer and middle caudal setae enlarged basally, both jointed. Anal operculum with 3-5 widely spaced spinules in female, with 8 in male. Antennule of female 8-segmented. Mandible palp 2-segmented. Leg 1, exopod segment 2 with inner seta; endopod 3-segmented, reaching beyond exopod by about half length of segment 3, endopod segments 1 and 2 with inner setae. Legs 2-4: exopod segment 3 with 3 outer spines, total number setae and spines: 6,7,7; endopod of female legs 2 and 3, 3-segmented; of leg 4, 2-segmented;

apical segments with total number of setae: 4,5,5. Leg 2 of male, endopod 2-segmented; segment 1 with inner seta; segment 2 with characteristic outer marginal notch, with 2 short inner setae and 2 closely set terminal setae, placed subapically on inner side. Leg 3 of male, endopod armed apically with extremely stout, long seta about 3 times the length of total endopod; and with a modified seta about as long as endopod, stout at base and divided into 2 apical processes by an incision that extends from apex to about the middle. Leg 4 of male, endopod segment 1 with inner seta and apical segment with 4 setae. Leg 5 of female, exopod segment oval in shape, with 5 setae; basal expansion irregularly produced to about middle of exopod, with 5 setae, the first extremely short and slender, prominent gap between setae 2 and 3. Leg of male, exopod with 6 setae; basal expansion with very short outer seta and much longer inner seta. Total body length of both sexes: 0.65-0.68 mm.

Remarks: This species has the caudal ramus and leg 5 of the female similar to those of *B. tarnogradskyi* Borutzky, from the Caucasus Mountains of southeastern Europe. It differs from this and all other species of *Bryocamptus* in the unusual modification of the apical setae of the endopod of the male third leg. This does not appear to be an anomaly inasmuch as it occurs symmetrically on each leg of the pair, and is present in specimens collected from separate pools and areas.

Paracamptus reggiae, new species

Specimens examined: Type lot, 13 ♀ (2 ovigerous), 3 ♂, from vegetation at edge of small bog pond, about Milepost 38, Steese Highway, northeast of Fairbanks, east central Alaska, July 15, 1955, M. S. Wilson, collector. 1 ♀, from vegetation of shallow pool, Saint Matthew Island, (Bering Sea) Alaska, Sept. 2, 1954, R. and R. Rausch, collectors.

Diagnosis: Caudal ramus of female shorter than anal segment (about 13:18) and about twice its own greatest width; with inner and outer marginal hairs and a basal crosswise crest of very fine, short hairs. Caudal ramus of male shorter than that of female, about half of the length of the anal segment. Stout middle caudal seta longer than urosome (including somite of leg 5) in both sexes. Leg 1, endopod reaching beyond exopod by nearly the length of second segment; segment 2 armed apically with elongate spine and much longer seta. Legs 2-4: exopod segment 3 with 5,5,4 spines and spiniform setae; endopods of female 2-segmented, the apical segment with extremely short outer seta and longer inner seta; apical endopod segment of male legs 2 and 4 with short outer seta and 2 elongate spiniform setae. Leg 3 of male, endopod with single apical seta modified, broadened throughout and with tip flattened and expanded. Leg 5 of female with the third seta of exopod not different from the other setae, being of similar stoutness and ornamentation, subequal to or longer than the innermost seta. Leg 5 of male, third seta of exopod plumose and stout like other setae but shorter than the second and fourth setae; basal expansion with 2 setae, the innermost nearly twice the length of the outer and exceeding the length of the longest exopod seta. Total body length: ♀ 0.68 mm. ♂ 0.6 mm.

Remarks: This species closely resembles the European *P. schmeili* (Mrazek) from which it differs principally in having the third exopod seta of the fifth leg of both sexes similar in stoutness and ornamentation to the other setae. The species is named for Mrs. Reggie Rausch who patiently collected many harpacticoids on Saint Matthew Island.

Mesochra alaskana, new species

Type lot: 25 ♀ ♂, Naknek Lake, Alaska Peninsula (about lat. 59°N., long. 156°W.), Alaska, surface tow, Sept. 2, 1949, G. Eicher, collector. Also collected abundantly in fresh water lakes on Adak Island, Aleutian chain (Everett Schiller and Robert Rausch, collectors), and in Matanuska Valley near Palmer, Alaska (C. S. Wilson, collector).

Diagnosis: Habitus and appendages of both sexes, except leg 1, very similar to *M. rapiens* (Schmeil). Urosome spination differing ventrally from *M. rapiens* in that all spinules are enlarged to similar size, and arranged in small groups of 2-5. Anal operculum of both sexes with spinules. Caudal ramus about as long as broad, outer distal margin constricted; middle caudal seta enlarged basally for about one-fifth of its length. Antennule of female 7-segmented. Leg 1 of both sexes, endopod 3-segmented, the first segment reaching considerably beyond the exopod, ratio of its actual length to that of total exopod about 1.26:1; relative length of endopod segments to one another 38:5:9. Other legs, including modified leg 3 of male, very similar to those of *M. rapiens*, except that the length of the exopod of the male fifth leg is about twice its width.

Remarks: This form differs strikingly from *M. rapiens* in the development of the endopod of the first leg, both as described from brackish and fresh water bodies of Europe and as observed on the Bering Sea coast of Alaska. In descriptions and in keys in the literature, the first segment of the endopod of *M. rapiens* is indefinitely spoken of as reaching beyond or as being about as long as the exopod, but its actual length is much less since the attachment of the two rami is at distinctly different levels on the basal segment. In Alaskan specimens of *M. rapiens*, the ratio of the actual length of the endopod to the total exopod is about 0.79:1, and endopod segments 2 and 3 are subequal to one another. Since the two forms are so similar in other ways, it is admittedly questionable whether the status of the new Alaskan form, confined in present knowledge to fresh water, is that of a full species. Such status is given here because the length of the endopod of the first leg, and particularly of the first segment, constitutes one of the primary characters differentiating species of the genus.

FAMILY CLETODIDAE

Huntemannia lacustris, new species

Type lot: 38 ♀ (3 ovigerous), 29 ♂, Bear Lake, Utah, horizontal haul in shallow water, July, 1957, W. J. Clark, collector.

Diagnosis: Habitus and appendages of similar structure and armature to *H. jadensis* Poppe. Caudal ramus about same length as anal segment, second outer lateral seta placed near middle. Caudal setae of female consisting of stout middle spinous production as long as or longer than ramus; the inner seta articulated, slender; the outer setiform and

more or less set off from ramus, with basal portion enlarged and distal half attenuated, reaching to middle of spinous process or beyond. Caudal setae of male similar to those of *H. jadensis*, with stout middle spine twice the length of ramus or more; inner seta as in female; the outer a stout spinous process with incurved apex, as long as the ramus. Leg 1, exopod segments 2-3 fused or separate; endopod 1-segmented with 2 stout spines. Legs 2-4 of female, exopod segment 2 with 5,5,6 or 5,6,6 total spines and setae; endopod of legs 2-3 of a single reduced segment with 1 or 2 setae (the innermost reduced); endopod of leg 4 papilliform with a single long seta. Legs 2-4 of male, exopod segment 2 with 5,8,7 spines and setae; that of leg 3 modified, with 3 outer spines and 5 setae, the first two spines short, subequal to one another, the first stoutly serrate on outer margin, the second with coarse spinulations on each side; the third spine elongate; relative length of segment (outer margin) and spines: 9:5:6:17; endopods as in female, those of legs 2-3 with 2 setae, both well developed in leg 3; endopod of leg 4 with single long seta. Leg 5 of female, exopod length 2 times its width, with 5 setae; basal expansion with 4 setae, the innermost much stouter than the others. Leg 5 of male, both exopod and basal part a narrow lamina, each with 4 setae; leg 6 with 3 stout setae. Total body length: ♀ 0.8-0.86 mm. ♂ 0.7-0.95 mm.

Remarks: This is the first record of the genus *Huntemannia* from fresh water. The occurrence in Bear Lake is of particular interest because the lake is situated far inland, on the eastern slope of the Wasatch Mountains at an elevation of about 6,000 feet. *H. lacustris* occurred in association with the euryhaline species, *Mesochra rapiens* (Schmeil), and the fresh-water copepods, *Epischura nevadensis* Lilljeborg and *Canthocamptus robertcookeri*, described above.

H. jadensis Poppe is known only from marine habitats on the northern coast of Europe. *H. lacustris* differs from it principally in having the outer caudal projection of the female developed as an elongate seta instead of a short spinous spur; in the greater development of the exopod of the female fifth leg; in the relative size of the exopod spines and endopod setae of the third leg of the male; and in having 7 instead of 6 spines and setae on the second exopod segment of the fourth leg of the male.

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PROCEEDINGS
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NORTH AMERICAN HARPACTICOID COPEPODS
5. THE STATUS OF *ATTHEYELLA AMERICANA*
(HERRICK) AND THE CORRECT NAME FOR THE
SUBGENUS *BREHMIELLA*

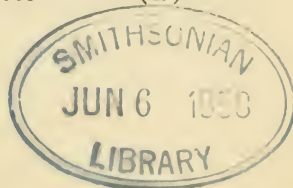
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Herrick (1884) correctly recognized that the form to which he gave the name *Canthocamptus northumbricus* var. *americanus* is related to a species widely distributed in Eurasia and now known as *Attheyella dentata* (Poggenpol), on the authority of Gurney (1932) and of Lang (1948). Records of this group in American literature are listed as the variety or subspecies *americanus* or simply as *northumbricus*. Lang (1948) has referred American records to the subspecies *americana*, but as pointed out (M. S. Wilson, 1956), the typical form of *dentata* does occur in North America, having been found in collections from Alaska and western Canada.

The additional presence on the Continent of another species of the *dentata* group, *Attheyella dogieli* (Rylov) makes somewhat uncertain the identity of the specimens in published records not substantiated by description or available specimens. Alaskan and Canadian specimens of *dentata* agree very closely with Gurney's (1932) detailed description of British specimens. The species *dogieli* known from Manchuria (Rylov, 1923) and Japan (Chappuis, 1955) is closely related to *dentata*, but distinctly separable from it. In well-collected areas of Alaska, these two species occur throughout the same geographic regions and drainage systems. Although *dogieli* has been found more frequently in the marginal waters of large lakes, it has also been collected in ponds, pools and other small bodies of water that are on the whole more characteristic for *dentata*. On a basis of morphology and sympatric distribution, it is correct to consider these as two separate species.

Comparative studies of specimens and literature of the three forms now known to occur in North America point up structural characters in *americana* that have equal taxonomic value with those separating *dentata* and *dogieli*. Moreover, *americana* possesses an important individual distinction in the modification of the endopod of the male third leg.



For these reasons, Herrick's form is herein raised to the status of a species.

Attheyella (*Mrázekiella*) *americana* (Herrick)

Canthocamptus northumbricus, var. *americanus*, var. n., Herrick 1884: 170, Pl. O, figs. 6-14, 20-22; 1895: 130, Pl. 29, figs. 6-14, pl. 33, figs. 3-5.

? *Attheyella northumbricoides* Willey 1925a: 155; 1925b: 206.

? *Attheyella willeyi* (nom. nov. for *northumbricoides*) Kiefer 1929: 323.

Attheyella (*Brehmiella*) *northumbrica* subsp. *americana*, Chappuis 1929a: 48; 1929b: 488; 1931: 359 (refers *northumbricoides* and *willeyi* to n. *americana*).

Attheyella northumbrica americana, Kiefer 1931: 604, figs. 53-55.

Attheyella northumbrica americana, Coker 1934: 106, Pl. 6, Pl. 7, figs. 3-5.

Attheyella (*Brehmiella*) *dentata* subsp. *americana*, Lang 1948: 977, fig. 387a.

Attheyella dentata americana, M. S. Wilson 1956: 293.

The above references include only those of significance in synonymy and nomenclature. The name *northumbricoides* is listed with a question mark because Willey's description, unaccompanied by figures, does not seem sufficiently precise to indicate which of the three American species he actually had. The known distribution, as determinable from substantiated records, includes Minnesota (Herrick, 1884, 1895), Wisconsin and North Carolina (Coker, 1934), and Connecticut (Kiefer, 1931). Willey's questionable record is from Quebec. In addition, the species has been reported from Massachusetts (Pearse, 1906) Bear Lake, Idaho (Kemmerer et al, 1923), and Michigan (Kenk, 1949). Marsh's (1926) record of Florida specimens are listed only as *northumbricus*, but are probably referable to *americana*; other references in the literature to *northumbricus* that may or may not bear the same interpretation are those of Moore (1939) from Michigan, and of Ewers (1930) and Ward (1940) from Ohio.

New records of *Attheyella americana* from my collections are:

Florida: Lake Jackson, Leon Co., April 3, 1950, Murray Voth, coll.

Louisiana: roadside ditch, 1 mile west of Clarence, Natchitoches Parish, Feb. 11, 1956, J. E. Sublette, coll.

The most complete and reliable description of *americana* is that of Coker (1934). Herrick's description and figures leave no doubt that Coker's specimens are referable to the same form. Important in the characterization of the species is the very short caudal ramus (considerably shorter than the anal segment in both sexes), without dorsal or distal sclerotization as found in *dentata* and *dogieli*, and with the lateral setae placed far apart, the distal seta being attached near the apex.

Specimens of *americana* that I have examined agree with Herrick's and Coker's figures of the male third leg which has the second segment of the endopod elongate and produced into a weakly developed hypophysis. The slenderness and shortness of the hypophysis is in strong contrast to the stoutly developed and strongly outcurved process of *dentata* and *dogieli*. The specific importance of distinctive modification of any part of this appendage, particularly when it departs noticeably

from the structure of closely related species, cannot be underestimated in the phylogeny and taxonomy of any canthocamptid.

The three known species of the *dentata* group in North America are separable by the following key:

1. Caudal ramus ♀ ♂, outer marginal setae placed close together and the outer distal edge of ramus continued as rounded sclerotization overlying the bases of the apical setae. Leg 5 ♀ ♂, exopod segment elongate, ♀ length from 2-3 times the greatest width, ♂ length about 2.6 times greatest width.

Attheyella dogieli (Rylov) 1923

Caudal ramus ♀ ♂, outer marginal setae not arising from same place, the inner distal edge of ramus not continued as sclerotization. Leg 5 ♀ ♂, exopod not so elongate. 2

2. Caudal ramus ♀ ♂ about as long as last body segment; on dorsal face of ♀ ramus a prominent triangular or semi-rectangular sclerotization. Leg 5 ♀ greatly broadened in basal portion. Leg 3 ♂, hypophysis of endopod strongly developed (enlarged and outcurved at base and reaching beyond apex of endopod by about half of its own length).

Attheyella dentata (Poggenpol) 1874

Caudal ramus ♀ ♂ shorter than last body segment, about as broad as long, without sclerotization on dorsal face. Leg 5 ♀ not greatly broadened in basal portion. Leg 3 ♂, hypophysis of endopod weakly developed (hardly enlarged and not outcurved at base, reaching beyond endopod by only about one-third of its length).

Attheyella americana (Herrick) 1884

The Correct Name for *A. (Brehmiella)* Chappuis

Attheyella dentata is the type species of the subgeneric grouping named *Brehmiella* by Chappuis (1929a). Attention was drawn by Brehm (1949) to the fact that this name is preoccupied by *Brehmiella* Pascher 1928. Brehm proposed the new name *Mrázekiella* for *Brehmiella* Chappuis. This appears to have been overlooked by specialists in the Harpacticoida, and so far as is known, the name has not yet been used in the literature. Since Brehm's nomenclature correction is valid, the name for the subgenus of which *A. dentata* is the type species, is *Mrázekiella* Brehm 1949.

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PROCEEDINGS
OF THE
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TYPE LOCALITIES AND NOMENCLATURE OF SOME
AMERICAN PRIMATES, WITH REMARKS ON
SECONDARY HOMONYMS

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Several problems of general zoological and nomenclatorial interest are presented in a recent publication entitled "Notes on the Primates of Suriname," by A. M. Husson (1957, *Studies on the fauna of Suriname and other Guyanas*, 1, (2) : 13-40, 8 pls., 1 fig.).

Husson lists and describes the 8 species of monkeys known to occur in Suriname. The generic name he used for one of the monkeys is antedated and must be replaced. The type locality of each of two other species was restricted by him in a manner that failed to take into account some pertinent facts. The specific name of a fourth species was needlessly changed in conformity with notions which undermine the foundations of nomenclatorial stability.

Each objection is discussed here under a separate heading.

Saguinus (Saguinus) midas midas Linnaeus

Simia Midas Linnaeus, 1758, *Syst. Nat.*, ed. 10, 1:28.

Marikina (Tamarin) midas, Husson, 1957, *Studies on the Fauna of Suriname and other Guyanas*, 1, (2) : 37.

Type locality.—"America"; restricted to Suriname by Schreber, 1775 (*Säugethiere*, 1:132).

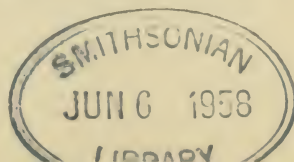
Remarks.—Husson has affirmed that the type locality of *Simia midas* was first restricted to Suriname by Schreber, 1775, then by Gmelin, 1789. No further action, such as "selection" of the "restriction," is required.

Saguinus Hoffmannsegg (1807, *Mag. Gesellsch. Naturf. Fr. Berlin*, 1:102), with type by monotypy, *Saguinus ursula* Hoffmannsegg [= *Saguinus tamarin* Link] antedates *Tamarin* Gray, 1870, with the same type species. *Saguinus* is also the first valid generic name for the group of marmosets characterized by normal lower canines.

The following genera and subgenera of the group are recognized.

Genus *Saguinus* Hoffmannsegg, 1807 (tamarins)

Saguinus Hoffmannsegg, 1807 (synonyms: *Leontocebus* Wagner, 1840; *Leontopithecus* Lesson, 1840; *Tamarin* Gray, 1870; *Cercopithecus* Gronov, 1763, rejected name; *Midas* Humboldt, 1812,



preoccupied; *Mystax* Gray, 1870, preoccupied; *Tamarinus* Trouessart, 1899).

Oedipomidas Reichenbach, 1862 (synonyms: *Oedipus* Lesson, 1840, preoccupied; *Hapanella* Gray, 1870).

Marikina Lesson, 1840 (synonym: *Seniocebus* Gray, 1870).

Genus *Leontideus* Cabrera, 1956 (little lion monkeys).

Synonyms: *Marikina* Reichenbach, 1862, not of Lesson, 1840; *Leontocebus* of authors, not Wagner, 1840 (see Cabrera, 1956, *Neotropicalica*, 2:45; Hershkovitz, 1957, *Proc. Biol. Soc. Washington*, 70:17).

Hill's classification of the marmosets in volume three of his monograph "Primates" (1957) has been taken into account in the above arrangement. It is proposed to review his work elsewhere.

Ateles paniscus paniscus Linnaeus.

Simia Paniscus Linnaeus, 1758, *Syst. Nat.*, ed. 10, 1:26.

Ateles paniscus paniscus, Husson, 1957, *Studies on the fauna of Suriname and other Guyanas*, 1, (2): 34.

Type locality.—"America meridionali: Brasilia"; redetermined as "America meridionali" by Linnaeus (1766, *Syst. Nat.* ed. 12, 1:37) and restricted to "La Guyane," i.e., French Guiana, by E. Geoffroy (1803, *Cat. Mann. Mus. Hist. Nat.*, Paris, p. 6; 1812, *Ann. Mus. Hist. Nat.*, Paris, 19:105).

Remarks.—As shown by Kellogg and Goldman (1944, *Proc. U. S. Nat. Mus.*, 96:15), the first, or 1758, Linnaean description of *Simia paniscus* is a composite of spider monkey and Brazilian howler, the *guariba* of Maregrave. In his 1776 account of *Simia paniscus*, Linnaeus recognized the composite nature of the earlier description and he dropped the reference to Brazil and the *guariba*. Linnaeus, therefore, as first reviser, eliminated Brazil as a necessary part of any future restricted type locality. Selection of Pernambuco, Brazil, where *Simia paniscus* does not occur, by Thomas (1911, *Proc. Zool. Soc. London*, 1911:127) can apply only to the *guariba*. Husson's redetermination of the type locality as Jamundá, Pará, on the assumption that the type locality must be Brazilian, is unwarranted.

Cebus apella apella Linnaeus

Simia Apella Linnaeus 1758, *Syst. Nat.* ed. 10, 1:28.

Cebus apella apella, Husson, 1957, *Studies on the fauna of Suriname and other Guyanas*, 1, (2): 26.

Type locality.—"America," restricted by Humboldt (1812, *Rec. Obs. Zool. Anat. Comp.*, 1:355) to "la Guyane françoise et la Terre-Ferme;" further restricted by E. Geoffroy (1812, *Ann. Mus. Hist. Nat.*, Paris, 19:109) to "la Guyane," i.e., French Guiana (see also Hershkovitz, 1955, *Journ. Mammal.*, 36:451).

Remarks.—Husson indicates that he has consulted the works cited above but he points only to Elliot as his "authority" for the claim that Suriname is the type locality of *Cebus apella*.

Secondary Homonyms and Status of the Name

Cebus nigrivittatus Wagner, 1848

The identification of *Cebus nigrivittatus* Wagner, 1848, as the un-

tufted species characterized by the wedge-shaped cap is accepted by Husson. This author, nevertheless, rejects the name because it had been treated once as a secondary homonym. Husson's position is derived from Pusch (1941, *Zeitschr. Säuget.*, 16:145), who combined *Saimiri* with *Cebus* and declared *Cebus nigrivittatus* Wagner, 1848, a junior secondary homonym of *Chrysothrix* [= *Saimiri*] *nigrivittatus* Wagner, 1846. In my revision of the untufted species of *Cebus* (1949, *Proc. U. S. Nat. Mus.*, 98:345), I denied Pusch's classification and the homonymy it entailed. Hudson also rejects Pusch's systematics but, paradoxically, strives to suffer its illusory consequences. Husson's arguments for dropping the name *Cebus nigrivittatus* Wagner, 1848, are a series of quotations from Follett's "An unofficial interpretation of the International Rules of Zoological Nomenclature . . .," a work issued in 1955 as "not published" and (p. i) "not to be quoted as authority for any nomenclatorial proposition." Husson also assists his reasoning by references to the "Copenhagen Decisions on Zoological Nomenclature," a quasi-official modification and clarification of certain Articles of the Rules. The existing Rules fail to distinguish between primary homonyms wholly subject to nomenclatorial discipline, and secondary homonyms which are essentially non-regulatory zoological, or philosophical, concepts.

Primary homonyms are objective or nomenclatorial homonyms. They are born homonyms and can never be anything else. There are comparatively few primary homonyms, and were it not for carelessness or ignorance there would be none. In contrast, nearly all secondary homonyms are subjective homonyms. They exist only as opinions, or illusions, that the animals bearing the names belong to genera other than the ones in which they were first described. There is no limit to the number of secondary homonyms that can be evoked in the minds of men and expressed in their schemes of classification. Every technical name proposed since the 10th edition of the *Systema Naturae* is a potential secondary homonym.

The problem of subjective secondary homonyms is by and large a zoological problem. It may also be a nomenclatorial problem but only transitorily. Its treatment should be on a corresponding transitory, or temporary, basis. The menace to nomenclatorial stability contained in the philosophy of "permanent rejection" of subjective secondary homonyms must be obvious. Pusch, acting in good faith, united only *Saimiri* with *Cebus* and produced one subjective secondary homonym. Another student, with equally good intentions, may, like Linnaeus, combine all Primates, except man, in but one genus. The secondary homonyms created by this drastic revision would result in wholesale elimination of universally accepted names if Husson's line of reasoning were followed.

The International Commission on Zoological Nomenclature cannot and must not pretend to exercise control or censorship over the minds or methods of zoologists and systematists. An author is free to create as many secondary homonyms as may be required to assert his concepts of classification. That author is free to rename as many secondary homonyms as he sees fit. At the same time, no ruling of the International Commission can make acceptance of such revisions compulsory

er, what is tantamount, oblige the student to recognize the nomenclatorial upheavals spawned by the revolutionary concept of "permanent rejection" of secondary homonyms.

Husson's application of the policy of "permanent rejection" of secondary homonyms illustrates the absurd and pernicious effects of the practice. The name *Cebus nigrivittatus* Wagner, 1848, is "permanently rejected" by Husson, because in the mind of one and only one author, it is a secondary homonym of *Chrysothrix nigrivittatus* Wagner, 1846. Husson (op. cit. p. 32) elects *Cebus olivaceus* Schomburgk, 1848, as the next available name for replacement. He also seems to be particularly elated that this move disposes of the problem of priority between *olivaceus* Schomburgk 1848 and *nigrivittatus* Wagner 1848. Actually, nothing is settled by this manipulation. The same devious reasoning that led Husson to reject *nigrivittatus* Wagner will oblige him to discard *olivaceus* Schomburgk. In his classification of mammals, Fischer (1829, Syn. Mamm. p. 41) includes the woolly monkey originally described as *Gastrimargus olivaceus* Spix, 1823, in his genus *Cebus*. This kills off *Cebus olivaceus* Schomburgk 1848. The next name in line for replacement is *Cebus castaneus* I. Geoffroy, 1851. Before adopting this binomial, however, it behooves the advocates of "permanent rejection" to examine every published work, whether by scholar, hack or crank, for possibilities of secondary homonymy. While the search goes on the writer rests with *Cebus nigrivittatus* Wagner, 1848, as the first valid name that must be used for the species in question.

PROCEEDINGS
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FIVE NEW SOUTH AMERICAN CHILOPODS

RALPH V. CHAMBERLIN

The five new species, including one new genus, of chilopods here described are represented in two small collections made by Borys Malkin in August and September, 1957. One of these collections was made in the state of Goias, Brazil, the other in the states of Trujillo and Portogueza, Venezuela.

Scolopendridae

Rhoda isolata new species

Dorsum brown, with head, last tergite and anal legs of a somewhat chestnut tinge.

Head small, decidedly narrower behind than the first tergite by which it is overlapped; a fine median longitudinal sulcus which extends forward to the frontal level. No basal plates. Antennae thick at base, strongly attenuated distad, composed of 17 articles.

Prosternum anteriorly with 3 - 3 teeth of which the two innermost on one side are partially fused in the type specimen; a transverse sulcus more obscure than in *calcarata*. Claws of prehensors when closed not surpassing anterior margin in head.

Paired dorsal sulci present on tergites 1 to 20, but on the first of these not quite reaching the anterior margin. Last tergite laterally margined and with a deep median longitudinal sulcus. First and second tergites about equal in length, considerably shorter than the third and fourth which are subequal to each other but clearly shorter than tergite 5. Paired sulci present on sternites 2 to 21. The last sternite strongly rounded behind. Coxopleurae without caudal processes and also lacking spinules.

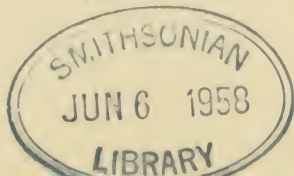
Anal legs very thick as in *calcarata*; prefemur on mesoventral line with three spinules of which the median and distal arise from a raised base; a series of 3 sponules on mesal face and 1 or 2 on mesodorsal line in addition to the large process at distal end, the latter bearing two spinous points.

Legs 1 to 19 with a tarsal spine.

Length, 43 mm.

Locality.—Brazil: State of Goias, Santa Isabel, Ilha do Bananal, Rio Aragua. Two specimens taken August 15-22, 1957; by Malkin.

In general structure this species agrees with *R. calcarata* (Pocock) but a smaller and darker species differing in having the paired dorsal sulci beginning on tergite 1 instead of on 2, in having 3 equal in length to 4



and shorter than 5 instead of having 4 longer than either 3 or 5, and also in having the claws of the prehensors when closed not surpassing the anterior margin of the head.

Of two other members of the Scolopendridae occurring at the same locality, *Scolopendra angulata* Newport, a species widespread in South America, is most abundantly represented, while *Scolopendra viridicornis* Newport is represented by one specimen.

Cryptopidae

Cryptops goiasus new species

Yellow, the head and first tergite light chestnut; legs and antennae yellow.

Cephalic plate with two longitudinal sulci extending from caudal margin well toward anterior border.

First tergite with cervical sulcus evenly curved; also with paired longitudinal sulci which continue beyond the cervical sulcus to the anterior margin of the plate. The other tergites from the second on also with complete paired paramedian sulci, and also with lateral sulci from the third tergite or these indistinct also on the second tergite.

Prosternum with margin convex on each side, the median angle shallow and obtuse; margin fifth four or five short setae.

Last ventral plate trapeziform, the caudal margin wide, forming at middle a slightly obtuse reentrant angle; coxal pores few, not extending to caudal margin of coxa.

First tarsus of anal legs with a series of four teeth beneath; tibia with six teeth, with no lateral terminal tooth, a series of spinules along distal margin and with numerous spinules beneath where they leave a median naked strip which is very narrow on prefemur but wide on femur.

Length, 20 mm.

Locality.—Brazil, state of Goias, Goiania August, 1957. One specimen. Borys Malkin collector.

This species seems to be readily distinguished from *heathi* and other related species by the paired longitudinal sulci of the first tergite which do not meet or cross and by the extension of these sulci cephalad of the cervical sulcus taken in conjunction with the long paired sulci of the head.

Newportia sargentii new species

General color orange brown.

Head smooth, without sulci. Antennae composed of 16 articles. Anterior margin of prosternum not protruding, horizontal and nearly straight, each half only slightly convex, the median sinus shallow and obtuse, the chitinous rim narrow.

First tergite overlapped by the cephalic plate, rather short, entirely lacking cervical sulcus as well as longitudinal sulci.

Paired paramedian longitudinal sulci first distinct on the fourth tergite; oblique lateral sulci deeply impressed.

Last ventral plate long, trapeziform, its sides gently convex. Coxal processes long and slenderly acute; no spinules; poriferous area extending to caudal end of coxa.

Prefemur of anal legs with a series of four large spinous process

beneath. Femur beneath with two denticles, one toward base and one at middle. Tibia without spinules. First tarsal joint shorter than tibia and longer than second tarsal article than which it is but little thicker; the five articles beyond first tarsal article proportionately long and slender.

Length, 21 mm.

Locality.—Venezuela: taken on road of Bocono-Trujillo pass on Atlantic Pacific divide, state of Trujillo, at elevation of 2500-3000 m. (?). One specimen taken September 15, 1957, by B. Malkin and M. J. Sargent.

A species distinct from all other members of the genus so far known in lacking a cervical sulcus on the first tergite. The anal legs are also distinctive.

Ballophilidae

Genus *Koinethmus*, new

Unlike other known genera of the Ballophilidae with the exception of *Taeniolum* in having the ventral pores diffuse and distributed in one or two transverse bands rather than condensed in one or two sharply defined submedian areas. From *Taeniolum* it differs in having the tarsus of the anal legs composed of one instead of two articles. Prosternum lacking sclerotic (chitinous) lines. Ventral pores in one, or in part two transverse bands. Coxal pores simple, one on each side. Antennae subfiliform, not clavate.

Genotype.—*Koinethmus guanereus* new species.

Koinethmus guanereus new species

Preserved specimen yellow, no darker pigment being preserved; head light chestnut.

Head small, widest behind middle; rounded anteriorly, the caudal margin slightly obtusely angled at middle. Antennae not clavate and not geniculate; a little thickest at ninth and tenth articles, the section beyond which is thus somewhat set off; last article large, subacutely conical.

Ventral pores beginning on the second sternite; on anterior sternites the pores form two narrow transverse lines or bands, these bands not elevated or otherwise sharply defined; on the more posterior sternites the pores form but single, wider, band behind middle.

Body narrowed over several segments behind the first one.

Anal legs crassate, narrowing continuously distad; composed of but five articles beyond the coxa. One large simple gland on each anal coxa, its pore located posteriorly and free from the sternite. Sternite trapeziform.

Pairs of legs, 71.

Length, 22 mm.

Locality.—Venezuela: state of Portoguesa, Guanare. One specimen taken September 10-17, 1957.

Psellioididae

Pselliodes subglaber new species

Dorsum with a median longitudinal yellow stripe which is bisected by a rather faint median line, the yellow stripe extending also on the

head where it is furcate between the bases of the antennae. Each side of the median yellow stripe a brown stripe separated from the lateral margin of the tergites by a narrow yellow submarginal line. Legs with prefemora and femora with three yellow annuli of which the distal one may be more or less obscure; tibia brownish, with a submedian and distal annulus of yellow; tarsi and antennae ferruginous.

Articles of first division of antennae for the most part distinctly longer than broad, shorter ones occurring at intervals; second division composed of 275 plus articles, with shorter articles intercalated at intervals. The division shows no definite distinction of a third division.

Tergites bearing numerous well-spaced spinules which are more numerous toward the middle and are more abundant on the posterior plates than on the anterior ones; marginal spinules directed dorsad except in the caudolateral part; the spinules not accompanied by hairs or hair points. Stoma large, reaching posterior excavation or slightly extending into it as a low convexity.

Anal tergite strongly narrowed caudad, its narrow caudal end blunt, its margin nearly straight, bearing numerous spinules above. The preceding tergite also strongly narrowed caudad, its caudal margin incurved at middle, clothed with numerous spinous points.

Gonopods of female with prongs about three times as long as the consolidated basal portion; the prongs parallel, each presenting the usual angle or shoulder on the mesal side at middle of length, the angle setose.

Length: 28 mm.

Locality.—Brazil, state of Goias, Santa Isabel, Ilha de Bananal, Rio Araguaia. Two females taken August 22, 1957. Borys Malkin.

In general appearance and structure suggesting *P. andicolens* but readily distinguishable from this and other known related species in the unusual complete absence of hair points between the dorsal spinules of the tergites.

574.0673

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF *CINARA* (APHIDAE) FROM
SITKA SPRUCE

F. C. HOTTES

The new species described herewith was sent me to determine by Prof. E. O. Essig who through the years has contributed greatly to our knowledge of the family Aphidae.

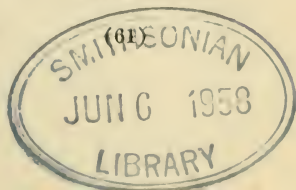
Cinara sitchensis n. sp.

Apterous viviparous female.

Length from vertex to end of cauda varying from 2.40-2.55mm. All specimens have been cleared and mounted very flat, so that the actual length may vary considerably from that given. Nothing has been recorded as to the color of living specimens, but alcoholic specimens have been described as being "pinkish maroon." Color of cleared mounted specimens as follows: head pale tan, abdomen pale with the cornicles tan but indistinctly separated in color from abdomen at the margin. Antennal segments one and two concolorous with head, remaining antennal segments, very light tan almost uniform in color, or with the sixth antennal segment slightly darker. Femora pale at the base, turning to pale brownish at the apex. Tibiae pale brown with an area on the basal half of segment somewhat lighter in color, but not distinctly so. Tarsal segments concolorous with ends of tibiae.

Head and thorax. Antennal segments with the following lengths: III .36-.45mm., IV .12-.15mm., V .15-.18mm., VI .12-.15 + .03mm. Sensoria distributed as follows: III, as a rule, no secondary sensoria, but one specimen has two secondary sensoria on this segment. IV as a rule no secondary sensoria but one specimen has one secondary sensorium on this segment. V as a rule one secondary sensorium, but there may be two. Hair on antennae not numerous, more upstanding on anterior margin of segment than on posterior. On the anterior margin the hairs are about .05mm. in length. Hairs on sixth antennal segment longer than usual.

Marginal sensoria on sixth antennal segment with wide rims, arranged in a straight row. Ocular tubercles apparently absent. Last three segments of the rostrum with the following lengths: .18, .17, .08mm. Mesosternal tubercle absent. Length of prothoracic femora varying from .67-.72mm. Length of prothoracic tibiae varying from .75-.90mm. Length of metathoracic femora varying from .90-1.05mm. Length of metathoracic tibiae varying from 1.35-1.57mm. Both the metathoracic femora and tibiae are comparatively short. Metathoracic



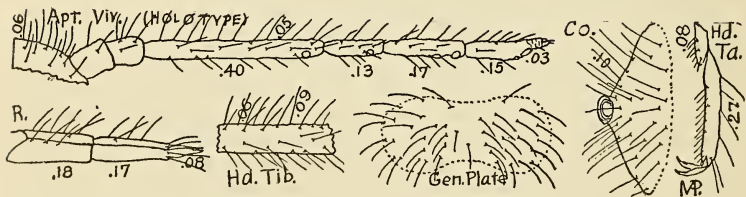
tarsal segments with the following lengths: .08-.09, .27mm. Hairs on metathoracic tibiae more upstanding on outer margin than on the inner margin, on this surface varying from .06-.09mm. in length, with most of the hairs about .06mm. long. Hairs on inner margin of tibiae more numerous than the hairs on the outer margin. Hairs on ventral surface of the first metatarsal segment numbering about ten, but difficult to count, located on the apical half of segment. Hairs on ventral surface of the second metatarsal segment much more numerous than the hairs on the dorsal surface, but shorter. Union of first and second tarsal segments, about equal to width of second tarsal segment.

Abdomen. Cornicles rather flat, with outer margin poorly differentiated from dorsum of abdomen. Width of cornicles about .375mm. Hairs on cornicles evenly distributed over the surface, about .10mm. in length and similar to the hairs on the dorsum of the abdomen. Hairs on the dorsal and ventral surfaces of the abdomen similar.

The two pigmented spots anterior to the cauda have two rows of hairs. Anal plate and cauda with a setulose surface, anal plate with numerous hairs.

Holotype apterous viviparous female, deposited in the collection of E. O. Essig. Host, *Picea sitchensis* (Sitka spruce). Collected by P. S. Bartholomew, Crescent City, California, July 17, 1931.

In Palmer's key to the genus *Cinara* in Aphids of the Rocky Mountain Region this species keys with some difficulty to *C. villosa* (G&P), a species with which it is not allied, except by characters made use of in the key, and from which it may be differentiated by the fewer hairs on the tibiae. It differs from *C. fornacula* H. by the shorter tarsal segments, shorter antennal segments, shorter tibiae and femora, as well as in the shape of the sixth antennal segment.



Cinara sitchensis n.sp.

PROCEEDINGS
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A NEW CANADIAN SPECIES OF *CINARA* (APHIDAE)
FROM *PICEA RUBENS*

F. C. HOTTES

It is pleasure to acknowledge the assistance of Mrs. M. E. MacGillivray who sent me the material from which this species is described.

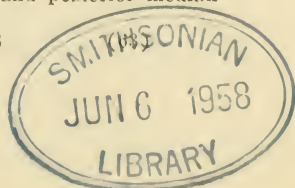
Cinara nepticula n. sp.

Alate viviparous female.

Length from vertex to end of cauda varying from 3.45-3.60 mm. Color of living specimens not recorded, as represented by cleared mounted specimens as follows: head and thorax dark dusky brown. Antennal segments I and II concolorous with head, segments III IV and V light dusky with the apical portions of segments darker, VI almost uniformly dark. Femora dusky almost uniform in color, or with the metathoracic femora slightly darker at the apex. Tibiae dusky with the apical portions darker, the dark portion of the metathoracic tibiae most extensive, but extending less than half way up the tibiae. Tarsal segments concolorous with apex of tibiae. Cornicles dusky.

Head and thorax: Length of antennal segments as follows: III .53mm., IV .25mm., V .31mm., VI .18 + .03mm. Sensoria distributed as follows: III primary, plus five secondary sensoria arranged in a straight row, IV primary, plus two secondary, V primary, plus one secondary. All sensoria are large, slightly tuberculate, with wide rims, and quite regular in size. Antennal hairs fairly numerous, upstanding, set at an angle of more than sixty degrees, on third segment about .09mm. in length. Antennal segments III IV and V rather rough, but not imbricated, VI weakly imbricated. Marginal sensoria on sixth segment small arranged in a straight row rather far removed from the primary sensorium.

Median transverse suture well developed brown in color. Ocular tubercles well developed. Last three segments of the rostrum varying in length as follows, .26-.28, .22-.23, .10mm. Prothoracic femora varying in length from .97-1.05mm, metathoracic femora varying in length from 1.35-1.50mm. Prothoracic tibiae 1.35mm. long. Metathoracic tibiae varying in length from 2.25-2.40mm. Hairs on metathoracic tibiae numerous, upstanding about .12mm. in length. Hairs on outer surface of tibiae fewer, more upstanding and longer than hairs on inner surface. First metathoracic tarsal segment .12mm. in length, length of second segment .31mm. Ventral surface of first metatarsal segment with about sixteen hairs. Second fork of media far removed from margin of wing, closer to body than start of anal sector. Lateral and posterior median

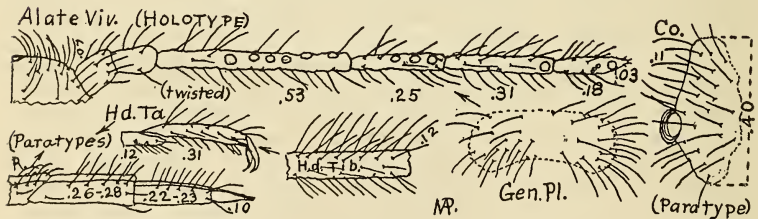


lobes of thorax with numerous long fine hairs which cover most of surface.

Abdomen. Hairs on dorsum of abdomen about .12mm. in length, fairly numerous, fine, roughly arranged in broad bands. Hairs on ventral surface of abdomen, more numerous than the hairs on the dorsum, not arranged in bands, otherwise similar to hairs on dorsum. Cornicles varying in width from .33-.40mm. the hairs on the cornicles are similar to those on the dorsum of the abdomen but slightly shorter, the hairs cover the entire surface and are evenly distributed over the surface. Anterior margin of cornicles more irregular than other margins. Orifice of cornicles closer to posterior margin than to anterior. The cornicles are rather flat. Each side of the dorsum of the abdomen has two rows of rather small wax pore plates. The genital plate has the hairs largely confined to the ends and posterior margin which is slightly concave. Hairs on the pigmented spots anterior to the cauda about .15mm. in length, the hairs cover a greater area in the middle of the spots than at the ends. Cauda and anal plate with setulae, both provided with numerous hairs.

This species may not be keyed in Palmer's key to the genus *Cinara* before couplet 10. Couplet 10 is based on apterous viviparous females which are not available. It may be assumed that the apterous viviparous female when known will have the hairs on the metathoracic tibiae longer than the width of the tibiae. Couplet 24 is also based on the length of hairs on the hind tibiae of apterous viviparous females, if the first alternative is followed this species keys to *C. braggi* (G). *C. nepticula* differs from *braggi* by having shorter hairs on the tibiae, the cornicles with more regular margins, more secondary sensoria, longer fourth, fifth and sixth antennal segments, smaller marginal sensoria. The second alternative of couplet 24 can not be completed.

Holotype alate viviparous female, deposited in the Canadian National Collection, Ottawa, Canada. Host *Picea rubens*, Melrose, Nova Scotia, Canada. Collected by F. G. Cuming.



Cinara nepticula n.sp.

PROCEEDINGS
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THE STATUS OF THE GRAY-BREASTED LEAST
HONEY-GUIDES

BY HERBERT FRIEDMANN*

In connection with comparative studies of small honey-guides of the genus *Indicator* occasioned by Chapin's recent discovery of a new and extremely small species in the eastern Belgian Congo, *Indicator pumilio*,¹ I was able to arrange an opportunity to investigate the status and relationship of *angolensis* Monard² and *meliphilus* (Oberholser),³ an opportunity for which I am greatly indebted to the Royal Museum of Natural History in Brussels, the Musée d'Histoire Naturelle of La Chaux-de-Fonds, Switzerland, and the National Museum of Southern Rhodesia, Bulawayo. Previously (1954, 1955) I had treated *angolensis* as a synonym of *meliphilus* and had considered the latter as a race of *exilis*. However, I was careful to point out that there was some reason to think that further data might indicate that *meliphilus* was a distinct species, as both *exilis* and *angolensis* had been recorded by Verheyen (1953, pp. 406-407) from the Upemba Park, in the southern Belgian Congo, and *meliphilus* had been known to extend westward across Northern Rhodesia (Mwinilunga), an area where *exilis* (subsp. *pachyrhynchus*) had been taken (at Kansoku). Accordingly, if some form of *exilis* and *meliphilus* did occur together all the way from Northern Rhodesia to Lake Upemba, it would seem necessary to accord the latter full specific status. Chapin (1954, p. 633) accepted this conclusion and added *I. meliphilus* to his list of Congo birds.

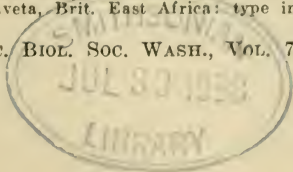
Examination of Verheyen's interesting material proved him to be quite correct in distinguishing between his specimens of *angolensis* and

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¹*Indicator pumilio* Chapin, Bull. Brit. Ornith. Club, vol. 78, 1958, p. 46 (Tshibati, southwest side of Lake Kivu, Belgian Congo).

²*Indicator minor angolensis* Monard, Arquivos do Museu Bocage, vol. 5, 1934, p. 55 (Tyhumbwe [Angola]; type in Musée d'Hist. Nat. de la Chaux-de-Fonds, Switzerland).

³*Melignothres exilis meliphilus* Oberholser, Proc. U. S. Nat. Museum, vol. 28, 1905, p. 869 (Taveta, Brit. East Africa; type in U. S. Nat. Museum).



of *exilis* from the Upemba Park. Verheyen also proved to be correct in calling his birds *angolensis* and not *meliphilus*, as they agree much more closely with the type specimen of the former bird from Tyihumbwe, Angola, than with that of *meliphilus* from Taveta, Kenya Colony. As a result of my present examination I find that there seems to be no question but that *angolensis* is a western form of *meliphilus*. I find it difficult to conclude otherwise than that *meliphilus* should now be treated as a species partly sympatric with *exilis*, although I must admit to a persistent suspicion that they may yet prove to be ecologically allopatric. The specimens of nominate *meliphilus* are considerably duskier below, especially on the throat, breast, and upper abdomen, than the type of *angolensis* and four other examples of this race from the southern Belgian Congo. The Congo birds are slightly paler below than Monard's type from Angola, but this may not be a constant geographic difference. There is no appreciable size difference between *angolensis* and *meliphilus*, as may be seen from the following figures: *angolensis*—type, unsexed, wing 77, tail 48.2, culmen from base 7.3mm., 4 specimens from the Belgian Congo have wing lengths of 78, 81 (males), 65 (female) and 74 mm. (unsexed). Two males from Abercorn, Northern Rhodesia, have wing lengths of 74.5 and 79; tail 49.2, 49.8; culmen from base 7.5 and 7.6mm.; a female from Port Herald, extreme southern Nyasaland, measures: wing 79, tail 46.1, culmen from base 7.4mm. By comparison, the type of *meliphilus* (male) has the wing 76, tail 48.3, culmen from base 7.7; a female has the wing 78, an unsexed bird 82 mm. The bill is very slightly stouter and heavier in *meliphilus* than in *angolensis*, but the number of specimens examined is too small to establish this as a constant character.

It appears, then, that *Indicator meliphilus* is best treated as a specific entity composed of two races with the following ranges.

I. m. meliphilus: extreme eastern Uganda (Mount Moroto, Soronko River), and Kenya Colony from Turkanaland (Kacheliba) and the drier parts of the Suk area, east to the Taveta-Kilimanjaro plains, and south in suitable spots across Tanganyika Territory to Nyasaland (?) and to Mozambique (near Zobue, Kirk Mountains). Of this race *I. appellator* Vincent⁴ and *I. narokensis* Jackson⁵ are considered synonyms.

I. m. angolensis: Angola (Chitau, Tyihumbwe, Ebanga, and Quibula near Banguella) east to the southern Belgian Congo (Pelenge, Kaziba, Munoi, Upemba Park) and to Northern Rhodesia (Mwinilunga, Kabompo River, Abercorn, Fort Jameson), and southern Nyasaland (Port Herald).

In the present study I have seen but one Nyasaland example, and that from the extreme southern part of the country (Port Herald), but but it is a very pale bird, clearly *angolensis*. Whether the more northern Nyasaland records (Cholo, Ndirande, Mlanje), none of which are available for examination, are also *angolensis* or should be placed with *meliphilus* is uncertain. The two races should meet either in Nyasaland or in the areas immediately to the east. This Port Herald bird is paler

⁴*Indicator appellator* J. Vincent, Bull. Brit. Orn. Club, vol. 53, 1933, p. 130 (near Zobu , on Portuguese East Africa—Nyasaland frontier, 2900 feet: type in Brit. Museum).

⁵*Indicator narokensis* Jackson, Bull. Brit. Orn. Club, vol. 19, 1906, p. 20 (Doiyo Narok Mt., Brit. East Africa: type in Brit. Museum).

below, with more of a pale yellow wash on the midventral area than are either of the examples from Abercorn, Northern Rhodesia, with which it was compared. In its extreme pallor, it agrees with those from the Upemba Park, in the Belgian Congo. It is marked by the collector (C. Long) as immature, but it has the rectrices rounded terminally as in adult birds, and shows no sign of immaturity.

The species, *I. meliphilus*, is, on the whole, somewhat larger and much more grayish, less greenish, especially below, than *exilis*, and still more markedly so than *pumilio*. It appears to inhabit more open, less humid regions and is extremely similar in coloration to the still larger *Indicator minor* with which it appears to be more or less sympatric.

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PROCEEDINGS
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SIX NEW SPECIES OF CHINAIA FROM CENTRAL
AMERICA (HOMOPTERA: CICADELLIDAE)

BY JAMES P. KRAMER

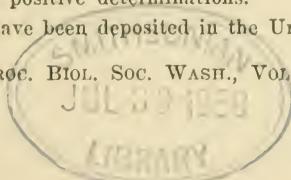
Entomology Research Division, Agr. Res. Serv., U.S.D.A.

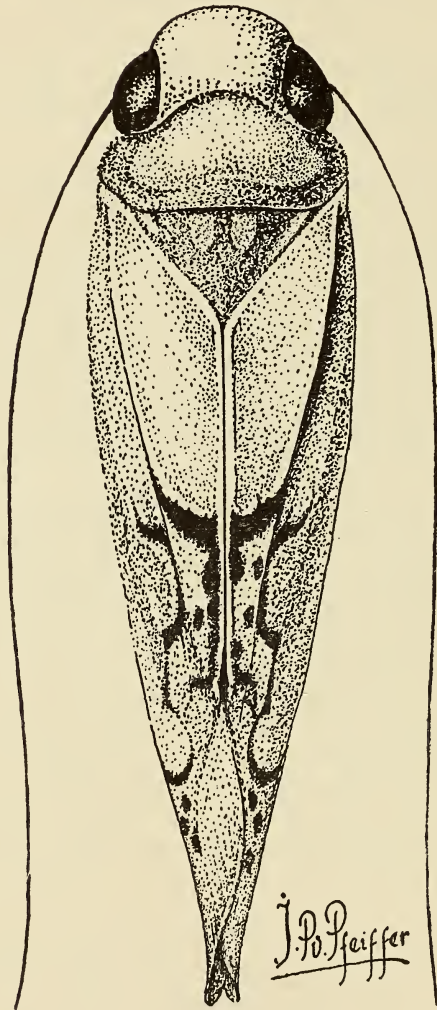
The new species characterized herein are all brightly colored leafhoppers of the genus *Chinaia*, and closely resemble the genotype, *Chinaia bella* Bruner and Metcalf (1934 Bull. Brooklyn Ent. Soc. 29(3):120-124). Inasmuch as the genotype was illustrated adequately, it has not been redrawn for this Publication. While the type series of *bella* was collected on avocado, indicating potential economic importance, no host records exist for any of the new species.

The general color patterns of the new species are very similar. All have an unmarked yellow to pale orange head, whereas that of *bella* is bordered posteriorly with bright orange. Like *bella*, they all have orange to bright orange lateral and posterior pronotal margins. In each species the large scutellum is predominantly orange. Anteriorly the clavus is pale yellow with a greenish cast, which is separated from the distal orange portion by an oblique dark brown marking. There are also additional brown markings in the distal portion of the clavus. *Chinaia permista* new species is the only one having an orange mark on the clavus like that of *bella*. The corium ranges from yellow to orange with or without brighter orange bands of varying distinctness. In most species there is an additional wavy pink band on the corium which is bordered distally with dark brown. The apical portions of the tegmina are light fumose hyaline with spots of dark brown. Venation is apparent only in the apical portion. The venter and legs range from yellow to pale orange.

Chinaia lepida new species [Plate I] serves as a general habitus for all of the species described in this paper. The exceedingly long antennae are frequently broken so that they often appear much shorter than illustrated. Even though color pattern seems to have some value in the recognition of species, study of the male genital structures is necessary for positive determinations.

All types have been deposited in the United States National Museum.





Chinaia bifurcata new species

Length.—Male 5.25 mm.

Coloration.—Venter and legs, stramineous to yellow; face, vertex, and antennae pale orange. Pronotum pale orange fading to whitish with orange lateral and posterior margins. Scutellum orange with two colorless oval areas toward anterior margin and small colorless strips anteriorly along lateral margins. Clavus yellow with vague greenish cast, its tip orange with irregular anterior oblique dark brown marking and spots near claval suture. Corium basally bright orange deepening to red orange distally with a longitudinal wavy pink band terminating in inner anteapical cell. Terminal portion of band bordered with dark brown. Apical portions of tegmina pale fumose hyaline with whitish areas, veins red bearing dark brown circular spots. Three narrow evanescent brown stripes, one through outer apical cell from costal margin, another along front margin of outer apical cell from costal margin, and third anterior to outer apical cell. Scattered areas of waxy bloom on tegmina.

Male genital structures.—See Plate II, figs. D1, D2, and D3. Pygofer process long slender, somewhat irregular, slightly decurved with sharply bifurcate apex. Aedeagus in lateral view short stout, the shaft narrowed but little with apex rounded.

HOLOTYPE Male, Trinidad River, Panama, May 6, 1911, August Busck. U.S.N.M. type number 64099. Female unknown.

The bifurcate pygofer process separates this species from all others in the genus.

Chinaia caprella new species

Length.—Male 5.5 mm.

Coloration.—Venter, legs, face, vertex, antennae, pronotum, scutellum as in *bifurcata*. Clavus basally yellow with faint greenish cast separated by dark brown oblique stripe from apical three-eighths which is orange with few dark spots. Corium yellow with three indistinct broad oblique orange bands, dark margined wavy pink band limited to distal portion. Orange bands fused to form a stripe along claval suture. Apical portions of tegmina with veins dull yellow, membrane fumose orange hyaline with dark spots. Three evanescent narrow brown stripes as in *bifurcata*. Waxy bloom on central area of costal margin.

Male genital structures.—See Plate II, figs. E1, E2, E3. Pygofer process "S" shaped. Aedeagus in lateral view long, stout basally, tapering to a sharp upturned tip.

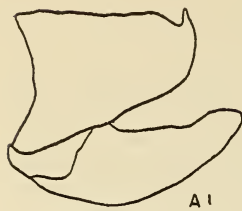
HOLOTYPE Male, Panama Swamp (near Colón), Panama, Nov. 20, 1951, F. S. Blanton. U.S.N.M. type number 64100. Female unknown.

The "S" shaped pygofer process will separate *caprella* from all others but *permista*. The lack of an orange stripe on the anterior portion of the clavus will distinguish *caprella* from *permista*.

Chinaia permista new species

Length.—Male 5.3 mm.

Coloration.—Venter and legs as in *caprella*. Face, vertex, antennae tending toward dull orange. Pronotum and scutellum as in *caprella*. Clavus, proximal portion pale yellowish white with irregular medially

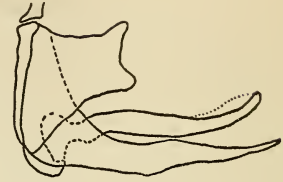


CUMARA

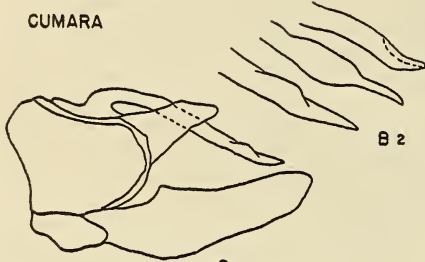
A 1



A 2



A 3



AGARISTA

B 1



B 2



B 3



LEPIDA

C 1



C 2



C 3



BIFURCATA

D 1



D 2



D 3

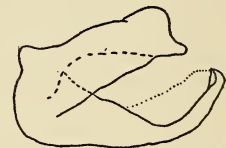


CAPRELLA

E 1



E 2



E 3



PERMISTA

F 1

located orange stripe from anterior border to commissural margin, distal three-eighths orange separated by oblique brown stripe. Corium marked as in *caprella* with three oblique orange bands, first and third of which are broken, on pale yellowish white. Pink stripe absent. Rest of tegmina like *caprella*.

Male genital structures.—See Plate II, fig. F1. Pygofer process as in *caprella*. Aedeagus in lateral view like *caprella* except slightly heavier and lateral flaps of a different shape.

HOLOTYPE Male, Panama Summit (16 km. N.W. of Balboa), Canal Zone, January, 1947, N. L. H. Krauss. U.S.N.M. type number 64101. Paratype male, Madden Dam (35 km. S.E. of Colón), Canal Zone, April 28, 1952, F. S. Blanton. Female unknown.

Close to *caprella* but appears paler and with differences in aedeagus and orange stripe on anterior portion of clavus. However, additional material may show that the characters here interpreted as distinguishing *caprella* and *permista* intergrade. If so, in the absence of evidence of reproductive isolation, *permista* should be suppressed as a synonym.

Chinaia cumara new species

Length.—Male 5.8 mm.

Coloration.—Venter, legs, face, vertex, antennae as in *bifurcata*. Pronotum pale yellowish white with very wide red orange lateral and posterior margins. Scutellum as in *bifurcata*. Clavus, anterior half, pale yellow with a greenish cast and pale border; posterior half orange separated by a dark brown oblique stripe, three small brown spots along commissural margin. Corium orange with vague pink stripe bordered distally by dark brown. Three evanescent brown stripes as in *bifurcata*. Apices of tegmina fumose hyaline, veins orange bearing brown spots. Waxy bloom on central area of costal margin.

Male genital structures.—See Plate II, figs. A1, A2, and A3. Terminus of pygofer short upturned and somewhat fingerlike. Aedeagus in lateral view very slender, slightly reflexed toward tip and flanked by a long sharp process on each side. Only one of these processes is shown in the drawing.

HOLOTYPE Male, Trece Aguas (vicinity of Cacao), Alta Verapaz, Guatemala, April 14, 1906, Barber and Schwarz. U.S.N.M. type number 64102. Female unknown.

The short terminus of the pygofer and paired processes which flank the aedeagus are distinctive.

Because the components of the genital capsule depart quite markedly in form from the other new species, *cumara* may represent a distinct genus. However, a conservative treatment places *cumara* in *Chinaia*.

Chinaia lepida new species

Length.—Male 5.3 mm.

Coloration.—Venter, legs, face, vertex, antennae, pronotum, scutellum is in *bifurcata*. Clavus as in *caprella*. Corium orange with indistinct wavy pink stripe bordered distally by dark brown. Three narrow evanescent brown stripes as in *bifurcata*. Apical portions of tegmina pale fumose hyaline with veins concolorous and difficult to discern. Veins bearing dark brown spots.

Male genital structures.—See Plate II, figs. C1, C2, and C3. Pygofer process subtriangular. Aedeagus in lateral view similar to *bifurcata* but shaft narrower and dorsal portion of base attenuated.

HOLOTYPE Male, Fort Gulick (4.5 km. S. of Colón), Canal Zone, Dec. 18, 1956, taken in light trap. U.S.N.M. type number 64103. Female unknown. Plate I illustrates *lepida*. The subtriangular pygofer process is distinctive.

Chinaia agarista new species

Length.—Males 5.6 mm. to 6.2 mm.; holotype 5.9 mm.

Coloration.—Venter, legs, face, vertex, antennae, pronotum, clavus, corium, and apical portions of tegmina as in *lepida*. Basal half of scutellum yellow, apical half orange. One paratype with scutellum colored as in *bifurcata*.

Male genital structures.—See Plate II, figs. B1, B2, and B3. Pygofer process long and spearlike, decurved with variations in apex as noted in drawings. Variations appear with rotation. Aedeagus in lateral view with basal part and tip rather bulbous and shaft narrowed.

HOLOTYPE Male, David, Panama, Dec. 13, 1952, F. S. Blanton. U.S.N.M. type number 64104. Paratypes, 2 males: David, Panama, Dec. 14, 1952, F. S. Blanton; Aguadulce, Panama, Nov. 21, 1952, F. S. Blanton. Female unknown.

The spearlike pygofer process is distinctive.

The following list includes all species described in or assigned to *Chinaia*. A revision may indicate generic misplacement of some of these species.

Check-list of species of *Chinaia*

1. *agarista* Kramer 1958—Panama
2. *bella* Bruner and Metcalf 1934—Costa Rica
3. *bifurcata* Kramer 1958—Panama
4. *caprella* Kramer 1958—Panama
5. *citrina* Evans 1947—British Guiana
6. *cumara* Kramer 1958—Guatemala
7. *lepida* Kramer 1958—Canal Zone
8. *ornata* (Osborn) 1924 [Neocoelidia]—Colombia
9. *permista* Kramer 1958—Canal Zone
10. *punctata* (Osborn) 1923 [Neocoelidia]—Bolivia
11. *ribescens* (Fowler) 1909 [Tettigonia]—Panama
12. *smithii* (Baker) 1898 [Neocoelidia]—Brazil
13. *undata* Linnavuori 1956—Brazil

Plate I. *Chinaia lepida* new species, male

Plate II. Explanation of figures A-F. Parts of male genital structures:

1. lateral view of pygofer, valve, and male plate;
2. enlarged pygofer process;
3. lateral view of aedeagus.

Note: series 1 drawn at 60x, series 2 at 120x, and series 3 at 120x. All drawings made with aid of camera lucida.

PROCEEDINGS
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TWO NEW APHIDS FROM *PINUS CONTORTA*

BY F. C. HOTTES

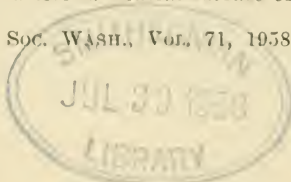
The new species described herewith are allied to a third species *Cinara brevispinosa* G & P and are likely to have been taken for it.

Cinara contortae n. sp.

Apterous viviparous female.

Length from vertex to end of cauda varying from 2.55-3.15mm. Color notes from living specimens not available. Color as presented by cleared mounted specimens as follows: Head and thorax pale brown, cornicles brown, femora pale at the base with remainder brown, tibiae brown with pale band on basal half of segment.

Head and thorax. Antennal segments one and two concolorous with head, antennal segments III, IV and V pale with apical regions brownish. Sixth antennal segment brown, distinctly imbricated, marginal sensoria in a row, with wide rims, close to primary. Sensoria distributed as follows: III none or with primary, IV with only primary sensorium, V with primary and one secondary sensoria, or with secondary sensorium absent. Hairs on third antennal segment sparse, coarse, spinelike, shorter than width of segment, set at an angle of about forty-five degrees. Hairs on fifth antennal segment numerous about equal to width of segment in length, less spinelike than hairs on third segment. Vertex of head with hairs varying in length from .045-.06mm. coarse, spinelike. Dorsum of head with few hairs, they being similar to those on vertex. Ocular tubercles present, but small. Last three segments of the rostrum with the following lengths: .18, .17 and .08mm. when extended the rostrum reaching to just beyond cornicles. Prothoracic femora varying from .75-.78mm. Prothoracic tibiae varying from 1.14-1.20mm. Metathoracic femora 1.12mm. Metathoracic tibiae 1.90mm. Metathoracic tarsal segments .09 and .23mm. long. Hairs on pale basal portion of metathoracic femora very fine and about .07mm. in length, remaining hairs about .04mm. in length, and distinctly spinelike. Hairs on outer margin of metathoracic tibiae varying in length from .03-.05mm. distinctly spinelike, spaced not much if any closer than their length, with the longest hairs on the apical fourth of segment. On the basal half of segment the hairs on the outer margin of the metathoracic tibiae are set at an angle of about forty-five degrees, the longer hairs near the apex are set at a lesser angle. Hairs on the inner margin of the metathoracic tibiae fine, on apical fourth of this margin distinctly more numerous. Ventral surface of the first metatarsal



segment with about ten hairs. Union of first and second metatarsal segments longer than width of second segment at junction. Hairs on ventral surface of second metatarsal segment about as long as hairs on dorsal surface, but distinctly more numerous. Mesosternal tubercle present, but so poorly developed that it has to be looked for. Pigmented areas on the dorsum of the thorax with few hairs similar to those on the dorsum of the head.

Abdomen.—Dorsum of abdomen with a few small scattered pigmented spots which vary in shape and size, the most consistent and largest being just anterior to the pigmented spots anterior to the cauda. Hairs on dorsum of abdomen quite similar to those on the dorsum of the head, increasing slightly in length from front to rear of abdomen, few in number. Hairs on ventral surface of abdomen numerous, fine, long. Dorsum of abdomen very finely reticulated, the reticulations being larger towards the rear, here they are also indicated by setulae. Pigmented areas anterior to cauda with a row of long fine hairs along the posterior margin.

Cornicles varying in width at the outer margin from .33-.40mm. Hairs on cornicles sparse, those on cone about .08mm. in length fine. Outer surface of cornicles with very few hairs, at the most four or five, and these distinctly spinelike, and much shorter than the hairs on the cone. Outer margin of cornicles irregular, but not distinctly so. Cauda and anal plate with black setulae, both provided with long fine hairs. Hairs on genital plate few, confined largely to ends.

Holotype apterous viviparous female, deposited in the collection of E. O. Essig. Data associated with holotype: *Pinus contorta*, Upper Echo Lake, California, Alt. 7500 ft. Aug. 6, 1937. Collected by E. O. Essig.

This species may be differentiated from *C. brevispinosa* G. & P. by the absence of transverse pigmented areas on the dorsum of the abdomen, and by the irregular arrangement of hairs on the dorsum, and by the arrangement and character of hairs on the cornicles. From *C. banksiana* P. & T. this species differs by having fewer hairs on the pigmented dorsal portion of the thorax, fewer hairs on the metathoracic tibiae, which are also shorter, and by having the hairs on the inner surface of the metathoracic tibiae unlike those on the outer surface, and by fewer hairs on the cornicles.

Cinara parvicornis n. sp.

Oviparous female.

Length from vertex to end of anal plate varying from 2.47-3.15mm. Color in life not recorded. Color as represented by cleared mounted specimens as follows: head and thorax brown shaded with dusky, the pigmented areas of the dorsum of the thorax somewhat darker than the head. First antennal segment concolorous with head. Second antennal segment pale dusky, not as dark as the first segment. Antennal segments three, four and five pale with the apical portions dusky, the dusky area of the fifth segment being the most extensive. Sixth antennal segment uniform brown. Pro and mesothoracic femora shading from light dusky at the base to brown at apex. Metathoracic femora pale dusky on basal half shading quickly to brownish black. Pro and

ments are less spinelike than those on the third. The hairs on the sixth antennal segment are very sparse, and fine, however they are no longer than those on the third. The apex of the fifth and all of the sixth antennal segments are imbricated. The marginal sensoria on the sixth antennal segment are in a double row, they have wide rims. The hairs on the vertex of the head and those on the dorsum are sparse, slightly longer and more spinelike than those on the antennae. The ocular tubercles are small. The rostrum when extended fails to reach the cornicles by about the length of the last three segments, which have a length as follows: .18, .19, .07mm. The prothoracic femora vary in length from .65-.75mm., the tibiae of the same vary from .90-.99mm. The metathoracic femora vary from 1.08-1.20mm., the tibiae of the same vary from 1.80-2.10mm. The hairs on the pro and mesothoracic femora are fine and comparatively short, the hairs on the metathoracic femora vary from .03-.04mm. in length, they are definitely shorter and more spinelike than the hairs on the femora of the pro and mesothorax, the more heavy spinelike hairs being towards the apex. The hairs on the metathoracic tibiae are similar on the outer and inner margins, they are only somewhat spinelike, and definitely shorter than one half the width of the tibiae. The hairs towards the apex of the segment are slightly longer and more droopy than the hairs closer to the base, they are also slightly longer. On the outer margin of the tibiae the hairs are from .03-.04mm. in length, quite sparse near the base where they are spaced further apart than their length, towards the end of this segment the hairs increase in number. The first metatarsal segment has about twelve hairs on its ventral surface, it is about .11mm. long. The second metatarsal segment is from .23-.24mm. long, the hairs on its ventral surface are extremely short, much shorter than the hairs on the dorsal surface. The union of the first and second metatarsal segments is no wider than the width of the second segment at the base.

Abdomen.—The dorsum of the abdomen is extremely finely reticulated. The hairs on the dorsum of the abdomen are very sparse, fine and short, ranging in length from just long enough to be present to .03mm., with most of the hairs not much longer than .015mm. Most of the hairs arise from a small pale area which in turn is within a small brownish band. The outer margin of the cornicles measures about .18-.19mm. it is quite irregular. The hairs on the cornicles are very sparse, and are no more numerous on the raised area than on the margin, in length they range from very short to about .015mm. Cauda and anal plate with setulae, both with long fine hairs. Genital plate large, slightly concave on anterior and posterior surfaces, well provided with fine hairs which cover all of the surface.

Alate male.—Length from vertex to end of anal plate 2.10mm. Length of antennal segments as follows: III .46-.50mm., IV .24-.25mm., V .24-.28mm., VI .11+ .05mm. Sensoria distributed as follows: III 61-68, IV 13-17, V 6-9. The sensoria on all antennal segments show considerable variation in size. Hairs on antennae short, much shorter than width of segment, sparse, fine. All of sixth antennal segment and most of fifth with well developed imbrications. Media twice branched, with the second fork much closer to the margin of the wing than to the first. Area of wing beneath costal margin dark dusky. Hairs on metathoracic tibiae much longer than the hairs on the tibiae of the oviparous female,

fine, similar on outer and inner margins, more droopy and more numerous towards the apex. Hairs on anterior margin of metathoracic femora near apex long and fine, hairs on the posterior margin in this region short and spinelike, hairs on both margins near base fine, much sparser than hairs near apex. Cornicles about .18mm. across the outer margin, more extensive than the cornicles of the oviparous female, and with more hairs, but with the hairs sparse. Restricted area of the cornicles higher than is the case in the oviparous females and acentric, being closer to the posterior margin. Pigmented spots anterior to cauda unequal in size, with a row of hairs on the posterior margin. Genital plate elongated, narrow, slightly concave on anterior and posterior surfaces. Hairs on genital plate numerous and covering entire surface. Anterior to the genital plate there is a pigmented band which is also covered with hairs. Hairs on the gonapophyses short and fine, inner margins of the gonapophyses elongated, quite finger like. Holotype, oviparous female, allotype alate male, both deposited in the United States National Museum. Host, *Pinus contorta* (lodgepole pine). Flathead, Montana. Sept. 21, 1955. Collected by David McComb.

In Palmer's key to the genus *Cinara* in Aphids of the Rocky Mountain Region, this species would most likely be keyed to *C. atra* (G&P), but not without question, and a species with which it has little in common. Because of the short hairs on the tibiae and similar host it is most likely to be taken for *C. brevispinosa* (G&P). When *brevispinosa* was described the presence of pigmented bands, provided with a few very short spinelike hairs on the dorsum of the abdomen was not recorded, possibly because no specimens were cleared, these bands are lacking in *parvicornis*. The cornicles of *parvicornis* in the oviparous female are very distinctive, the cornicles of the viviparous females should be similar, and should in themselves be enough to distinguish this species from other species on *Pinus contorta* as well as other species within the genus.

PROCEEDINGS
OF THE
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A NEW SPECIES OF *CINARA* FROM MICHIGAN
(APHIDAE)

BY F. C. HOTTES

The material from which this new species was described was sent me by Miss Louise M. Russell of the Entomology Research Division, United States Department of Agriculture.

Cinara kocheta n. sp.

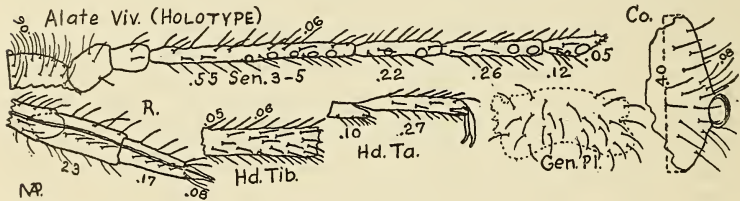
Alate viviparous female.

Length from vertex to end of cauda varying from 2.55-2.85mm. Color in life not recorded, as represented by cleared mounted specimens as follows: Head and thorax very dark dusky brown, both in life most likely black. Abdomen light dusky brown, cornicles much darker. First and second antennal segments concolorous with head, or slightly darker, third, fourth and fifth segments with basal regions dusky, remainder of segments much darker, sixth segment uniform dark brown. Median suture of head black. All femora very dark brown. Pro and mesothoracic tibiae with short region near base brown, this followed by a pale region, which shades into brown at the apex. Metathoracic tibiae almost uniform deep brownish black, but sometimes with just a suggestion of a lighter area on basal half. Tarsal segments concolorous with ends of tibiae.

Head and thorax.—Length of antennal segments as follows: III .52-.55mm., IV .21-.27mm., V .22-.27mm, VI .12 + .05mm. Secondary sensoria distributed as follows: III 2-4, IV 0-1, V 1-2. The secondary sensoria on the third segment are arranged in a straight row, they show much variation in size and position, the primary sensorium on this segment is much like the secondary. The remaining antennal segments have large primary sensoria with wide rims. The sixth antennal segment is weakly imbricated, the marginal sensoria on this segment are of two sizes and are grouped. The hair on the antennae are rather sparse, on the third segment they are about .06mm. in length, set at an angle of about forty five degrees, they are more numerous on the anterior margin. Ocular tubercles well developed. Hairs on vertex and dorsum of head numerous, fine, sharp pointed, about .06mm. in length. Rostrum in one case almost as long as the body, as a rule reaching the cornicles. Hairs on lateral lobes of thorax covering median half of lobe, long and fine, posterior median lobe of thorax with hairs on central portion of lobe. Media twice forked, second fork closer to mar-

gin of wing than to first. Last three segments of the rostrum with the following lengths: .23, .17, .08mm. Prothoracic femora varying in length from .97-1.05mm., tibiae of same varying from 1.35-1.65mm. Metathoracic femora varying from 1.27-1.35mm., tibiae of same varying from 2.47-2.85mm. Length of first and second metatarsal segments .10 and .27mm. Hairs on femora fine, upstanding, hairs on anterior margin of metathoracic femora finer but about as long as the hairs on the anterior margin of the third antennal segment. Hairs on metathoracic tibiae rather spine like, sharp pointed, set at an angle of about forty five degrees, similar on both margins as to character but more numerous on the inner margin. On the outer margin the hairs vary in length from .05-.06mm. being considerably shorter than the width of segment. First metatarsal segment with about nine hairs on the ventral surface. Second metatarsal segment with the hairs on the dorsal and ventral surfaces about the same in length, but with the hairs on the ventral surface more numerous.

Abdomen.—Dorsum of abdomen with extremely few fine rather short hairs, hairs on the ventral surface abundant. Width of cornicles varying from .40-.52mm. The cornicles are rather shallow, with the outer margins irregular but not deeply indented in any one place. Opening of cornicles closer to posterior margin than to anterior. Hairs on cornicles sparse, hardly more numerous on constricted area than on



Cinara kocheta n. sp.

margin. Pigmented areas anterior to cauda variable, sometimes united, sometimes divided, sometimes joined by teeth on the inner margins, always rather narrow, with a single row of hairs along the posterior margin. Hairs on cauda confined to posterior margin, both cauda and anal plate with setulose surface. Genital plate concave on posterior surface, with hairs over most of surface.

This species is closely allied to *C. banksiana* P. & T. but differs from that species as follows: more numerous, finer and sharper hairs on the head. Smaller more brown cornicles, shorter hairs on the tibiae, more numerous hairs on the first and second antennal segments, fewer hairs on the dorsum of the abdomen, and the imbrications on the sixth antennal segment being more poorly developed.

From *Cinara nigra* (Wilson), this species would appear to differ as follows: much larger base of cornicle, in *nigra* Wilson records the base of cornicle as being much smaller than the base of the cornicle in the apterous viviparous female. Prof. Palmer's drawings of these structures from the type slide indicates the base of the cornicles in the alate of *nigra* as .19mm. and in the case of the apterous viviparous female

as .33mm. The antennal segments of *C. kocheta* are longer, and the secondary sensoria fewer than in *C. nigra* (Wilson).

Host, *Pinus banksiana* (Jack pine) Iron River, Michigan July 6, 1951. Collected by D. M. Benjamin. Collected on terminal branches. Holotype alate viviparous female, deposited in the United States National Museum.

PROCEEDINGS
OF THE
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A NEW SPECIES OF *CINARA* FROM IDAHO
(APPHIDAE)

BY F. C. HOTTES

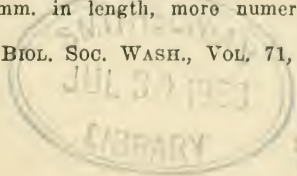
I am indebted to Prof. Carl Johansen of Pullman, Washington for sending me the material from which this new species is described.

Cinara kuceha n. sp.

Apterous viviparous female.

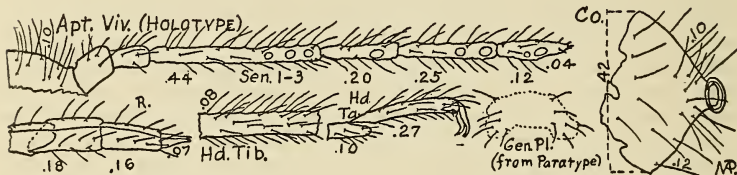
Length from vertex to end of cauda varying from 2.28-2.62mm. Color not recorded from living specimens, as represented by mounted cleared specimens as follows: Head pale dusky brown. Prothorax concolorous with head, meso and metathorax similar to prothorax but the color is broken and irregular. Abdomen as cleared pale, cornicles blackish. Pigmented areas anterior to cauda very large very close together, and sometimes almost united by teeth on their inner margins, anterior to these there are a few scattered irregular spots which vary in size, the most posterior being largest and the most consistent. None of the smaller pigmented spots extend forward of the posterior margin of the cornicles. Antennal segments I and II concolorous with head, third antennal segment pale except for the extreme apex, fourth and fifth antennal segments with basal half pale remainder pale dusky. Sixth antennal segment pale dusky throughout. Femora pale at base shading gradually to light brownish tan. Pro and mesothoracic tibiae pale except for short brownish areas at base and apex, the brown at the apex being no longer than the tarsal segments. Metathoracic tibiae similar to mesothoracic tibiae except that the pale area extends only to the middle of segment. Tarsal segments concolorous with ends of tibiae.

Head and thorax.—Antennal segments varying in length as follows: III .31-.49mm., IV .16-.20mm., V .21-.25mm., VI .11-.12 + .03mm. Sensoria distributed as follows: III 0-4 secondary, most common number 1-2. IV 1-2 as a rule one, V 1. The primary sensorium of the fifth segment is much larger than the primary sensoria on the third and fourth segments, it has a wide rim. Marginal sensoria on the sixth segment bunched at side of primary, they have wide rims, the primary sensorium on this segment is larger than other primary sensoria. Hairs on antennal segments fairly numerous, quite upstanding, on third segment about .075mm. in length, more numerous on anterior margin.



Sixth antennal segment lightly imbricated beyond the middle. Hairs on vertex and dorsum of head about .10mm. in length, fine. Ocular tubercles well developed. Rostrum extending to anterior margin of cornicles, last three segments with the following lengths: .18, .16, .07mm. the second segment of the rostrum is spotted, for most of its length. Median transverse suture of head well developed, dark. Lengths of pro and metathoracic femora varying as follows: .70-.93, 1.05-1.27mm. Lengths of pro and metathoracic tibiae varying as follows: 1.05-1.23, 1.83-2.22mm. Lengths of first and second metatarsal segments .10-.12, .27-.28mm. All femora with numerous long fine hairs, the hairs on the anterior margin of the metathoracic femora being longest. Hairs on metathoracic tibiae numerous, long, fine, sharp pointed, set at an angle of about forty five degrees. Hairs on inner margin of metathoracic tibiae more numerous and slightly shorter than the hairs on the outer margin, where the hairs vary in length from .05-.06mm. First metatarsal segment with about eleven hairs on the ventral surface. Mesosternal tubercle well developed, about as wide as long, but sometimes difficult to differentiate.

Abdomen.—Hairs on dorsum of abdomen not sparse, but hardly numerous, for the most part spaced but little closer than their length, ventral hairs numerous, shorter and finer than the hairs on the dorsum. Width of cornicles varying from .30-.40mm. shallow, outer margin ir-



Cinara kuceha n. sp.

regular, hairs on cornicles not numerous, similar to those on the dorsum of the abdomen, very sparse on outer half. Hairs on transverse pigmented spots anterior to cauda roughly arranged in two rows, with the more anterior row with fewer hairs. Genital plate rather deeply excavated along posterior margin, the hairs confined largely to the ends and very few in number. Cauda with the hairs on the dorsum confined largely to the posterior margin. Both cauda and anal plate with a setulose surface.

This species may be differentiated from *C. hirsuta* H. & E. by its smaller size, shorter and fewer hairs on the antennae and tibiae, fewer hairs on femora, extent and shape of cornicles, fewer hairs on pigmented spots anterior to cauda.

Host, *Pinus monticola* (western white pine) Priest Lake, Idaho, Aug. 23, 1956. Sent for determination by Prof. Carl Johansen of State College of Washington, and probably collected by him.

Holotype apterous viviparous female, deposited in the United States National Museum.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF *CINARA* FROM WASHINGTON
(APHIDAE)

By F. C. HOTTES

I am indebted to Prof. E. O. Essig for sending me the material from which this new species is described.

Cinara hirticula n. sp.

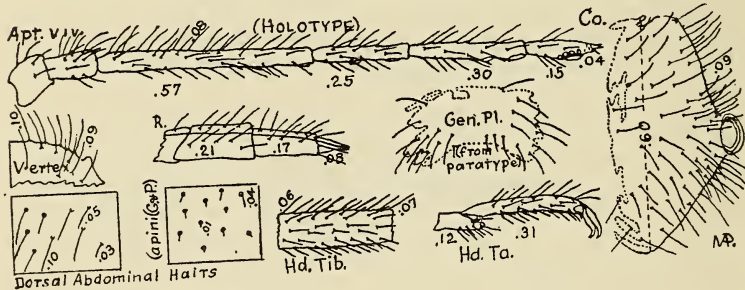
Apterous viviparous female.

Length from vertex to end of cauda varying from 3.65-3.80mm. Color notes taken from living specimens not available, as represented by cleared mounted specimens as follows: head and thorax dark dusky, in life most likely black. Cornicles two toned with the darker area adjacent to the orifice, both areas dusky black. Dorsum of abdomen posterior to cornicles with or without irregularly shaped pigmented spots of varying size. First antennal segment concolorous with head, second antennal segment slightly lighter than the first. Third, fourth and fifth antennal segments pale dusky with the extreme apical regions darker, the darker area of the fifth segment being the most extensive. Sixth antennal segment almost uniform dark dusky. Femora with basal areas pale, shading to dark dusky, with the anterior margin and apex much the darkest, the pale area most extensive on the metathoracic femora. All tibiae with a very short area near the base black, prothoracic and mesothoracic tibiae with dusky following the black at the base, and this followed by dark dusky at the apex. Metathoracic tibiae with basal area followed by pale dusky to middle of segment, from here shading quickly to dark dusky black. Second segment of rostrum with pale dusky spots, remaining segments of the rostrum dark brown.

Head and thorax.—Length of antennal segments as follows: III .52-.57mm., IV .22-.25mm., V .21-.30mm., VI .15 + .04mm. Sensoria distributed as follows: III with only primary sensorium, IV, O-I secondary plus primary, V, I secondary plus primary. Hair on antennae numerous, on third segment more abundant and longer on anterior margin, set at angle of about sixty degrees, about .08mm. long. Sixth antennal segment weakly imbricated. Rostrum reaching orifice of cornicle. Last three segments of the rostrum with the following lengths: .21, .17, .08mm. Ocular tubercles small but very protuberant. Median transverse suture of head narrow but very distinct. Hairs on dorsum of head numerous, about .10mm. in length. Mesosternal tubercle present with the width greater than the length. Length of prothoracic femora

and tibiae varying as follows: .97-1.08mm., 1.35-1.38mm. Length of metathoracic femora and tibiae varying as follows: 1.50-1.72mm., 2.40-2.77mm. Hairs on metathoracic femora numerous, more numerous towards apex, and along anterior margin, where the hairs are also longest. Hairs on metathoracic tibiae numerous, more numerous on outer margin than on inner margin, also more numerous towards the apex of segment. The hairs are spaced closer together than their length, set at an angle of about forty-five degrees, the apical half of each hair is finer than the basal half. On the outer margin the hairs vary from .06-.07mm. in length, being slightly shorter than the width of segment, the ratio of length to width being .06-.07 to .09mm. The segments of the metatarsus measure .12 and .03-.31mm. The ventral surface of the first metatarsal segment has about fourteen hairs, on this surface the two apical hairs arise at an angle to each other and are shorter and thicker than the others. The hairs on the ventral surface of the second metatarsal segment are more numerous and shorter than the hairs on the dorsal surface.

Abdomen.—Width of base of cornicles varying from .60-.67mm. The



Cinara hirticula n.sp.

outer margin of the cornicles is very irregular, the posterior margin is associated with a few small free pigmented spots. The darker more constricted region of the cornicles has more hairs than the outer area. The hairs on the cornicles are about .09mm. in length. The dorsum of the abdomen has fairly numerous long fine hairs which vary in length from .09-.13mm. for the most part, but there are a few hairs as short as .05mm. These hairs are closer together than their length. Hairs on the ventral surface of the abdomen much more numerous than the hairs on the dorsal surface but of about the same length. Dorsum of the abdomen very finely reticulated. Ventral surface of the abdomen with transverse rows of setulae, similar rows of setulae are present on the dorsum on the larger pigmented areas, when such are present. Transverse pigmented spots anterior to the cauda wide, more or less joined on their inner margins by teeth, or free. Posterior portion of these spots with about three rows of long stiff hairs. Genital plate varying much in size, with the lateral portions toothed, the hairs few and confined largely to the ends and posterior margin. Cauda and anal plate with black coarse setulae. Hairs on cauda few, these and the hairs on the anal plate are about .15mm. in length.

This species is perhaps most closely allied to *C. apini* G. & P. It was so determined when sent to me. It differs from *apini* by the much longer coarser hairs on the dorsum of the abdomen, by longer tibial hairs, shorter and wider mesosternal tubercle, and by the distribution of hairs on the cornicles. In Paumer's key to the genus *Cinara* in, Aphids of the Rocky Mountain Region, this species keys to *C. apini* without difficulty. Strangely enough cleared specimens of *apini* do not key to *apini* in Palmer's key because of the short hairs on the dorsum of the abdomen, this fact not being known when the key was constructed, because the original material was not cleared. *C. apini* keys to the same section as *C. atra*, and differs in the longer antennae, larger cornicles, and shorter hairs on the ventral surface of the first metatarsal segment, as well as longer hairs on the antennae and tibiae. From *C. hirsuta* H. & E. this species differs in having much shorter body, femoral and tibial hairs, as well as shorter antennae. From *C. moketa* H. described from the same host, this species differs in the much longer antennal segments, much shorter tibial hairs, and the shorter hairs on the cornicles.

Holotype apterous viviparous female, returned to the collection of prof. E. O. Essig. Taken on *Pinus lambertiana*, Seattle, Washington June 21, 1955. Collected by M. J. Forsell.

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OF THE

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NOTES ON THE SCAPHOPOD MOLLUSKS:
RECTIFICATIONS OF NOMENCLATURE II¹

BY WILLIAM K. EMERSON

American Museum of Natural History

In the course of studying the Tertiary scaphopods of western North America, certain nomenclatural problems were encountered which require rectification. The purpose of this paper is to correct the present nomenclatural misconceptions concerning the scaphopod material described by Timothy A. Conrad as "*Teredo substriata*," in 1849. Although subsequently Conrad (1865) questionably referred his material to the scaphopod genus *Dentalium*, he was not aware that this combination was preoccupied by *Dentalium substriatum* Deshayes, 1825.

As Dall (1909) pointed out, Conrad's taxon not only was a homonym, but the original material consisted of two valid species. Dall renamed the longitudinally striated specimens *Dentalium conradi* and the smooth ones *Dentalium petricola*. Unfortunately, Dall was not cognizant of the prior proposal by Pilsbry and Sharp (1898) of *Dentalium pseudonyma* to replace Conrad's homonym. Pilsbry and Sharp, moreover, failed to recognize the composite nature of Conrad's type material.

Inasmuch as the smooth specimens were not mentioned by Conrad (1850) in the brief original description, it appears advisable to restrict *Dentalium pseudonyma* to the finely striated species (Conrad's figure 7a) and retain *Dentalium petricola* Dall (1909) for the smooth species (Conrad's figures 7 and 7b). Thus, *Dentalium conradi* Dall (1909) becomes a junior synonym of *Dentalium pseudonyma* Pilsbry and Sharp (1898).

Annotated synonymies for the two recognized species are given below.

Dentalium (*Dentalium*?) *pseudonyma* Pilsbry and Sharp, 1898.

Teredo substriata Conrad, 1849 [in part], in Dana, Geol. U. S. Explor. Exped. (Wilkes), Appex 1, pt. 3, p. 728, pl. 20, figs. 7, 7b, not fig. 7a. Not *Dentalium substriatum* Deshayes, 1825.

¹The first number bearing this title appeared in vol. 67, pp. 183-188, August 5, 1954 of these Proceedings. Dr. J. W. Durham, Department of Paleontology, University of California, Berkeley, kindly read the manuscript.

- Teredo substriata*, Woodward, 1857, in Carpenter, Rept. Brit. Assoc. Adv. Sci. for 1856, p. 367.
- Dentalium? substriatum* (*Teredo*), Conrad, 1865 [in part], Amer. Jour. Conch., vol. 1, pt. 2, p. 151, (reference to Conrad, 1849, fig. 7a only; fig. 7b not cited).
- Dentalium substriatum*, Gabb, 1868, Geol. Surv. Calif., Paleont., p. 115, ("Miocene, Astoria, Oregon").
- Dentalium pseudonyma* Pilsbry and Sharp, 1898, [in part], Man. Conch., ser. 1, vol. 17, p. 213, ("new name for *Teredo substriata* Conrad, 1850" [sic], here restricted to Conrad's fig. 7a).
- Dentalium substriatum*, Arnold, 1908, Proc. U. S. Nat. Mus., vol. 34, no. 1617, pl. 33, fig. 16.
- Dentalium substriatum*, Arnold, 1909, in Branner, Newsom, and Arnold, U. S. Geol. Surv., Folio no. 163, fig. 22.
- Dentalium conradi* Dall, 1909, U. S. Geol. Surv. Prof. Pap. no. 59, p. 136, (new name for *Teredo substriatum* Conrad, 1849, in part, fig. 7a only).
- Not *Dentalium substriatum*, Arnold, 1910, U. S. Geol. Surv. Bull. 398.
- Dentalium substriatum*, Anderson, 1911, Proc. Calif. Acad. Sci., ser. 4, p. 71, pl. 26, fig. 15, ("Tejon, Eocene, Coalinga district").
- vol. 3, p. 100.
- Dentalium conradi* (?), Clark, 1912, Univ. Calif. Publ. Geol., vol. 7, no. 4, p. 51.
- Dentalium conradi*, Arnold and Hannibal, 1913, Proc. Amer. Philos. Soc., vol. 52, no. 212, pp. 581, 583, 584, 588.
- Dentalium conradi*, Weaver, 1916a, Univ. Wash. Publ. Geol., vol. 1, no. 1, pp. 30, 32.
- Dentalium conradi*, Weaver, 1916b, Proc. Calif. Acad. Sci., ser. 4, vol. 6, no. 2, p. 37.
- Dentalium conradi*, Weaver, 1916c, Proc. Calif. Acad. Sci., ser. 4, vol. 6, no. 3, p. 51.
- Dentalium conradi*, Clark, 1918, Univ. Calif. Publ. Geol., vol. 11, no. 2, pp. 80, 91, 98, 190.
- Dentalium* cf. *conradi*, Wagner and Schilling, 1923, Univ. Calif. Publ. Geol., vol. 14, no. 6, p. 246.
- Dentalium conradi*, Etherington, 1931, Univ. Calif. Publ. Geol., vol. 20, no. 5, p. 48.
- Dentalium conradi*, Weaver, 1942, Univ. Wash. Publ. Geol., vol. 5, pt. 1, p. 267; pt. 3, pl. 100, fig. 20.
- Dentalium conradi*, Keen, 1943, Trans. San Diego Soc. Nat. Hist., vol. 10, no. 2, p. 37.
- Dentalium conradi?*, Durham, 1944, Univ. Calif. Publ. Geol., vol. 27, no. 5, pp. 125, 191.
- Dentalium conradi*, Keen and Bentson, 1944, Geol. Soc. Amer. Spec. Pap., no. 56, p. 123.
- Dentalium conradi*, Vokes, Norbistrath, and Snavelly, 1949, U. S. Geol. Surv. Oil and Gas Invest. Prelim. map 88.

Original description of *Teredo substriata*: "Nearly straight and evenly cylindrical, very slightly tapering. Surface minutely and very neatly striate longitudinally" Conrad, 1849.

Type locality: "Astoria, Oregon, Miocene."

Type depository: U. S. National Museum 3481, in part.

Geologic range: Late Oligocene to "Middle" Miocene.

Occurrences: Washington, Blakeley formation, Oligocene ("Seattle formation," Arnold and Hannibal, 1913; "*Echinophoria rex* zone," Durham, 1944); Twin River formation, Oligocene-Miocene (Arnold and Hannibal, 1913); Astoria formation, Miocene (Etherington, 1931). Oregon, Astoria formation, Miocene (Weaver, 1942; Vokes Norbistrath and Snavelly, 1949). California, Temblor formation, Miocene ("Kern River group," Anderson, 1911); Round Mountain Silt, Miocene (Keen, 1943); "Monterey formation" [Contra Costa County], Miocene (Clark, 1912); San Ramon formation [Contra Costa County], "Oligocene" [Miocene] ("San Lorenzo series," Clark, 1918); San Lorenzo formation, Oligocene (Arnold, 1908; 1909); Pleito formation, Oligocene (Wagner and Schilling, 1923).

Dentalium (Rhabdus) petricola Dall, 1909

Teredo substriata Conrad, 1849 [in part] in Dana, Geol. U. S. Explor. Exped. (Wilkes), Appex 1, pt. 3, p. 728, pl. 20, figs. 7, 7b, not fig.

7a. Not *Dentalium substriatum* Deshayes, 1825.

Dentalium? substriatum (Teredo), Conrad 1865 [in part], Amer. Jour. Conch., vol. 1, pt. 2, p. 151, (reference to Conrad, 1849, fig. 7 only).

Dentalium petricola Dall, 1909, U. S. Geol. Surv. Prof. Pap. no. 59, p. 136, (new name for *Teredo substriatum* Conrad, 1849, in part, figs. 7, 7b only).

Dentalium petricola, Clark, 1912, Univ. Calif. Publ. Geol., vol. 7, no. 4, p. 51.

Dentalium petricolum [sic], Anderson and Martin, 1914, Proc. Calif. Acad. Sci., ser. 4, vol. 4, no. 3, p. 43.

Dentalium petricola, Clark, 1915, Univ. Calif. Publ. Geol., vol. 9, no. 2, p. 15.

Dentalium petricola, Clark, 1918, Univ. Calif. Publ. Geol., vol. 11, no. 2, pp. 80, 98, 190.

Dentalium rectius "Cpr." Howe, 1922, Univ. Calif. Publ. Geol., vol. 14, no. 3, p. 94. Not *Dentalium rectius* Carpenter, 1865.

Dentalium petricolum, Loel and Corey, 1932, Univ. Calif. Publ. Geol., vol. 22, no. 3, p. 152.

Dentalium petricola, Weaver, 1942, Univ. Wash. Publ. Geol., vol. 5, pt. 1, p. 267.

Dentalium petricola, Keen, 1943, Trans. San Diego Soc. Nat. Hist., vol. 10, no. 2, p. 37.

Dentalium petricola, Durham, 1944, Univ. Calif. Publ. Geol. Sci., vol. 27, no. 5, pp. 125, 191.

Dentalium petricola, Snavelly and Vokes, 1949, U. S. Geol. Surv. Oil and Gas Invest. Prelim. map 97.

Dentalium petricola, Vokes, Norbistrath and Snavelly, 1949, U. S. Geol. Surv. Oil and Gas Invest. Prelim. map 88.

Dentalium petricola, Weaver, 1949, Geol. Soc. Amer. Mem. 35, p. 66.

Dentalium petricola, Weaver, 1953, Univ. Wash. Publ. Geol., vol. 7, p. 60.

Type locality: "Astoria, Oregon, Miocene."

Type depository: Syntypes U. S. National Museum 3528 and 3481, in part.

Geologic range: Late Oligocene to "Middle" Pliocene.

Occurrences: Washington, Blakeley formation, Oligocene ("Echinophoria rex zone," Durham, 1944); Astoria formation, Miocene (Weaver, 1942). Oregon, Astoria formation, Miocene (Snively and Vokes, 1949; Vokes, Norbistrath and Snively, 1949); Empire formation, Pliocene (Howe 1922; Weaver, 1942). California, Temblor formation, Miocene ("Temblor horizon," Loel and Corey, 1932; "Kern River district," Anderson and Martin, 1914); Round Mountain Silt, Miocene (Keen, 1943); "Monterey formation" [Contra Costa County], Miocene (Clark, 1912, 1915); San Ramon formation [Contra Costa County], "Oligocene" [Miocene] ("San Lorenzo series," Clark, 1918; "San Ramon sandstone" Weaver, 1949; "San Ramon formation" Weaver, 1953).

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A REVISION OF THE PHILIPPINE ELEGANT
TITMOUSE (*PARUS ELEGANS*)

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The titmouse genus *Parus*, in the broad sense currently used, displays a marked tendency toward geographic variation, many if not most of the included species being divided into numerous subspecies. The resident birds of the Philippine archipelago exhibit a strong tendency to develop well-marked races from island to island. With these two tendencies reinforcing one another, it is not surprising to find that one of the most plastic bird species in the Philippines is the Elegant Titmouse (*Parus elegans*). Delacour and Mayr (1946: 217-218) listed no less than nine subspecies of this endemic Philippine species, with the caution that "several possibly are not valid."

Dr. David Snow, who is preparing the section on the family Paridae for the Peters "Check-list of Birds of the World," suggested that in connection with my current studies of Philippine birds I undertake a review of the races of *Parus elegans*. I have therefore assembled over 200 specimens, including six types. This unprecedented series represents virtually all of the existing specimens of *Parus elegans* in North American museums. As will be noted beyond, there are some serious gaps in the available material, but this cannot be remedied without further collecting which may not be done for many years to come. The most unfortunate lack is the series, including three type specimens, formerly housed in the Bureau of Science in Manila, destroyed by fire in 1945.

Specimens were borrowed for this study through the courtesy of the authorities of the following institutions: Academy of Natural Sciences of Philadelphia, American Museum of Natural History, British Museum (Natural History), Chicago Natural History Museum, Minnesota Museum of Natural History, Museum of Comparative Zoology, Museum of Vertebrate Zoology, Royal Ontario Museum of Zoology, United States National Museum, and Yale Peabody Museum. Dr. S. Dillon Ripley also allowed me to use the specimens from the Hachisuka Collection, now in his personal collection. For additional information through cor-

respondence I am indebted to David Snow, Canuto G. Manuel, and D. S. Rabor.

The Elegant Titmouse is the only species of its family to have reached a tropical archipelago. It is widely distributed in the Philippines, from the Babuyan Group in the north to the Sulu Archipelago in the south. Major islands from which the species does not seem to have been recorded include Basilan, Bohol, Catanduanes, Romblon, Sibuyan, Siquijor, and Tablas. Although McGregor (1920: 427) attributes this species to the Samar-Leyte group, I cannot find any records from either of these islands, and the absence of *Parus elegans* from Samar and Leyte is specifically mentioned by Delacour and Mayr (1946: 218). In Palawan *elegans* is replaced by a closely related species, *P. amabilis*; these two and the Chinese *P. venustulus* have sometimes been separated as a genus *Pardaliparus*, but this division is not currently recognized. The close relationship of these three species might best be expressed by considering them to represent a superspecies; they are almost certainly derived from the widely distributed palaeartic *Parus* ("Periparus") *ater*, the Coal Tit.

Size in *Parus elegans* decreases, in general, from north to south. In most of the archipelago this change is rather gradual, but is somewhat more marked at both extremes. The difference in wing length between the largest and smallest males measured was only 11 millimeters, indicating the relative unimportance of size as a principal subspecific character. There is no such obvious cline in any color character throughout the archipelago, although certain groups of subspecies have common color differences from other groups. In general, the aspects of color and pattern which vary geographically, and which are used in subspecific diagnoses are: relative amounts of black, white, gray and yellow in dorsal area; relative intensity of yellow in yellow areas; size of white spots on wings; presence or absence of yellow edges or wash on white spots of wing and tail; size of nuchal spot. There is also some evidence of geographic variation in the amount of sexual dimorphism, but series of the critical races are too small, and the possibility of erroneously sexed specimens too great, to do more than call attention to this phenomenon in the discussions of the pertinent subspecies.

The number of subspecies of *Parus elegans* recognized in the present paper may seem excessive to anyone who has not examined the definitive series I have been able to assemble. I have synonymized two names used by earlier workers, and have erected two additional subspecies. I believe that any further suppression of races would not do justice to the facts; in fact, in the discussion of *P. e. mindanensis* evidence is presented to indicate the probable existence of still another race.

Parus elegans and its near relatives are unusual among the true titmice in possessing a definite sexual dimorphism in color as well as a minor size dimorphism. Descriptions of the various subspecies, beyond, will emphasize the plumage of the male. In general, females have all black areas duller and sometimes (throat) washed with yellow (but not "dark brown" as described by McGregor, 1909: 605). The white tips of wing coverts and tertials are smaller in females, and there is much less white on the dorsum. The yellow of the underparts is duller and sometimes washed with gray, and the remiges (which are much duller than those of the male) are more broadly edged with greenish

or gray in most races. Females average smaller than males. Several of these sexual differences are foreshadowed even in juvenal plumage.

A detailed plumage description of both sexes will be found under the nominate race. The recognized subspecies, however, are given in approximate geographic order, from north to south. All measurements are in millimeters, to the nearest half millimeter. The wing was flattened against the ruler, and the bill measurement is that from the anterior edge of the nostril to the tip. Only adult birds were measured, but the list of "specimens examined" includes birds of all ages. No attempt was made to apply any statistical techniques beyond the arithmetic mean, since so many of the samples were small that such a treatment would be relatively meaningless.

Parus elegans edithae (McGregor)

Pardaliparus edithae McGregor, Philippine Journ. Sci., 2, 1907, p. 294. Type, from Calayan Island, Babuyan Group, in Bureau of Science, Manila, destroyed by fire in 1945.

Characters: Bill longer than that of any other race; wing long, and in sufficient series would probably average longer than other races. All yellows pale and dull; the cheek patches and nuchal spot creamy white rather than yellow. White spots on wing coverts reduced. Anterior dorsum black with little white spotting; posterior dorsum dark greenish gray.

Measurements: wing, 1 ♂, 70; 1 ♀, 68; bill, 1 ♂, 9.5; 1 ♀, 9.5.

Range: Babuyan Group, north of Luzon.

Specimens examined: Calayan, 2; Camiguin, 1.

Remarks: In view of the fact that only two adults were available for measuring, it seems desirable to quote figures given by McGregor (1909: 606) for two different specimens: wing (probably chord) of ♂, 67; of ♀, 63; bill from nostril of ♂, 10; of ♀, 9. With allowance made for the longer measurements of the flattened wing, McGregor's specimens thus agreed well with the two extant adult specimens.

Parus elegans montigenus (Hachisuka)

Pardaliparus elegans montigenus Hachisuka, Orn. Soc. Japan Supplementary Publ. 14, 1930, p. 200. Type (examined), from Haight's Place (2469 meters), 56 km. from Baguio, Mountain Province, Luzon. Formerly in Hachisuka Collection, now in collection of S. Dillon Ripley.

Characters: Nearest *elegans*, but all yellow areas averaging paler. Wing averaging slightly longer than *elegans*. Anterior portion of dorsum more solidly black, less spotted in male, but *more* spotted than *elegans* in female. Greenish posterior portion of dorsum darker, without any of the bluish-white wash often present in *elegans*. In females this area is grayer, less yellowish green. Nuchal spot in both sexes often elongated posteriorly to the middle of the back. White spots on wings averaging somewhat smaller.

Measurements: wing, 37 ♂, 64.5-72 (67.7); 21 ♀, 61.5-66 (64); bill, 35 ♂, 7.5-9 (8.3); 21 ♀, 7.5-9 (8.2).

Range: Highlands of northern Luzon.

Specimens examined: LUZON: Mountain Province: Baguio, 36; Haight's Place, 8; La Trinidad, 4; Irisan, 8; Mt. Data, 4; Santo

Thomas, 2; Sablan, 1. *Ilocos Norte Province*: Bangui, 1; Nagpratian, 1. *Abra Province*: Massisiat, 2.

Remarks: Delacour and Mayr (1946: 217) ascribe *P. e. elegans* to "Luzon, lowlands," and *P. e. montigena* [sic] to "highlands of Mindoro, Luzon." This is an error. The division on Luzon is on a north-south basis, with *elegans* being the race of southern Luzon both at high and low elevations. In view of the allocation by Delacour and Mayr, special attention was paid to a comparison of the Mindoro sample with *montigenus* and true *elegans*. The Mindoro population is not *montigenus*, but is inseparable from *elegans*.

***Parus elegans gilliardi*, new subspecies**

TYPE, adult ♂, A.M.N.H. no. 459598, collected at Lamao, Bataan Province, Luzon, Philippine Islands, by E. Thomas Gilliard, December 6, 1947.

Characters: Similar to *P. e. elegans* of southern Luzon, but males more strongly washed with yellow dorsally; spots on foreback which are white in *elegans* are yellow in *gilliardi*; yellow of nuchal spot averaging deeper; white tips of wing coverts and tertials averaging larger and, in fresh plumage, with rather well-defined yellow edges; white spots at tips of rectrices averaging larger. Females brighter, more yellowish dorsally than *elegans*, with a larger yellow nuchal spot. The black areas of the female, particularly throat and wings, are more nearly as dark as in the males than is true of *elegans* and most other races of the species. Size averages somewhat larger than *elegans*; bill averages longer than any other race except *edithae*.

Measurements: wing, 6 ♂, 67-70 (68); 5 ♀, 63-67 (64.5); bill, 6 ♂, 8.5-9 (8.9); 5 ♀, 8-9 (8.6).

Range: Known at present only from the Bataan Peninsula of central-western Luzon. It may be presumed that *gilliardi* is the resident race in the entire Zambales-Mariveles chain. Three specimens from Antipolo, Rizal Province (east of Manila and north of Laguna de Bay) appear to be intermediate between *elegans* and *gilliardi*, suggesting the possibility that the latter race may have a wider distribution in central Luzon, south and perhaps also east of the range of *montigenus*, and north of that of *elegans*. Unfortunately the greatest part of the Zambales-Mariveles chain and virtually the entire mountain chain running the length of eastern Luzon are ornithologically unknown, and, in fact, are among the last frontiers for future ornithological discoveries.

Specimens examined: LUZON: *Bataan Province*: Lamao, 5; Mt. Cayapo, 3; Mariveles, 3.

Remarks: In Gilliard's (1950: 473) list of species polytypic on Luzon, he omitted *Parus elegans*, although the northern subspecies *montigenus* has been accorded general recognition. The only species which Gilliard considered to have an endemic race in the Zambales-Mariveles subregion of Luzon was *Nectarinia sperata*, in which he named *N. s. thereseeae* from Lamao, Bataan. However, in his description of the latter race, Gilliard (1950: 500) admitted that *thereseeae* represents a population both geographically and morphologically intermediate between the northern *N. s. henkei* and the southern *N. s. sperata*. Salomonsen (1953: 255) showed that Mariveles birds were inseparable from *sperata*, and believed that the Bataan population rep-

resents "an unstable hybridization zone between *henkei* and *sperata*," and he synonymized *therescae* with the latter.

This left the Zambales-Mariveles subregion with no known endemic subspecies. As Gilliard has pointed out, this is somewhat surprising, as this mountainous area was wholly separated by water from the rest of Luzon until relatively recently, and the general pattern of Philippine zoogeography is such that endemism in this subregion might well be expected. This anticipation is now realized with the discovery that the population of the plastic *Parus elegans* inhabiting Bataan (and presumably the rest of this former island) represents a distinct subspecies. Unlike the case of *Nectarinia sperata*, the Bataan population of *Parus elegans* is *not* intermediate in its characters between the northern (*montigenus*) and southern (*elegans*) races, but represents extreme conditions in certain color characters, as well as averaging larger-billed than either of its neighbors; specifically, it is much yellower than either *montigenus* or *elegans*, although geographically intermediate between *elegans* and the less yellow *montigenus*. It seems highly appropriate to dedicate this attractive new subspecies to its collector.

The effect of wear and fading on the plumage of *Parus elegans* is relatively little for the first few months after the molt. By the end of the year, however, the change in appearance is sometimes quite radical. This is exemplified by two August specimens of *gilliardi* from Mariveles in the U. S. National Museum. In this pair, particularly the male, the yellows are so bleached and the back and flight feathers so worn as to make these specimens unidentifiable on the basis of color, although both exhibit the long bills (9 mm.) of *gilliardi*. A February specimen from Mariveles, however, shows the characters of *gilliardi* to good advantage. Fortunately for the study of *Parus elegans*, few collectors of Philippine birds have been in the field when these birds are in such poor plumage; of more than 200 specimens examined, only 11 July and 4 August adults were found.

Parus elegans elegans Lesson

Parus elegans Lesson, *Traité d'Ornith.*, 1831, p. 456. No locality cited in original description. Type specimen in Muséum National d'histoire Naturelle, Paris. See below under "Remarks."

Parus quadrivittatus Lafresnaye, *Rev. Zool.*, 3, 1840, p. 129. Type locality "in Manilla aut in India." Type specimen (examined) in Museum of Comparative Zoölogy.

Pardaliparus elegans panayensis Mearns, *Proc. U. S. Nat. Mus.*, 51, 1916, p. 57. Type (examined) from Panay, in U. S. National Museum.

Description: MALE. Top of head and sides of neck glossy black and slight blue reflections; an irregular nuchal spot of light yellow; mantle black with white spots at tips of scapulars and in center; lower back and rump greenish gray with slight yellowish tinge, washed with varying extent of bluish white; upper tail coverts and rectrices black, the latter with triangular white spots at tips; three outer pairs of rectrices with a portion of the outer web white; chin and throat deep velvety black; cheek patch and underparts yellow, grayer along flanks; wings black, with white tips to median and greater coverts forming two wing-bars; secondaries and tertials tipped with white, the tips increasing in size proximally; primaries with very narrow whitish outer margin.

FEMALE. Top of head and sides of neck black, less glossy than male; nuchal spot paler yellow; most of back greenish gray, with some black and a few yellowish white spots in anterior portion; tail and wings as in male, but much duller, more brownish black, and white spots smaller; remiges with narrow but distinct outer margin of greenish or yellowish gray; chin and throat much duller black than male; cheek patch and underparts paler, duller yellow.

Measurements (Luzon specimens only): wing, 19 ♂, 63-69 (65.8); 6 ♀, 62-63.5 (62.7); bill, 18 ♂, 8-9 (8.5); 6 ♀, 8-9 (8.2).

Range: Luzon from the vicinity of Manila, south; Mindoro; Panay.

Specimens examined: No data (type of *Parus quadrivittatus* Lafresnaye), 1. LUZON: Manila, 2. Rizal Province: Antipolo, 3 (intermediate toward *gilliardi*); Jalajala, 3; Quisao, 1. Laguna Province: Mt. Makiling, 5; Longos, 1. Tayabas Province: Aloneros, 2; Tiaong, 2; unspecified, 4. Albay Province: unspecified, 1. Sorsogon Province: unspecified, 4. "Laguna de Bay," 3. MINDORO: Barawan Peak, Halcon, 7; Ilong Peak, Halcon, 17; Alag River, 3; Mt. Dulangan, 1. PANAY: unspecified, 3.

Remarks: No locality of any sort was given by Lesson with his brief description of *Parus elegans*. Pucheran (1854: 68) redescribed Lesson's type specimen in detail, and stated that it had been presented to the national collection by Dusummier in 1820, and that it had come from the Philippines. According to Hachisuka (1931: 16), Dusummier stayed in Manila; that city is therefore here designated as the type locality of *Parus elegans* Lesson, a restriction necessary in view of the geographic variation in this species in the Philippines in general and in Luzon in particular. Pucheran's description of Lesson's type matches, as far as can be told, the southern Luzon race here called *elegans*.

Peters (1939: 105) pointed out that Lafresnaye's type of his *Parus quadrivittatus* had not been compared with specimens of the various races of *P. elegans*, although Mearns (1916: 59), in his revision, listed *quadrivittatus* as a synonym of *elegans*. I have examined Lafresnaye's type, and find it a good match for adult males of *P. e. elegans*. The type locality of *quadrivittatus* ("in Manilla aut in India") may thus also be safely restricted to Manila.

It was mentioned above that Mindoro birds are not *montigenus*, to which they have been referred by some authors. They match Luzon specimens of *elegans* both in color and in size. Measurements of Mindoro specimens, for comparison with figures from Luzon (above), are as follows: wing, 18 ♂, 64-69.5 (66.2); 8 ♀, 61-65 (62.6); bill, 16 ♂, 8-9 (8.4); 10 ♀, 8-9 (8.3).

The material from Panay is highly unsatisfactory, consisting only of the two males originally seen by Mearns, plus an additional female from the same (Worcester and Bourns) collection acquired by the National Museum at a later date. Mearns compared his "*panayensis*" only with *albescens*, although he had no topotypes of the latter subspecies at hand. Most of the characters described for "*panayensis*" can be matched in *elegans*. Although one of the principal characters used by Mearns was "less black on the upper back," most of the feathers of this critical area are missing in the type of *panayensis*! The other male specimen does, indeed, have less black than the average

elegans, but the difference is relatively minor and may be considered to be a tendency in the direction of *albescens*, the next race to the south of Panay. Until better material is available, therefore, *panayensis* is best considered a synonym of *elegans*.

Parus elegans albescens (McGregor)

Pardaliparus albescens McGregor, Philippine Journ. Sci., 2, 1907, p. 293. Type, from Ticao Island, in Bureau of Science, Manila, destroyed by fire in 1945.

Pardaliparus elegans guimarasensis Mearns, Proc. U. S. Nat. Mus., 51, 1916, p. 58. Type (examined) from Guimaras, in U. S. National Museum.

Characters: Males immediately separable from all other races by the greater amount of white on the dorsum; white spots on anterior part of dorsum large, and a whitish wash extending over the posterior part; white spots on wing coverts much larger; black throat patch somewhat reduced in extent; underparts clearer yellow than *elegans*, with less darkening at flanks. Females with crown and throat patch duller black than *elegans*, the throat patch reduced in extent; anterior part of dorsum with more yellow and less black spotting, and posterior part yellower than *elegans*; spots on wing coverts slightly larger. Size about as in *elegans*.

Measurements: MASBATE: wing, 6 ♂, 64-67 (65.4); bill, 6 ♀, 8-9 (8.5); no females available. GUIMARAS: wing, 2 ♂, 63.5-65.5 (64.5); 1 ♀, 63; bill, 2 ♂, 8; 1 ♀, 8. NEGROS: wing, 14 ♂, 65-69 (67); 8 ♀, 64-66.5 (64.9); bill, 15 ♂, 8-9 (8.3); 8 ♀, 7.5-9 (8.1).

Range: Islands of Ticao, Masbate, Guimaras and Negros.

Specimens examined: MASBATE: Palanoc, 5 unspecified, 1. GUIMARAS, 3. NEGROS: Pula, Canlaon, 10; Canlaon Volcano, 2; Cuernos de Negros, Luzuriaga, 4; Inubungan, Santa Catalina, 4; San Antonio, 2; Naliong, Tolong, 1; Bacolod, 1; Bais, 1.

Remarks: When McGregor described *albescens*, he had before him two specimens from Ticao (not three, as claimed by Hachisuka, 1930: 201) and three from Masbate. As the type he chose one of the Ticao specimens. All of these skins were destroyed in 1945 with the burning of the building housing the Bureau of Science in Manila. I have written to every museum likely to have Philippine specimens in a vain search for additional Ticao material. Dr. Canuto G. Manuel of the Philippine National Museum and Dr. D. S. Rabor of Silliman University have both informed me that they know of no collecting activity on Ticao after McGregor's work there. It is therefore necessary, in the total absence of Ticao specimens of *Parus elegans*, to assign the populations of certain other islands to *albescens* on a more-or-less provisional basis. However, McGregor, the author of *albescens*, considered Ticao and Masbate specimens to be the same, and I have fortunately been able to assemble a series of six specimens from Masbate to use as presumably typical of *albescens* for comparative purposes.

Mearns named his race "*guimarasensis*" on the basis of a single female specimen in the U. S. National Museum. I have no females of *albescens* from Masbate (or, of course, Ticao) with which to compare the type of *guimarasensis*; however, I have been able to locate two males from Guimaras, one each in the American Museum of Natural

History and the British Museum (Natural History). These are indistinguishable from Masbate males, and on this basis *guimarasensis* is considered a synonym of *albescens*.

The arrangement of races and islands given by Delacour and Mayr (1946: 217-218) is apparently based chiefly on the revision by Hachisuka (1930). They assign the races of the central islands as follows: *guimarasensis* [*sic*], Guimaras; *albescens*, Ticao; *visayanus*, Cebu, Masbate, Negros; *panayensis*, Panay. Hachisuka's revision of this species abounds in discrepancies and inaccuracies. He named *visayanus* with a type from Cebu, and assigned Masbate specimens to the new race. The material I have assembled clearly shows that Masbate birds have nothing to do with *visayanus*, and I follow McGregor in calling them *albescens*, as explained above. Hachisuka also assigned Negros and Panay to the range of his *visayanus*, although clearly stating that he had before him only undeterminable juveniles. He recognizes Mearns' race *panayensis*, although if, as Hachisuka claimed, Panay birds "from all probabilities . . . belong to this new form [*visayanus*]," then *visayanus* would obviously immediately fall as a synonym of *panayensis*! Hachisuka included both Cebu and Negros (as well as Ticao) in the range of *albescens*, then, on the following page, proceeded to erect *visayanus* with the type from Cebu! As previously mentioned, he had only juveniles from Negros, which he assigned as probably *visayanus*. This tentative identification has been widely adopted, by Delacour and Mayr and others. However, Negros birds, of which an ample series is available, are *not* the same as Cebu birds and are, in fact, closest to *albescens* where they were placed by Mearns. The assignment of subspecies in the central islands here adopted is much closer to that of Mearns (1916) than to that of any subsequent authors. His concept of *albescens* was largely correct, except that Guimaras birds (of which Mearns saw no males) are now added to *albescens*, and the subsequently-described race *visayanus* is recognized for birds from Cebu.

The Negros population differs slightly from *albescens* of other islands. The extent of white on the dorsum and wings of Negros males averages slightly less. The only female *albescens* available with which to compare Negros birds is the type of "*guimarasensis*;" this is slightly brighter dorsally and slightly more spotted with yellow above than are Negros females. There is also a small average difference in wing length, Negros birds being the larger. None of these differences is sufficient to warrant subspecific separation of the Negros population from *albescens*, and certainly not assignment to *visayanus*.

Parus elegans visayanus (Hachisuka)

Pardaliparus elegans visayanus Hachisuka, Orn. Soc. Japan Supplementary Publ. 14, 1930, p. 201. Type, from Danao, Cebu, in Bureau of Science, Manila, destroyed by fire in 1945.

Characters: Nearest *elegans* (not *albescens* as might be expected on geographic grounds), but males with rump bluish or grayish, without any yellow or greenish tinge; anterior dorsum slightly more heavily spotted with white; white spotting on wings slightly *less* extensive; yellow of cheeks and underparts less intense; flanks markedly grayer, less greenish. The one available female of *visayanus* is very similar to

elegans, differing chiefly in having grayer flanks and slightly less white spotting on the wings. Males differ from *albescens* in having much less white on the dorsum, smaller white spots on the wings, a more extensive black throat patch, and much duller underparts.

Measurements: wing, 4 ♂, 64.5-66.5 (65.1); 1 ♀, 62.5; bill, 4 ♂, 8.9 (8.7); 1 ♀, 8.5.

Range: Known only from Cebu.

Specimens examined: CEBU: Toledo, 4; unspecified, 1.

Remarks: As mentioned above under *albescens*, the Elegant Titmice of various central islands, particularly Negros, have been assigned to *visayanus* by recent authors, but the latter name must be confined to the Cebu population. This accords well with the zoological subdivisions of the Philippines recognized by Worcester, who wrote (in McGregor and Worcester, 1906: 5) "Cebu cannot be recognized as one of the central Philippine group, but must be classified by itself."

The action of Manuel (1956: 320) in designating a "neotype" of *Pardaliparus elegans visayanus* Haehisuka from a locality (in Negros) other than the type locality was unjustified for several reasons. The Colloquium on Zoological Nomenclature in Copenhagen, in recommending that provisions be inserted in the International Rules of Zoological Nomenclature for recognizing neotypes as a category of type specimens, stated (Hemming, 1953: 28): "(1) Neotypes are not to be designated for themselves alone, or as a curatorial routine, but only in exceptional circumstances when they are desirable in the interests of stability. (2) Neotypes are to be designated only in cases (preferably in revisionary work) in which they are relevant and essential to solving a confused zoological problem, such as the confused identities of closely related species for which holotypes are no longer extant." Such necessity is not demonstrated in Manuel's paper, in which no less than 28 "neotypes" are designated for subspecies originally named from the collections of the destroyed Bureau of Science. Further, the Colloquium recommended (p. 29) that neotypes be accepted, provided "that, when the precise locality . . . from which the original holotype or lectotype was obtained is known, the neotype is shown to have come from as near as possible to that locality . . . subject only to the availability of material, and, in no case, to have come from a locality . . . outside the natural range of the species [or subspecies]." Of the 28 "neotypes" designated in Manuel's paper, no less than 12 come from localities other than the original type locality within a major island (Luzon, Mindoro, Negros, Bohol, Mindanao), and three, including the "neotype" of *Pardaliparus elegans visayanus* Haehisuka, are actually from a different island than that of the type locality. This was unfortunate on several counts. In the first place, Cebu (topotypical) material is available of *Parus elegans*, though perhaps not in the Philippine National Museum. In the second place, the assumption that the subspecies found at Cuernos de Negros, Luzuriaga, Negros is identical with that of Cebu is here shown to be erroneous, and Dr. Manuel's "neotype," therefore, *does* come from "outside the natural range of" the subspecies *visayanus*, and can have no standing in nomenclature.

Parus elegans mindanensis (Mearns)

Pardaliparus elegans mindanensis Mearns, Proc. Biol. Soc. Washington, 18, 1905, p. 8. Type (examined) from Mt. Apo (6200'), Mindanao, in U. S. National Museum.

Characters: Males with dorsum heavily washed with yellow, in this respect being nearest *gilliardi*, but decidedly smaller than that race, with more black spotting of the mantle and smaller spots on the wings; white wing spots broadly (rather than narrowly as in *gilliardi*) margined with yellow; differs from all races to the north in having the white areas on the outer margin of the outer rectrices washed with yellow; all primaries and secondaries with well-marked yellow margin to outer web, rather than a partial whitish or grayish margin to primaries only as in *elegans*. I believe the supposed posterior extension of the black throat patch mentioned by Mearns in his original description is an artifact of preparation. Females share with males the general yellowness of the plumage including the spots of wings and tail which are, if anything, yellower than those of the male. In addition there is a strong tendency in females to have the throat patch heavily washed with yellow, giving it an olive-green appearance. In fresh plumage the tips of the black crown feathers may also have greenish tips, giving a faintly scalloped appearance.

Measurements: wing, 10 ♂, 62-66 (63.3); 4 ♀, 60-62.5 (61.6); bill, 10 ♂, 7-8 (7.7); 5 ♀, 7.5-8.5 (7.9).

Range: Mindanao (highlands only? See below).

Specimens examined: MINDANAO: Mt. Apo (various localities), 12; Lake Lanao, 5; Tumadgopt, 2; Ayala, 2; Catagan, 1.

Remarks: Only three adult specimens from relatively low elevations on Mindanao are available; two poor skins, both male, from Ayala and one female from Catagan, 1100 feet. These specimens suggest that further material might well show that *mindanensis* must be restricted to Mt. Apo and vicinity, or at least to the highlands. The two Ayala males have the cheeks and underparts of a deeper, richer yellow than Mt. Apo males, and there is much *less* yellow on the margins of the white wing and tail spots. The single female differs even more strikingly from Mt. Apo females. The crown is blacker and glossier; the throat patch does not have the yellowish wash described above for female *mindanensis*; the underparts, cheeks, and nuchal spot are deeper yellow; there is more black on the anterior portion of the back; and, like the male, there is less yellow edging on white wing and tail spots. This lowland form cannot be placed with any of the more northern races, nor with the next race, *suluensis*, to the south.

Parus elegans suluensis (Mearns)

Pardaliparus elegans suluensis Mearns, Proc. U. S. Nat. Mus., 51, 1916, p. 59. Type (examined) from the Island of Sulu, in U. S. National Museum.

Characters: A very small and rather "hen-feathered" race. There is much less difference in color between the sexes than is the case in other subspecies of *Parus elegans*; males have a few whitish spots on the anterior part of the dorsum which are lacking in females; crown and throat patch of females are slightly duller black, and the under-

parts very slightly paler yellow. The race as a whole is pale with respect to its yellows, the nuchal spot in particular being almost white. The wing spots, which are relatively small, are tinged with yellow, although less so than in *mindanensis*. As in the latter race, males as well as females have both primaries and secondaries prominently edged with yellowish, a character confined to females in the northern races. The female may prove to have a more restricted nuchal spot than the male, although this portion of the plumage is defective in the two available female specimens.

Measurements: wing, 2 ♂, 61-62 (61.5) bill, 3 ♂, 7.5-8 (7.7); 1 ♀, 7.

Range: Presumably most of the Sulu Archipelago; specimens are known only from Sulu (Jolo) and Tawi-tawi.

Specimens examined: Sulu (Jolo), 4; Tataän, Tawi-tawi, 1.

Remarks: Mearns, when describing *suluensis*, had before him only three specimens, all from the island of Sulu. He stated in a footnote (Mearns, 1916: 60): "A form of *Pardaliparus elegans* was collected by Messrs Bourns and Worcester on the island of Tawi Tawi and Bongao. Possibly this may prove to be identical with the Sulu form, but I have not examined these specimens." A single adult male from Tawi-tawi does not differ in any respect from Sulu birds. Most unexpectedly, however, a small series from Bongao, a small island just off the southwestern tip of Tawi-tawi, proves to represent a highly distinctive population. The series, unfortunately, is a very poor one, consisting of two specimens labelled "♀" but almost certainly males, one very worn adult female, and one juvenile female. In view of the striking characters of the Bongao birds, however, and particularly their distinctiveness when compared with the neighboring *suluensis*, and in view of the fact that additional material from Bongao, although greatly to be desired, is not likely to be forthcoming in the near future, I venture to name this race on material which might under other circumstances be deemed inadequate.

Parus elegans bongaoensis, new subspecies

Type, adult "♀," probably ♂, R.O.M.Z. no. 13922, collected on Bongao Island, Sulu Archipelago, Philippine Islands, by Alfred Marche in December, 1884.

Characters: Smallest and darkest of the races of *Parus elegans*. The anterior part of the dorsum of the presumed males has much more black than in the neighboring *suluensis*, and the posterior portion is a blackish green, darker than in any other race. Edgings of remiges less yellowish, more greenish than in *suluensis* or *mindanensis*; white area on outer edge of outer rectrices much reduced in extent; white spots on wings about as in *suluensis*, but slightly smaller and with little or no yellow. The one adult female is a very worn specimen, but obviously a very dark bird with much reduction in white markings even prior to wear. The juvenile female is in good condition, and fortunately a juvenile female of *suluensis* is available for comparison. The specimens of *bongaoensis* is very much blacker on the entire dorsum, and has the white spots on the wing coverts very much reduced. The midventral region is a deeper yellow, contrasting rather sharply with olivaceous flanks.

Measurements: wing, 2 [♂], 56-62.5 (59.2); 1 ♀, 58.5; bill, 2 [♂], 7.5; 1 ♀, 7.

Range: Known only from Bongao Island, southwest of Tawi-tawi, Sulu Archipelago.

Specimens examined: Bongao, 4.

Remarks: The three specimens other than the type were collected, not by Bourns and Worcester, but by Everett. Mearns' statement that Bourns and Worcester had collected *Parus elegans* on Bongao is probably an error, since the latter authors (1894: 39) mention Tawi-tawi but not Bongao, and McGregor (1909: 605) lists only Everett as having collected the species on Bongao; he was probably unaware that Marche had secured it there.

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PROCEEDINGS
OF THE
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THE TYPE LOCALITY AND NOMENCLATORIAL
STATUS OF *PEROMYSCUS MANICULATUS*
NEBRASCENSIS (COUES)

By J. KNOX JONES, JR.

Two readily recognizable subspecies of *Peromyscus maniculatus* inhabit the northern Great Plains, *Peromyscus maniculatus osgoodi* in the west and *Peromyscus maniculatus nebrascensis* in the east. *P. m. osgoodi* is the larger, both externally and cranially, and is more grayish (less buffy) dorsally. The subspecific names currently used for these two kinds of mice are misapplied as shown below.

In his account of North American mammals, Baird listed in text (1858:462) the name "*Hesperomys sonoriensis*, var. *nebrascensis*" without description, definition or indication and the name as used by Baird is thus a *nomen nudum*. Nineteen years later, Coues (1877:79) listed the same name in synonymy under *Hesperomys leucopus sonoriensis* as "*Hesperomys sonoriensis* var. *nebrascensis*, Baird, M. N. A. 1857, 462 in text (based on the below-enumerated Nebraskan examples)." Osgood (1905:77 and 1909:78-79) contended that *nebrascensis* of Coues also was a *nomen nudum*, and that a redescription of *nebrascensis* by Mearns (1890:287), based on a specimen from Calf Creek, Montana, was in fact the original description for the western subspecies from the northern Great Plains. Accordingly, Osgood described (1905:77) the eastern subspecies under the name *Peromyscus luteus* (type from Kennedy, Cherry Co., Nebraska). However, as Mearns (1911:102) pointed out, Coues gave brief critical remarks on coloration (*op. cit.*:28) and on length of tail (*op. cit.*:80), and listed measurements (*op. cit.*:80-82) for some specimens (which at that time he referred to *Hesperomys leucopus sonoriensis*), thereby satisfying the minimal requirements for a valid description. Mearns applied the name *nebrascensis* of Coues to the eastern subspecies (because he assumed it was based on specimens from Nebraska) and proposed a new name, *Peromyscus maniculatus osgoodi* (type from Calf Creek, Custer Co., Montana) for the western mice. As indicated above, the arrangement proposed by Mearns is currently in use.

Exactly what Coues intended to indicate as the "below-enumerated Nebraskan examples" is not clear. From 1854 until 1863 Nebraska Territory contained, in addition to what is now Nebraska, the southern half of Wyoming. Most of the specimens from the northern Great

Plains available to Coues were obtained in the period 1854-1863. A large proportion of these mice were from what is now southern Wyoming, but many of these were probably regarded by him as being from Nebraska, because they had been collected in Nebraska (*sensu lato*) and in many instances probably were noted as being from there on the specimen labels. In his list of specimens examined Coues usually did not indicate localities by state, perhaps because he was not sure in all instances where specimens actually originated. He did list several specimens from what is now Nebraska but did not identify them with the State. The only specimens that he did identify with Nebraska were two (USNM 4310-11) from "Deer Creek, Nebr." and 18 (USNM 10401-18) from "Nebraska." Subsequent workers (Osgood, 1909; Mearns, 1911) quite naturally assumed that Coues' "below-enumerated Nebraskan examples" were the two Deer Creek specimens because 1) they were the first Nebraskan specimens listed by him, and 2) they were the only specimens he identified with a precise locality in Nebraska. Osgood (*op. cit.*:78-79) went so far as to say, "... Coues . . . states that Baird based the name upon two specimens from Deer Creek, Nebraska." Coues stated nothing of the sort and, in fact, the specimens from Deer Creek were not even in existence at the time of publication (1858) of Baird's monograph, having been collected in January, 1860. Nonetheless, because Coues' description of *nebrascensis* validates that name, even though he obviously did not intend his description to do so, subsequent revisors were at liberty to designate as the type locality any locality in Nebraska (*sensu lato*) from which Coues listed specimens.

This was done, as I see it, by Osgood (*loc. cit.*) and Mearns (*op. cit.*:102), acting as revisors, with their mention of Deer Creek, and the latter has been accepted as the type locality for *P. m. nebrascensis* by all subsequent authors known to me (see, for example, Miller, 1912:147; Miller, 1924:329; Cockrum, 1952:172; Miller and Kellogg, 1955:482). The type locality usually has been listed by later workers as "Deer Creek, western Nebraska."

Having established "Deer Creek, Nebr." as the type locality of *P. m. nebrascensis*, there remains the problem of the precise location of Deer Creek. Miller and Kellogg (*loc. cit.*), without comment, identified it as the Deer Creek in Sheridan County, Nebraska. The syntypes of *nebrascensis* (USNM 4310-11) were contained in a lot of 40 mammal specimens obtained from Deer Creek by the Yellowstone exploration party of Capt. W. F. Reynolds, Topographic Engineers, including collectors F. V. Hayden and G. H. Trook, between November 23, 1859, and February 21, 1860 (see original catalogue, United States National Museum, nos. 4236-61, 4271, 4296-97, 4303-08, 4310-12, 4315). Reynolds' party went into winter quarters on or about October 18, 1859, along Deer Creek, approximately five miles from its mouth, in what is now Converse County, Wyoming (see Senate Executive Documents, 2nd Session of the 40th Congress, 2(No. 77):1-174, with fold-out map, 1868, for a documented history of the party). They broke winter quarters on May 10, 1860. The two specimens of *Peromyscus* in question were obtained on January 17, 1860 (USNM 4311, original no. 79), and January 19, 1860 (USNM 4310, original no. 80). It should be mentioned that Baird erroneously listed the dates of collection of these two specimens as June 17 and June 19, 1860, when he recopied from the original

catalogue into the catalogue currently in everyday use at the U. S. National Museum. I do not know whether this error on Baird's part contributed to the subsequent confusion concerning the exact location of Deer Creek.

Several of Osgood's co-workers in the Biological Survey were aware of the correct location of Deer Creek. Nelson (1909:78 and 207) recorded from Wyoming lagomorphs contained in the original Deer Creek collection. Goldman (1910:105) recorded a *Neotoma cinerea orolestes* from the original collection from "Deer Creek, Converse County", Wyoming. Hollister (1916:19) correctly listed one of the two original *Cynomys ludovicianus ludovicianus* from Deer Creek, Wyoming. Osgood, nevertheless, seemed to think that the Deer Creek concerned was actually in Nebraska. He assigned (1909:77) all *maniculatus* available to him from eastern Wyoming to his *P. m. nebrascensis* [currently equals *P. m. osgoodi*], but he listed (*op. cit.*: 79) as from Nebraska a single specimen from Deer Creek under his *P. m. luteus* [currently equals *P. m. nebrascensis*]. This oversight on Osgood's part may have contributed to the incorrect assumption by subsequent authors that the Deer Creek mentioned by Coues was in what is now Nebraska. Actually the type locality of *P. m. nebrascensis* is in Converse County, Wyoming, within the geographic range now associated with *P. m. osgoodi*, not in Sheridan County, Nebraska.

As noted above, Osgood listed one of the syntypes of *nebrascensis* in 1909. I have searched the collections of the U. S. National Museum for the specimens from Deer Creek but neither is now to be found. Poole and Schantz (1942) did not list either of the specimens and I presume they are no longer in existence.

I have examined a series of *Peromyscus maniculatus* from the vicinity of Casper, Natrona County, Wyoming (KU 15593-96, 27506-14), approximately 23 miles west of Deer Creek and another series from the vicinity of Bill, Converse County, Wyoming (KU 32658-69), northeast of Deer Creek. The mice in these series agree with other specimens seen by me from the plains of eastern Wyoming and eastern Montana, and from extreme northwestern Nebraska, in large cranial and external size and buffy-gray coloration dorsally. Therefore, *Peromyscus maniculatus nebrascensis* (Coues, 1877) is the valid name for the mice of the western part of the northern Great Plains that are currently known as *P. m. osgoodi*, whereas *Peromyscus maniculatus luteus* Osgood, 1905, is the correct name for the smaller, more buffy-colored mice to the east that are currently known as *P. m. nebrascensis*.

Synonymies (original description followed by other pertinent citations in chronological order) and geographic ranges (modified from Miller and Kellogg, 1955:482) of *nebrascensis* and *luteus* are as follows:

Peromyscus maniculatus nebrascensis (Coues)

Hesperomys sonoriensis var. *nebrascensis* Coues, in Coues and Allen, Monographs of North American Rodentia, U. S. Geol. Surv. Terr., 11: 79, August, 1877, syntypes from Deer Creek, approximately five miles from its mouth, Converse Co., Wyoming.

Hesperomys leucopus nebrascensis, Mearns, Bull. Amer. Mus. Nat. Hist., 2:285, February, 1890 (a redescription of *nebrascensis* on p. 287, based on a specimen from Calf Creek, Custer Co., Montana).

Peromyscus texanus nebrascensis, J. A. Allen, Bull. Amer. Mus. Nat. Hist., 8:251, November, 1896 (part); Miller and Rehn, Proc. Boston Soc. Nat. Hist., 30:85, December, 1901.

Peromyscus maniculatus nebrascensis, Osgood, N. Amer. Fauna, 28: 75, April 17, 1909.

Peromyscus maniculatus osgoodi Mearns, Proc. Biol. Soc. Washington, 24:102, May 15, 1911, type from Calf Creek, Custer Co., Montana; Miller, Bull. U. S. Nat. Mus., 79:147, December 31, 1912; Miller, Bull. U. S. Nat. Mus., 128:328, April 29, 1924; Miller and Kellogg, Bull. U. S. Nat. Mus., 205:482, March 3, 1955.

Geographic distribution.—Southern Saskatchewan and southern Alberta, south through most of Montana and most of Wyoming; parts of western North and South Dakota, northwestern Nebraska and eastern Colorado, south through the Oklahoma Panhandle to northwestern Texas; northeastern Utah and adjacent parts of Colorado and Wyoming.

Peromyscus maniculatus luteus Osgood

Peromyscus luteus Osgood, Proc. Biol. Soc. Washington, 18:77, February 21, 1905, type from Kennedy, Cherry Co., Nebraska.

Peromyscus texanus nebrascensis, J. A. Allen, Bull. Amer. Mus. Nat. Hist., 8:251, November, 1896 (part).

Peromyscus maniculatus luteus, Osgood, N. Amer. Fauna, 28:77, April 17, 1909.

Peromyscus maniculatus nebrascensis, Mearns, Proc. Biol. Soc. Washington, 24:102, May 15, 1911; Miller, Bull. U. S. Nat. Mus., 79:147, December 31, 1912; Miller, Bull. U. S. Nat. Mus., 128:328, April 19, 1924; Miller and Kellogg, Bull. U. S. Nat. Mus., 205:482, March 3, 1955.

Geographic distribution.—Southwestern North Dakota and most of western South Dakota, south through central and southwestern Nebraska, western Kansas and extreme eastern Colorado, western Oklahoma and the eastern parts of the Texas Panhandle.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

ON THE IDENTITY OF *PSEUDOTREMIA CAVERNARUM* COPE, A POORLY KNOWN AMERICAN CHORDEUMOID DIPLOPOD

By RICHARD L. HOFFMAN

Uncritical reliance upon the authority of early workers has led many systematists into difficulty and this situation can hardly be better exemplified than by the history of the name *Pseudotremia cavernarum*. In this case the trouble started with the treatment of the species in the otherwise faultless "Craspedosomatidae of North America" (Cook and Collins, 1895), and has been perpetuated by workers who have recently dealt with the genus. In current usage the name is associated with a species entirely different from that upon which I believe Cope originally based it.

Ever since the spring of 1947, when I first encountered a member of the genus, I have been accumulating material for an eventual monographic treatment of *Pseudotremia*. Typical material of most of the known forms, as well as nearly a score of undescribed species, has been acquired, but the higher priority of several other projects makes it likely that several years may elapse before the revision will appear in print. For this reason it seems desirable to clarify the status of *cavernarum*—the type species of *Pseudotremia*—for the benefit of other investigators who may have to deal with the genus in one way or another.

The name *Pseudotremia* was proposed by E. D. Cope in 1869 to embrace two new millipeds which he collected in southwest Virginia as well as the species which H. C. Wood had described under the name *Spirostrephon caesioannulatus*. The genus thus originally contained three species, and the statement in the "Checklist of the millipeds of North America" (Chamberlin and Hoffman, 1958) that *cavernarum* is the generotype by monotypy is in error. Of Cope's new species, *vudii* was described from a single female without precise locality data but thought to be from Montgomery County, Virginia, while *cavernarum* was

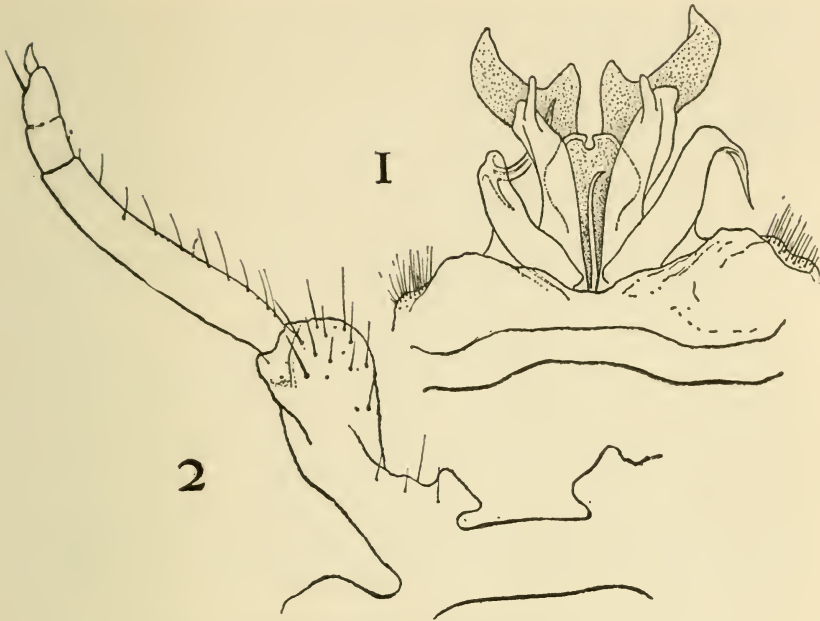
“. . . taken in Erhart's Cave, Montgomery County, and Spruce Run and Big Stony Caves, in Giles County," Virginia. In two subsequent papers (1870, 1872) Cope reported material under the name *P. cavernarum* from caves in east Tennessee and southern Indiana, additional Indiana records later being published by McNeill (1888) and Bollman (1888).

When Cook and Collins studied the American chordeumoids for their 1895 paper, their concept of *cavernarum* was drawn from material collected in Wyandotte and Marengo Caves, Crawford Co., Indiana. Oddly enough, they apparently did not challenge the validity of the earlier identifications of the Indiana population, which were made in the era before male genitalia were utilized as specific characters. In other respects the quality of the "Craspedosomatidae" was so high that it has set a standard of excellence yet to be equalled in American diplopod literature, and so far only one, somewhat misguided, dispute of its accuracy has arisen.

From the time of my first acquaintance with the genus, it has not seemed likely to me that a typically cavernicolous diplopod described from southwest Virginia would occur over such a wide geographic range as had been ascribed to it. Solution of the problem seemed to depend on relocating Cope's original localities, and upon taking up residence in Montgomery County, Virginia, in 1950, I set out to accomplish this. Numerous caves in both Montgomery and Giles counties were explored for millipeds, and it gradually became evident that the two caves named by Cope in the latter county were inhabited solely by a large, strongly pigmented species which has recently been described by Loomis (1944) under the name *Pseudotremia sublevis*. Although Cope had stipulated that his species was rather small and pallid, I assumed that (1) he may have had only immature specimens, and (2) that only one species occurred in the New River drainage basin including the two counties mentioned. On these somewhat tentative guesses, *sublevis* was reduced to synonymy under *cavernarum* in the "Checklist."

During the foregoing explorations, the location of Erhart's Cave was never ascertained, and it was not until 1957 that Dr. Thomas C. Barr, Jr., supplied me with the necessary details. A prompt investigation brought surprising results: a small bodied, colorless species which matches Cope's description exactly and which is almost certainly the original of *Pseudotremia cavernarum*. The cave which it inhabits is in the eastern half of Montgomery County, drained by the Roanoke River east into the Atlantic, and the species is trenchantly different from that of the New River drainage (*sublevis*) as well as from the population of southern Indiana.

It is now obvious that the records cited by Cook and Collins for *cavernarum* actually apply to four or more different species. As first reviser of the complex, I herewith restrict the type locality, from the three caves originally mentioned, to Erhart's Cave, in the village of Ellett, Montgomery County, Virginia. The name *sublevis* of Loomis is accordingly resurrected from its unwarranted sojourn into synonymy. The Indiana population described and figured by Cook and Collins has already received a new name, *Pseudotremia indianae*, in the "Checklist."



Pseudotremia cavernarum Cope
Figures 1, 2

Pseudotremia cavernarum Cope, 1869, Proc. Amer. Philos. Soc., vol. 11, p. 179.

The species is to be diagnosed primarily upon the shape of the gonopods and ninth legs, as illustrated, with the additional notes which follow as supplementary specific characters:

Size moderate for the genus, adults ranging from about 20 to 27 mm in length (specimens over 25 mm very scarce), and up to 1.8 mm in greatest diameter. The body shape is very slightly fusiform, the 6th and 7th segments being widest in males, but only a little broader than the adjoining segments.

Color varying from almost completely white to a pale yellowish tan, the pigment when present concentrated on the dorsal surface of the anteriormost segments, head and mandibles usually darkest; basal articles of antennae pigmented but the distal two always pure white. Lower sides and legs whitish-gray.

Texture of tergites nearly obliterated, the dorsolateral knobs so common to many forms of the genus are here only poorly defined longitudinal swellings, subtended on the sides by vague striation; surface of dorsum chiefly smooth. Dorsal setae very slender and acicular, instead of clavate.

Ocelli present in elongated triangular patches, usually about 15 in each, with only half or less of the ocelli pigmented.

Gonopods typical for the genus, in anterior aspect seen to have a wide

sternite and transversely elongate, mesially fused syncoxites, the latter densely setose laterally. Distal elements consist of two major divisions:

(1) two anterior bifid joints, the lateral branches of which are grooved, curving caudad and then mesiad, each with a small spur at about the midlength; the mesial branch projecting distad, with a smaller subapical process.

(2) a pair of large, basally fused flat plates (the "bifid laminae" of Cook and Collins) which carry a large zygomatic subcoarctate structure, itself subtended on the anterior side by a slender median aciculate process extending distad between the anterior elements of the gonopod.

Ninth legs as illustrated, the second joint rather long and slender, the two distalmost joints very indistinctly segmented and in some specimens not clearly set off from the second.

Although the gonopods appear at first glance to represent a unique development in the Cleidogonidae, they are in actuality not greatly removed from the form typical of *Cleidogona*. The "bifid laminae" emphasized by Cook and Collins as diagnostic of *Pseudotremia* are actually homologous with the somewhat smaller and separate posterior processes of the gonopod of *Cleidogona*, which are likewise held by the coxal lobes of the 9th legs when at rest, just as in *Pseudotremia*. The latter genus, to be sure, has become much more specialized in gonopod structure, but the morphological similarities are clear. A precise terminology is still in a developmental stage, pending completion of detailed anatomical studies, so that no specific descriptive names are introduced at this time.

It is a matter of interest that no one has heretofore observed or remarked the presence of the zygomatic structure formed by the posterior laminae of the gonopods, for it is present in most of the species which I have studied, its shape varying with the different forms. The median spine is likewise present in most species, although often quite short and not readily visible. In some, such as *P. indianae*, the process is very long and distally bifid.

The outer member of the anterior division of the gonopods is distinctly grooved or channeled, and presumably functions as a form of solenomerite, although this development must be quite rare in the suborder Chordeumidea. I have so far been unable to detect a basal gland or duct through gross dissections, but at this writing am preparing sectioned material for a more precise microscopic study of the situation. A similar grooving of the gonopod appears not to be present in the genus *Cleidogona*, but does occur in the Guatemalan *Solaenogona*.

Pseudotremia cavernarum has not yet been found elsewhere than the type locality. The material at hand consists of males and females cataloged under numbers 6991, April 25, 1957, and 7285, April 8, 1958.

The following two citations are of the closest interest to the history of *P. cavernarum*; the others cited in the text can be located, by the date cited, in the bibliography accompanying the recently published "Checklist of the millipeds of North America" (U. S. Nat. Mus. Bull. No. 212, 1958).

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Figures 1, 2. *Pseudotremia cavernarum* Cope, from male topotype. 1, anterior aspect of gonopods, the accessory posterior elements lightly stippled. 2, ninth leg and part of sternum, caudal aspect (figures drawn to same scale).

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF TWO NEW VENEZUELAN BIRDS
AND DISTRIBUTIONAL NOTES

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Besides the new forms described here from our collection, we have added some taxonomic and distributional data which we consider of interest. We wish to thank the Curators of the American Museum of Natural History, British Museum, Carnegie Museum, Muséum National d'Histoire Naturelle, Pons Collection (Maracaibo), Rancho Grande Biological Station and U. S. National Museum for access to the collections of these institutions and for their aid in our research.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

Leucopternis schistacea (Sundevall)

Asturina schistacea Sundevall, Ofv. K. Vet—Akad. Förh., 7, p. 132, nota, 1850. (Rio Negro, Brazil.)

1 ♂, San Fernando de Atabapo; 1 ♂ imm., Cerro Yapacana, Terr. Amazonas; in forest at 110 meters. These are the only specimens known from Venezuela. The immature male is similar to the all slate adult except that the abdomen, under tail-coverts, under wing-coverts and inner webs of the remiges are barred with white.

Ortalis ruficauda ruficrissa (Selater and Salvin)

In our "Lista de las Aves de Venezuela con su Distribución" (Vol. 2, Part 1, Non Passeres, May, 1958) we have considered *O. ruficrissa* to be conspecific with *O. ruficauda* (Jardine) because of twelve specimens in our collection from the eastern shore of Lake Maracaibo. These are 1 ♂ from Mene Grande, 1 ♂ from Río Aurare (Palmarejo) and ten complete tails from mutilated specimens also from Mene Grande.

The only noticeable difference between the former species *ruficrissa* and *ruficauda* is that the former has white tips to the tail feathers and the latter rufous ones. The twelve specimens mentioned above have the tips to the tails intermediate in color, more or less buffy instead of

either white or rufous. The two forms have not been found together. Typical *ruficauda* is found at Quebrada Arriba, Lara, at the foot of Cerro El Cerrón, at a distance of forty miles to the northeast of Mene Grande and typical *O. ruficauda baliolus* Osgood and Conover (formerly *O. ruferrissa baliolus*) occurs at a similar distance to the south.

A specimen in the American Museum of Natural History from twenty miles north of Cúcuta, Colombia, collected by Hermano Nicéforo María, also has the tip of the tail intermediate in color. Another specimen in the collection of Hermano Nicéforo María from Petrólea, fifty miles north of Cúcuta, has the tail typically *baliolus*, thus indicating the instability of this character in the area where the two forms meet.

Rynchops nigra nigra Linné

We can find only one valid record of this migrant for Venezuela. Mr. J. D. Macdonald, Deputy Keeper-Zoology, of the British Museum, writes to us that the only specimen of *R. n. nigra* in the Museum is the one collected by Lowe at the Laguna Grande del Obispo, Golfo de Cariaco, on January 14, 1904. At the same time Lowe collected a specimen of *R. n. cinerascens* Spix, the common Venezuelan resident. The Museum has two other specimens of *cinerascens* collected at other times from the same locality.

When Lowe visited the same locality again on the yacht *Zenaída* on January 3, 1908, he reported¹ “*Rynchops nigra* present in enormous quantities.” Apparently he did not collect any specimens as they are not in the British Museum. As the two forms are so similar, we do not doubt that the “enormous quantities” were the common form in Venezuela, *cinerascens*, and not the apparently rare migrant known in Venezuela from one specimen.

Aëronautes noctivagus (d’Orbigny and Lafresnaye)

Cypselus montivagus d’Orbigny and Lafresnaye, Rev. Zool., p. 70, 1837. (Santa Cruz de la Sierra, Bolivia.)

1 ♂, Rancho Grande (1100 m.), Aragua; 1 ♀, Pico de Naiguatá (2600 m.), Miranda; 1 [♀], Curupao (1200 m.), Guarenas; 4 ♂, 1 [♂], 2 ♀, Cerro Duida (1900 m.), Terr. Amazonas; 3 ♀, Cerro Yapacana (1300 m.).

In 1929, Chapman² described *Duidia tatei* on one specimen from Mount Duida. Later,³ in 1931 he changed the name to *Aëronautes montivagus tatei* (Chapman). Since then, we have collected seven more specimens from Duida and three from nearby Cerro Yapacana and have examined in the U. S. National Museum 1 ♀ and 1 imm. from Serra Imeri on the Brazilian frontier, and in the American Museum of Natural History 2 ♂ from Cerro Auyan-tepui. So there are in all 15 specimens of former *tatei* from southern Venezuela.

Now, with those fifteen specimens available, we find that *tatei* cannot be separated from the twenty-four specimens of *montivagus* in the Car-

¹Notes on some Birds collected during a cruise in the Caribbean Sea. Ibis, p. 322, 1909.

²Descriptions of New Birds from Mt. Duida. American Museum Novitates. No. 380. p. 11, Oct. 21.

³The Upper Zonal Birds of Mounts Roraima and Duida. Bulletin American Museum of Natural History, 63, pp. 68-70.

negie Museum nor from the four in our collection from the north coast mountains of Venezuela. Consequently there is only one form in Venezuela, which we have not been able to separate from the very few specimens from Perú and Bolivia which we have examined: in the American Museum of Natural History, 1 ♂, 1 ♀, from Vermejo, Bolivia; 1 ♀, Urubamba Cañon, Perú; and in the Academy of Natural Sciences in Philadelphia, 1 ♀, Junín, Perú.

Other specimens which we know of but have not examined: Pons Collection, Maracaibo, 1 ♀, El Escondido, Perijá; Rancho Grande Biological station, 2 ♂, 1 ♀; Paris Museum, the mounted type; probably in the Berlepsch Collection in Frankfurt, 1 specimen from Huaynapata, Perú, and in the Warsaw Museum, collected by Jelski and Stolzmann, five from Perú from Lima, Huambo, Huanta, Monterico and Pumamarca.

Leucippus fallax (Bourcier)

The senior author examined two specimens from "Cayenne" in the Paris Museum and found them similar to *L. f. richmondi* Cory from the coast of northeastern Venezuela. They form part of a collection made in French Guiana by M. F. Geay during 1900 and 1902. Ménégau⁴ 1904: 114 cites these specimens "sans lieu précis d'origine," as do Berlepsch⁵ 1908: 265 and Simon⁶ 1921: 318. Berlepsch *idem* "—also a true Cayenne skin from the Gould collection in the British Museum," and Simon *idem* cites a specimen in the British Museum but the senior author did not find it there in 1951.

Peters 1945: 59 limits the range of the species to Venezuela and Colombia. It is characteristic of the Caribbean Fauna of Chapman⁷ which comprises the arid Caribbean littoral from northeastern Colombia to Carúpano at the base of the Peninsula of Paria. Inasmuch as these specimens lack precise localities and dates, and as the species is not known from southeastern Venezuela, nor from British or Dutch Guiana, we believe that they may be commercial skins from another locality, probably from the northeastern coast of Venezuela.

***Hypnelus ruficollis striaticollis*, new subspecies**

Type: From Dabajuro, Estado Falcón, Venezuela. No. 7429, Phelps Collection, Caracas. Adult male collected March 22, 1940, at sea level, by Fulvio Benedetti. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all other subspecies of *H. ruficollis* (Wagler) by having more or less prominent black lines across the lower throat, and occasionally black bases to these feathers, instead of having the lower throat immaculate as in *ruficollis*, *decolor* Todd and *coloratus* Ridgway, or with a solid black band as in *bicinctus* (Gould) and *stoicus* Wetmore.

⁴Catalogue des Oiseaux rapportés par M. Geay de la Guyane française et du Contaté franco-brésilien. Bulletin du Muséum d'Histoire Naturelle, No. 3, pp. 107-118, et No. 4, 174-185.

⁵On the Birds of Cayenne. Novitates Zoologicae, 15, No. 1, pp. 103-164. No. 2, pp. 263-324.

⁶Histoire Naturelle des Trochilidae. pp. 1-416. Paris.

⁷The Distribution of Bird Life in Colombia. Bull. Am. Mus. Nat. Hist., 36, pp. 1-729.

Range: Known from the Caribbean coast region from Quisiro, Zulia to Dabajuro, Falcón; at sea level.

Description of Type: Upper parts nearest to Bister; top of head faintly lined with buffy; back and wings mottled with buffy white; upper tail-coverts black, barred with buffy; a semi-concealed white collar across nape; forehead against bill buffy white; lores and ear-coverts white, latter with black tips; wide maxillary stripe brownish black. Under parts Light Ochraceous-Buff; lower throat heavily lined with black on a buffy white ground, some of the feathers with black bases, thus forming an indistinct band; lower breast with a broad brownish black band; flanks mottled with brownish black; axillaries brownish black. Outer margins of more central primaries with median buffy white patches; other remiges lightly margined basally with buffy white, more extensively so towards tertials; bend of wing Light Ochraceous-Buff; under wing-coverts buffy white. Tail darker than Natal Brown, paler on under surface, the feathers lightly margined with buffy white.

Bill (in life) "black"; feet "gray"; iris "yellow." Wing, 86 mm.; tail, 78; exposed culmen, 28; tarsus, 19.

Remarks: Sexes alike. Size similar to *decolor*. Range of measurements: five adult males, including type—wing 83-86 (84.4) mm.; tail, 75-80 (77.8); exposed culmen, 27-31 (29.2); five adult females—wing, 85-87 (86.7); tail, 79-82 (80); exposed culmen, 30-33 (30.8). Measurements of *H. r. decolor*: five adult males—wing, 82-90 (85.8) tail, 73-82 (77.6); exposed culmen, 27.5-30 (28.9); five adult females—wing, 86-91 (87.8); tail, 81-86 (83.6); exposed culmen, 30-33 (31.6).

This local race, with the incipient black band across the lower throat, is intermediate between the one banded form *H. ruficollis* and the two banded form *H. bicinctus*. The only difference between the two is the lack of the second band in *ruficollis*. Their ranges do not overlap.

We have in our collection a male specimen of *bicinctus* from Ciudad Bolívar, very far removed from the range of *ruficollis*, which is similar to the type of the new *striaticollis*, with the same incipient throat band, lined instead of solid black. These specimens indicate that the hitherto so called species are conspecific, *bicinctus* being a subspecies of *ruficollis*.

Specimens Examined

H. r. ruficollis.—VENEZUELA: Perijá region (var. locs.), Zulia, 8 ♂, 3 ♀; La Fría, Táchira, 1 ♂; Mene Grande, Zulia, 1 ♂, 7 ♀, 2 (?). COLOMBIA: Lorica, 1⁸; Gamarra, 1⁸; Santa Marta, 20⁸; Santa Marta, 22⁹.

H. r. decolor.—VENEZUELA: Paraguaipoa, Zulia, 6 ♂, 2 ♀; Cojoro, 1 ♂; Río Socuy (El Aral), 1 ♀; Santa Cruz de Mara, 1 ♂; Maracaibo, 1 (?); Río Aurare, 3 ♂, 1 ♀, 1 (?); Cabimas, 1 ♂, 1 ♀; Peninsula Paraguaná (var. locs.), Falcón, 11 ♂, 15 ♀, 1 (?); Quiuragua, 1 ♂. COLOMBIA: Río Hacha, 6⁹.

H. r. coloratus.—VENEZUELA: Santa Bárbara, Zulia, 4 ♂, 5 ♀; El Vigía, Mérida, 3 ♂; Dividivi, Trujillo, 1 ♂, 2 ♀.

H. r. striaticollis.—VENEZUELA: Quisiro, Zulia, 1 ♂; Casigua, Falcón, 3 ♂; Dabajuro, 3 ♂ (inc. type), 6 ♀.

⁸Specimens in American Museum of Natural History.

⁹Specimens in Carnegie Museum.

H. r. bicinctus.—VENEZUELA: Quebrada Arriba, Lara, 2 ♂, 3 ♀, 1 (♂); Carora, 1 ♀, 1 (?); San Felipe, Yaracuy, 2 ♂; Nirgua, 1 ♂; Urama, Carabobo, 1 ♂, 4 ♀; La Victoria, Aragua, 1 ♂, 2 ♀; San Antonio de Yare, Miranda, 1 ♂; Carenero, 2 ♀; Tacarigua de Mamporal, 1 ♂; Barcelona, Anzoátegui, 1 ♂, 2 ♀; Puerto de la Cruz, 1 ♀; Cumaná, Sucre, 1 ♂, 1 ♀; San Antonio del Golfo, 2 ♀; Edo. Barinas, 2 ♂, 1 ♀; Guasdalito, Apure, 2 ♂, 3 ♀; El Baúl, Cojedes, 2 ♂, 1 ♀; Edo. Guárico, 7 ♂, 2 ♀; Maturín, Monagas, 1 ♂, 3 ♀, 2 (?); Terr. Delta Amacuro, 3 ♂, 3 ♀; Edo. Bolívar, 16 ♂, 12 ♀, 1 ♂ juv.; Terr. Amazonas, 2 ♂, 3 ♀.

H. r. stoicus.—VENEZUELA: Isla de Margarita, 9 ♂, 5 ♀, 2 (?).

Pteroglossus formosus Cabanis

Pteroglossus formosus Cabanis, Journ. Orn., p. 332, 1862. ("Venezuela".) Known only from the type in the Zoologisches Museum in Berlin, No. 9726. Prof. Dr. Erwin Stresemann wrote to us that it had been presented to the Museum by the botanist D. F. L. von Schlechtendal, probably before the year 1833; that it is marked as collected in Venezuela but that von Schlechtendal never went abroad and that he probably obtained the specimen from some collector; that the locality "Venezuela" is doubtful and that probably the type of *P. formosus* came from southeastern Brazil. Dr. Zimmer wrote to us that he believed that the supposed Venezuelan origin of the type was in error.

The range of the supposed species has also been given as Venezuela by Brabourne and Chubb (The Birds of South America, p. 158, 1912), Catalogue of Birds in the British Museum (19, p. 139, 1891) and Cory (Catalogue of Birds of the Americas, p. 368, 1919). Peters does not list the name in his Birds of the World.

Inasmuch as Cabanis, in the original description, made comparisons with *P. aracari* (Linné) and *P. wiedi* Sturm (a synonym of *P. aracari*) it is probable that the unique specimen of *P. formosus* is referable to one of the Brazilian subspecies of *P. aracari*. We deny the Venezuelan occurrence of the species.

Thripadectes flammulatus flammulatus (Eyton)

Anabates flammulatus Eyton, Contri. Orn., p. 131, 1849. ("New Grenada" = Bogotá.)

1 (?) imm., Río Chiquito, Hda. La Providencia, Táchira (southwestern), collected February 25, 1956; 1900 meters, in forest in Subtropical Zone.

This specimen, fully grown, extends the range of the subspecies from Colombia to Venezuela. It has been recorded from the Colombian part of nearby Páramo de Tamá.

The species has been hitherto known in Venezuela from at least four specimens of *T. f. briennoi* Berlepsch from the páramos de la Culata, de Conejos and Escorial, in the Mérida Andes.

Thripadectes virgaticeps tachirensis, new subspecies

Type: From Río Chiquito, Hda. La Providencia, Estado Táchira, Venezuela; 2100 meters. No. 62178, Phelps Collection, Caracas. Adult male collected March 7, 1956, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *T. v. klagesi* (Hellmayr and Seilern) of the Cen-

tral Coast Range of the Caracas region but has darker under parts, more ochraceous, less yellowish; a dusky wash across the breast; darker back, more brownish, less yellowish tint; rump and upper tail-coverts darker, more brownish, less reddish.

Range: Known from southwestern Táchira, in the Páramo Tamá region, in the forests of the Subtropical Zone at altitudes of 1250 and 2100 meters.

Description of Type: Top of head dark brownish olive, feathers with whitish shafts bordered by grayish, less dusky on nape; back nearest to Prout's Brown; rump and upper tail-coverts Burnt Sienna. Chin and throat nearest to Raw Sienna, feathers margined with blackish forming a diamond pattern, merging into the dusky olive breast and sides, these feathers with fine buffy shaft lines; this in turn merging into the more olivaceous abdomen; flanks and shanks more brownish; under tail-coverts more rufous olivaceous. Wings uniform with back; inner margins of remiges cinnamon, only basally on primaries; bend of wing, under wing-coverts and axillaries Xanthine Orange. Tail Mahogany Red, under surface paler and feathers with buffy shafts.

Bill (in life) "black"; feet "greenish gray"; iris "dark". Wing, 93 mm.; tail, 89; exposed culmen, 23; culmen from base, 27; tarsus, 26.

Remarks: Sexes alike. Size similar to *T. v. klagesi*. Range of measurements, including type: one adult male, see above; one adult female—wing, 86 mm.; tail, 88; culmen from base, 26. Measurements of *T. v. klagesi*: two adult males—wing, 86-90 (88); tail, 92-93 (92.5); culmen from base, 26; three adult females—wing, 87-88 (87.7); tail, 90-94 (92.3); culmen from base, 25-26 (25.7); one adult of undetermined sex—wing, 89; tail, 92; culmen from base, 25.

There are 12 additional specimens of *klagesi* from various localities in Perijá in the Pons Collection, Maracaibo, which we have not had occasion to examine.

Specimens Examined

T. v. virgaticeps.—ECUADOR: Quito, 1 (?)¹⁰; Gualaes⁸, 1 ♂, 1 ♀.

T. v. sumaco.—ECUADOR⁸: Sumaco Abajo, 2 ♂; Baeza, 1 ♀.

T. v. sclateri.—COLOMBIA: Bitaco Valley, Valle⁹, 1 ♂, 1 ♀; La Cumbré, 1 ♀⁹; Salencio, Cauca, 1 ♀⁸; San Antonio⁸, 2 ♂, 2 ♀, 1 (?)⁸; Ricaurte, Nariño, 1 ♀⁸.

T. v. tachirensis.—VENEZUELA: Táchira: Río Chiquito, 1 ♂ (type); Cerro El Teteo, Burgua, 1 ♀.

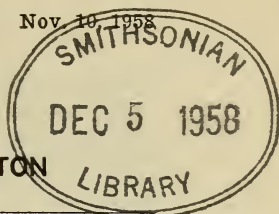
T. v. klagesi.—VENEZUELA: Anzoátegui, Lara, 1 ♀⁹; Cumbre de Valencia, Carabobo, 1 ♀⁸, 1 ♀⁹; Rancho Grande, Aragua, 1 ♂¹⁰, 1 ♂¹¹, 1 ♀¹¹; Colonia Tovar, 1 ♂, 1 ♀; Ño León, Dist. Federal, 1 ♂; El Junquito, 1 ♀, 1 (?)¹¹; Ayapa, Perijá, Zulia, 1 ♀¹²; Jamayaujaina, 1 ♀¹²; Cerro Yamoré, 1 ♂¹².

¹⁰Specimens in U. S. National Museum.

¹¹Specimens in Rancho Grande Biological Station.

¹²Specimens in Pons Collection, Maracaibo.

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A NEW SHRIMP OF THE GENUS PERICLIMENES
FROM THE WEST INDIES

By FENNER A. CHACE, JR.

Smithsonian Institution, Washington, D. C.

The shrimp described below was first observed in 1954 by Harry Pederson of McAllen, Texas, who photographed its remarkable fish-cleaning habits at New Providence Island, Bahamas. Not until two years later were specimens collected by Conrad Limbaugh of the Scripps Institution of Oceanography, La Jolla, California, who is collaborating with Mr. Pederson on a study of fish cleaning by various marine shrimps.

Periclimenes (*Periclimenes*) *pedersoni*, n. sp.

Holotype.—Male; Lyford Cay, New Providence Island, Bahamas; August 1956; collected by Conrad Limbaugh; U. S. Nat. Mus. Cat. No. 101894.

Paratypes.—One ovigerous female; same locality as holotype (U. S. Nat. Mus.). One ovigerous female; same locality; August 8, 1957; collected by Conrad Limbaugh (U. S. Nat. Mus.). One male; small reef at north end of West Bay, Lyford Cay, New Providence, Bahamas; May 10-11, 1956; collected by Conrad Limbaugh (Acad. Nat. Sci. Philadelphia). One male, one female; old cement ship wreck, south shore of Hog Island, Nassau Harbor, Bahamas; May 19, 1956; collected by C. G. Chaplin and J. E. Böhlke (Acad. Nat. Sci. Philadelphia). Two males, three females (two ovigerous); Coral Harbor inside Lagoon Head, St. John Island, Virgin Islands; six to eight feet; April 24, 1958; collected by Conrad Limbaugh (U. S. Nat. Mus.).

Description.—Sexually dimorphic. Carapace of male (fig. 1) narrowed and bent upward in anterior two thirds, rostrum directed obliquely upward, barely or not reaching cornea of eye in adults, and unarmed ventrally; dorsal margin with three to five teeth, the first somewhat anterior to level of hepatic spine, the second just behind or just anterior to level of orbital margin. Carapace of adult female (fig. 3) not markedly narrowed or bent upward anteriorly; rostrum nearly horizontal, reaching to or beyond second segment of antennular peduncle, and armed with two to four ventral teeth in distal third; dorsal margin with five or six teeth, one slightly behind or slightly in front of level of hepatic spine, one just behind orbital margin, and three or four at slightly decreasing intervals on rostrum. Both sexes with hepatic spine

prominent and outstanding (fig. 2). Antennal spine small. Lower orbital angle blunt and strongly produced.

Abdomen with all pleura rounded. Third somite produced medially as a prominent, slightly compressed cap overhanging base of fourth somite. Sixth somite of male nearly twice as long as fifth and distinctly longer than telson. Sixth somite of female usually less than twice as long as fifth and shorter than telson. Telson (figs. 5, 6) with two dorsal and three posterior pairs of spinules, both dorsal pairs posterior to middle of telson.

Eye with subglobular cornea. Eyestalk fully twice as long as cornea.

First segment of antennular peduncle long (fig. 2). Stylocerite outstanding but not reaching beyond middle of eyestalk. Outer margin of basal antennular segment slightly concave and terminating in a prominent anterolateral tooth, which falls far short of anterior end of segment. Anterior margin of segment strongly and acutely produced laterally as far as middle of second segment. Margin between anterolateral tooth and end of segment setose but unarmed. Second segment slightly shorter and broader than third. Upper antennular flagellum with branches fused for 12 to 18 joints; free part of shorter branch one fourth to one third as long as fused part and consisting of 4 to 7 joints.

Antennal scale reaching about as far as antennular peduncle, more than two and one half times as long as wide in males, slightly broader in females. Outer margin nearly straight. Outer spine falling far short of variably subtruncate distal margin of lamella. Antennal peduncle reaching to or beyond middle of antennal scale. Basal antennal segment with outer spine at juncture with scale.

Mouth parts as illustrated (figs. 7-12). Inner lacinia of second maxilla simple, not cleft. Caridean lobe of exopod of first maxilliped narrow, epipod hardly bilobed. Third maxilliped small, scarcely reaching end of antennal peduncle; terminal segment three fifths as long as penultimate and slightly more than half as long as antepenultimate; exopod clearly shorter than antepenultimate segment.

First pereiopod reaching beyond antennal scale by length of fingers to length of chela in males and by chela and at least one third of carpus in females; fingers (fig. 13) as long as palm; carpus distinctly longer than chela and subequal to merus. Second pereiopods unequal, especially in males. Larger one overreaching antennal scale by chela and from one third to more than two thirds of carpus; fingers two thirds as long as palm or slightly longer; cutting edge of movable finger with two to five and of fixed finger with one to four low denticles in proximal half (fig. 14); carpus about four fifths as long as chela; merus about nine tenths as long as, or subequal to, carpus; ischium from slightly shorter to slightly longer than merus. Smaller second cheliped overreaching antennal scale by chela and sometimes by one third of carpus; fingers more than three fourths as long as palm; cutting edges with fewer denticles than those of major chela; carpus from four fifths to nearly as long as chela. Third leg exceeding antennal scale by dactyl and at least half of propodus; dactyl (fig. 15) bifid, about four times as long as broad and about one fourth as long as propodus; propodus about one third again as long as carpus and five sixths as long as merus. Fifth leg exceeding antennal scale by dactyl and at least half of propodus. Legs increasing proportionately in length with growth.

Endopod of first pleopod of male (fig. 16) broadly rounded distally, without processes. Appendix masculina on second pleopod (fig. 17) nearly half again as long as appendix interna in adult males.

Color in life.—The following description is based on color notes made by Conrad Limbaugh from an ovigerous female taken at St. John, Virgin Islands.

General appearance transparent with opaque white antennae and white lines running along body. Dorsal surface of abdomen and tail fan with violet dots, the larger ones outlined in white. Third maxillipeds and both pairs of chelipeds white banded with violet and orange brown. Walking legs transparent, faintly violet when viewed over a white background.

Longitudinal white lines on body converging dorsally near posterior margin of third abdominal somite. Between white lines on back of abdomen are crowded violet dots of irregular sizes, about 12 on first somite, 9 on second, and 16 on third. Outside of white lines on each side of posterior two thirds of third abdominal somite are three similar small dots of violet followed by a large, triangular violet patch edged with white. Two medium-sized median dots on each of fourth and fifth somites and about five slightly smaller dots diverging posteriorly on either side of midline of sixth somite. These, together with about seven dots of various sizes on either side of median row on fourth and fifth somites, are set in slightly opaque, bluish white wash which grades to complete transparency laterally. End of telson white with about three dots and a transverse bar of violet. Distal half of inner branch of uropods with oval, blue-violet spot grading irregularly from white near edge to violet at center. Basal half with outer margin partially white, a violet dot just inside margin, and another violet spot at base. Outer branch of uropod with similar large, oval spot of violet and, proximad to it, two violet dots and one white one. An opaque white line on ventral surface of body from bases of walking legs to telson.

Eyes opaque, pink. Eyestalks white with short, white, transverse dash at base and purple line below. Two small white dots on either side of rostrum [perhaps on antennular peduncle]. Outer antennular flagellum white from base; inner flagellum transparent. Antennal flagellum mostly opaque white but transparent in basal part.

Third maxilliped white at base and tip, with six or seven violet bands between. First cheliped evenly banded with purple and white or bluish white; fingers tipped with brown. Second cheliped white with purple bands on distal half of fingers, distal half of palm, and distal half of carpus; brown saddles on inner surface at base of palm and in basal half of carpus; and numerous small purple saddles on inner surfaces of merus and ischium. Walking legs translucent pale violet when observed over a white background; region of thoracic attachment pale brown.

Eggs translucent yellowish brown.

Size.—The carapace of the male holotype is 4.5 mm. long to the orbital margin. The other males have carapace lengths of 3.0 to 4.6 mm. The females have carapace lengths of 3.6 to 6.5 mm.; they may be ovigerous at a carapace length of 3.8 mm.

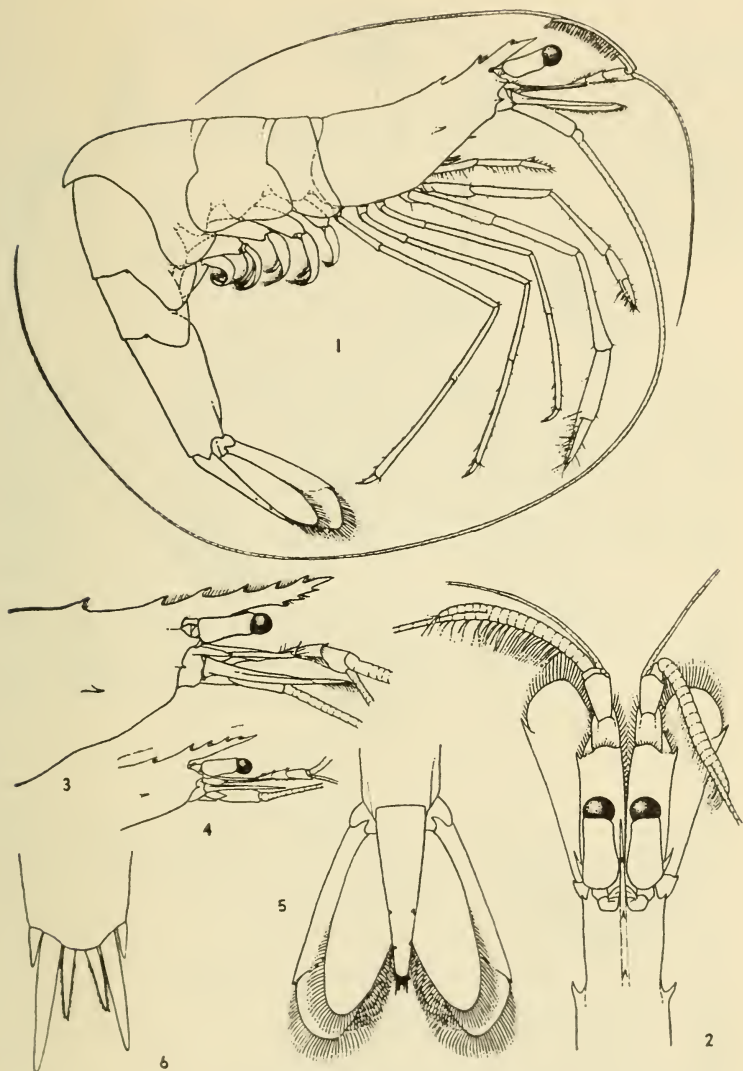
Ecology.—These shrimps were observed by Mr. Pederson and Mr. Limbaugh in two areas near New Providence Island, Bahamas: near Lyford Cay in depths of 5 to 18 feet and in Nassau Harbor from 5 to

30 feet. The species was also taken by Mr. Limbaugh at St. John, Virgin Islands, in depths of 6 to 8 feet. In general, it occurred in localities protected from violent surge. In every instance, the individuals were associated with the sea anemone *Bartholomea annulata*, either hanging directly from the anemone or on objects nearby. Also associated with this anemone, in a complex and variable pattern, were a red mysid, *Heteromysis actiniae*, the closely related spotted cleaning shrimp, *Periclimenes yucatanicus*, the purple snapping shrimp, *Alpheus armatus*, hermit crabs, the arrow crab, *Stenorynchus seticornis*, and two fishes, *Paraclinus grandicornis* and an apogonid. *Periclimenes pedersoni* generally occurs singly, but sometimes in pairs, and occasionally in groups of as many as five individuals with a single anemone. Ovipigerous females were present during the entire period of observation, from April through early August. The shrimps usually remained with the same anemone for from one to three weeks, and probably longer, but occasionally they disappeared completely or appeared a short distance away on another anemone. The fish-cleaning habits of the species will be discussed in a forthcoming paper by Limbaugh, Pederson, and Chace.

Remarks.—*P. pedersoni* is closely related to *P. yucatanicus* (Ives), a species with similar habits that occurs more commonly in the same region. The two species may be distinguished by the following characters:

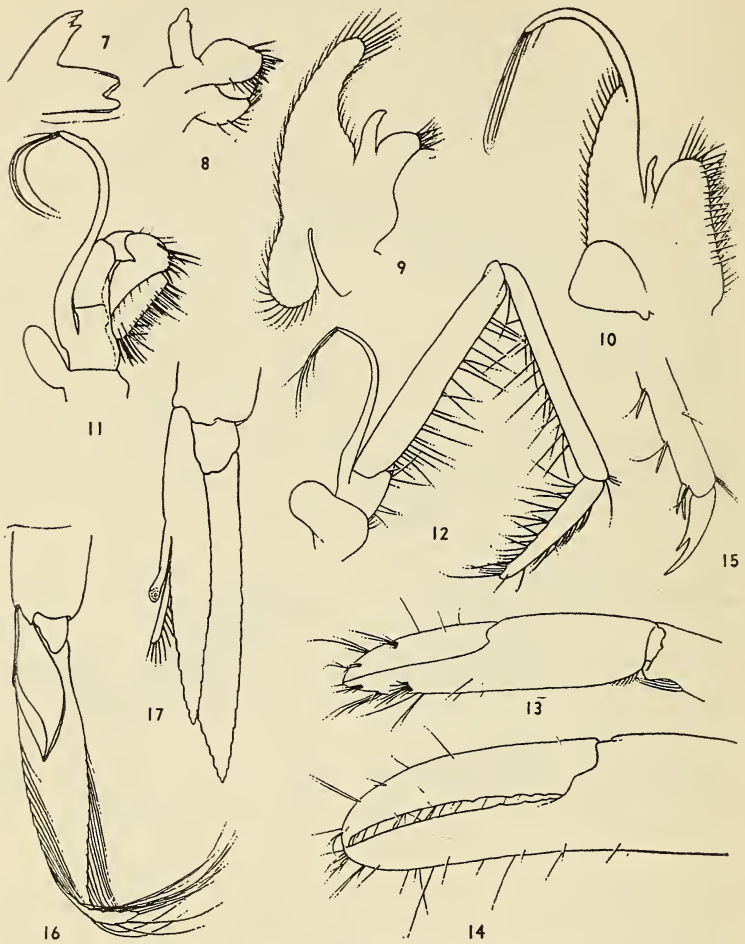
<i>P. pedersoni</i>	<i>P. yucatanicus</i>
Sexually dimorphic.	Not noticeably dimorphic.
Rostrum of female with 5-6 dorsal teeth.	Rostrum of female with 7-9 dorsal teeth.
First segment of antennular peduncle with 1 anterolateral spine.	First antennular segment with 3-4 anterolateral spines.
Pereiopods slender; carpus of second cheliped nearly as long as chela.	Pereiopods stouter; carpus of second cheliped little more than half as long as chela.
Marked with blue and white stripes and spots; antennae white; walking legs translucent pale violet.	Marked with a few opaque white and tan spots; antennae white with red bands; walking legs purple with white bands.

The sexual dimorphism of *P. pedersoni* is less apparent in small specimens. Young males (fig. 4) resemble the females in having the rostrum longer and with more numerous dorsal teeth; young females resemble the males in having the rostrum directed obliquely upward and the ventral margin less distinctly dentate.



Periclimenes (Periclimenes) pedersoni

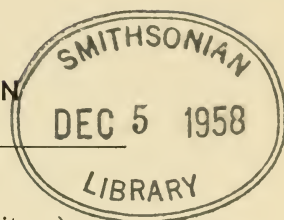
- Fig. 1. Male holotype from right side. x 5.
 Fig. 2. Anterior part of holotype in dorsal view. x 7.5.
 Fig. 3. Anterior part of female paratype from Bahamas. x 5.
 Fig. 4. Anterior part of male paratype from Virgin Islands. x 5.
 Fig. 5. Tail fan of holotype. x 7.5.
 Fig. 6. End of telson of holotype. x 50.



Periclimenes (Periclimenes) pedersoni

- Fig. 7. Right mandible of holotype. x 30.
- Fig. 8. Right first maxilla of holotype. x 30.
- Fig. 9. Right second maxilla of holotype. x 30 .
- Fig. 10. Right first maxilliped of holotype. x 30.
- Fig. 11. Right second maxilliped of holotype. x 30.
- Fig. 12. Right third maxilliped of holotype. x 25.
- Fig. 13. Chela of right first pereopod of holotype. x 25.
- Fig. 14. Fingers of right second pereopod of holotype. x 25.
- Fig. 15. Daetyl of right third pereopod of holotype. x 25.
- Fig. 16. Right first pleopod of holotype. x 25.
- Fig. 17. Right second pleopod of holotype. x 25.

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NEW NEOTROPICAL VELIIDAE (Hemiptera)

By CARL J. DRAKE
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The present paper comprises the descriptions of one new species of the genus *Husseyella* Herring, four new species of the genus *Rhagovelia* Mayr and illustrates the type of *Rhagovelia traili* (Buchanan-White) from South America. The types of the new species are in the Drake Collection (U. S. N.M.). Mr. Arthur Smith of the British Museum made figure 1; the rest of the illustrations were drawn by Mrs. Jerry Rozen, Alexandria, Virginia.

Rhagovelia traili (Buchanan-White) (Fig. 1)

Neovelia traili Buchanan-White, 1879. Journ. Linn. Soc. 14:487.

The type, brachypterous, Manaos, Brasil, in British Museum, is figured. As this species is unknown to American workers, the illustration (Fig. 1) will be of much help in identifying the species.

***Husseyella halophila* sp. nov.**
(Fig. 2 & 3a & b)

Small, subovate, apterous, blackish brown with the short, transverse band (as wide as vertex) near middle of anterior lobe of pronotum and a U-shaped mark at base of head (arms projecting anteriorly next to eyes) reddish brown; entire dorsal surface densely pubescent and interspersed with numerous dark hairs, the hairs on sides of thorax and abdomen a little longer and stiffer than on dorsal surface; body beneath bluish black. Legs dark brown with coxae, trochanters, bases of upper and under surfaces of all femore testaceous. Antennae dark brown with basal fourth of first segment testaceous. Length 2.25 mm. (male) and 2.50 mm. (female), with 1.10 mm. (male) and 1.30 mm. (female, across base of pronotum.)

Head with median, longitudinal, impressed line. Antennae (Fig. 3a) with three, subbasal, moderately long, dark, bristly hairs on second segment, and a subbasal and another bristly hair near the middle of second segment, measurements: I, 0.33 mm.; II, 0.35 mm.; III, 0.52 mm.; IV, 0.45 mm. Pronotum (Fig. 2) (male, cleared) nearly twice as wide (across widest part of hind lobe) as long, composed of two fairly distinct lobes, with fore lobe a little shorter than hind lobe; front

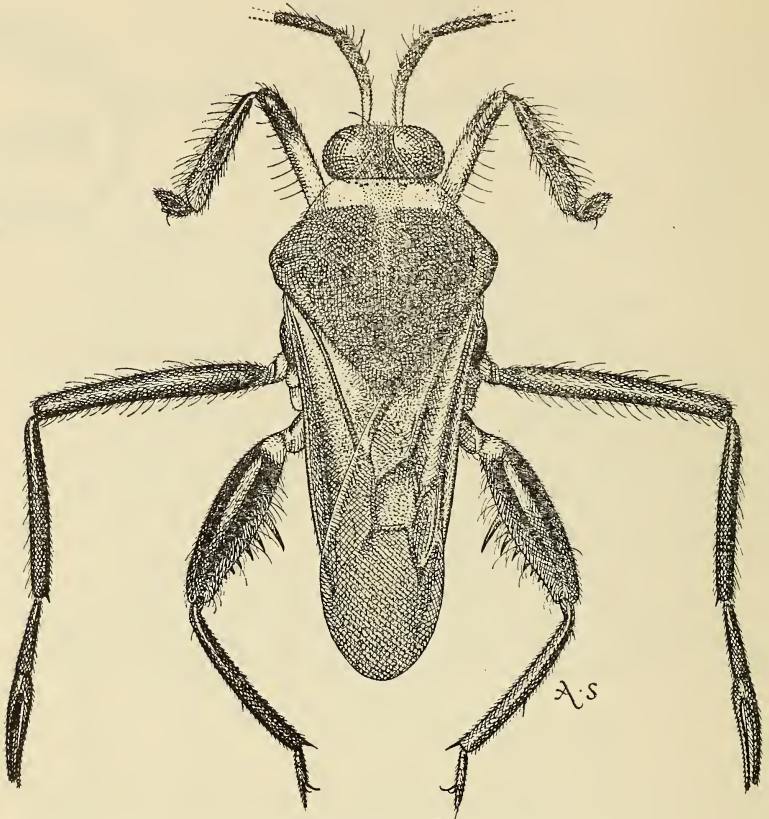


Fig. 1. *Rhagovelia traili* (Buchanan), type

lobe with a transverse row of punctures near hind margin and with collar set-off by an encircling row of punctures, otherwise impunctate; hind lobe with many deep punctures; mesonotum represented on each side by a short triangular plate; metanotum about one-third as long as pronotum, with punctures about the same as in hind lobe of pronotum. Abdomen tapering posteriorly with the connexiva slightly wider in female than in male. Legs unarmed in both sexes; femora only slightly swollen; anterior tarsi strongly swollen; apices of hind femora not reaching to apex of genital segments; tarsi of middle legs as in illustration (Fig. 3b). Alate form unknown.

Holotype (male) and *allotype* (female), Santa Catarina, collected on the quiet, salty waters of a small stream flowing into the Atlantic Ocean. *Paratypes*: 12 specimens, collected with the type in eastern Santa Catarina, Brasil. Many nymphs in various stages of development were also taken.

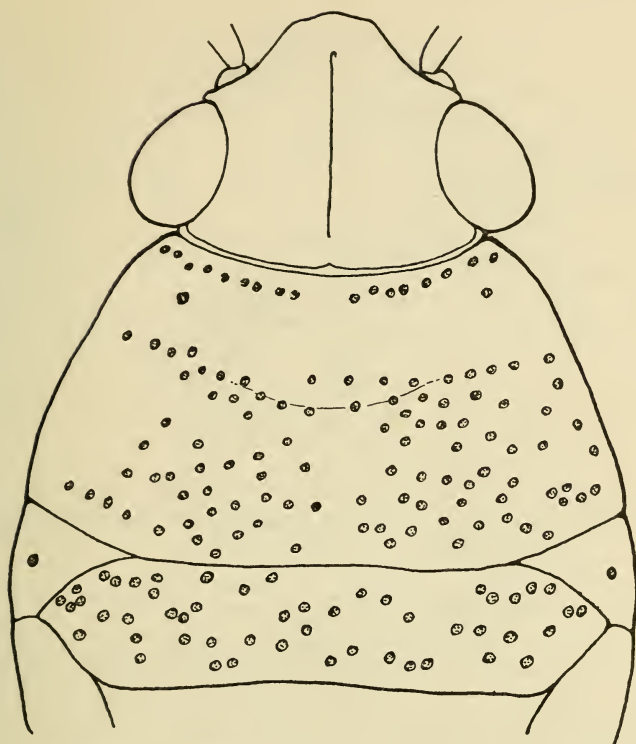


Fig. 2. *Husseyella halophila*, n. sp., pronotum (cleared).

Differs from *H. diffidens* also an inhabitant of Brasil, by the longer hairs on dorsal surface, more shaggy appearance, shorter antennae and measurements of middle tarsi as noted under *H. diffidens*.

Husseyella diffidens (Drake and Harris)

Microvelia diffidentis Drake & Harris, 1933. Proc. Ent. Soc. Wash. 46:52.

Original characterized from five females (*holotype* and four paratypes), Sao Matheos, Brasil. The male (*allotype*) is slightly smaller than the female, but the color, markings and vestiture are quite similar. The connexiva are reddish brown and clothed with moderately long, dark hairs. The reddish brown markings are the same as in female. Antennal measurements: segment I, 34; II, 32; III, 50; IV, 40. Middle legs with tarsal segment I longer than II (38:30).

The antennae of *diffidens* (1.95 mm.) is longer than in *haplophylla* (1.65 mm.); tarsi of middle legs also longer (0.85 mm. to 0.62 mm.); and besides the dorsal surface is not so shaggy. In both species the last segment of the middle tarsi is provided with four bladelike structures instead of claws (Fig. 3b).

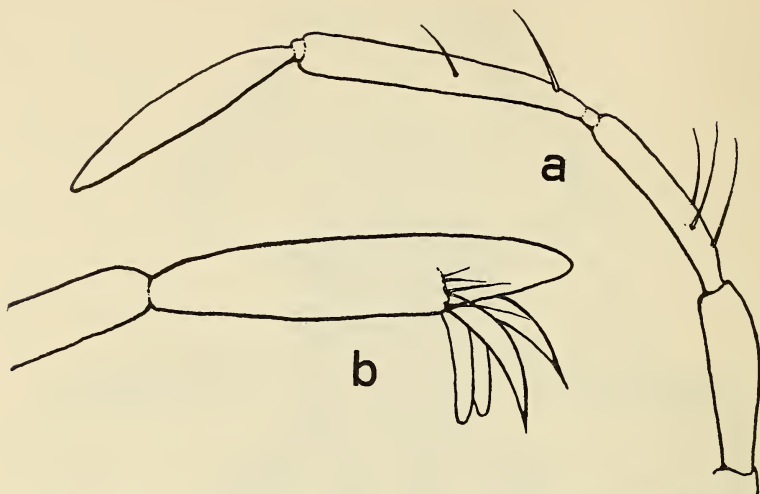


Fig. 3. *Husseyella halovelis*, n. sp.: a, antenna & b, last tarsal segment of middle leg.

Rhagovelia thaumana, sp. nov. (Fig. 4a)

Small, blackish with transverse, subapical, orange band of pronotum interrupted at middle and as wide as vertex; pubescence short, grayish brown. Antennae shortly pubescent, deep black, shining, with basal two-fifths of first segment pale testaceous. Legs deep black, shining, with inferior parts of acetabula, coxae and trochanters of fore and hind legs pale testaceous; middle legs entirely deep black. Last dorsal tergite and sometimes also a spot on preceding segment shining black. Body beneath quite bluish. Length 2.50 mm., width 1.10 mm. male and 1.30 mm. female. Alate form unknown.

Male: Head with the usual impressed, median line and basal marks; labium black-fuscous, shining, reaching a little beyond prosternum. Antennae with bristly black hairs on first two segments, measurements: I, 0.70 mm.; II, 0.41 mm.; III, 0.42 mm.; IV, 0.41 mm. Pronotum very short, not as long as an eye. Mesonotum depressed, especially beyond the middle, shorter than wide (55:75) obliquely converging behind humeri, apex broad and subtruncate; exposed part of metanotum about as long as a tergite. Abdomen strongly tapering apically, last tergite about one-third as wide as basal width, beneath without spine or median carina; connexiva reflexed obliquely upright outwardly, not abruptly narrowed on last two segments. Anterior femur 1.80 mm. long; tibia 0.86 mm. long, scarcely dilate apically, feebly flattened apically beneath. Middle legs with femur 1.80 mm. long; tibia 1.10 mm. long; tarsal segments II and III subequal, each 0.60 mm. long. Hind femur distinctly slenderer than in middle leg, 1.05 mm. long, scarcely swollen, armed barely behind middle of ventral surface with a fairly long spine, followed between there and apex with four or five very short

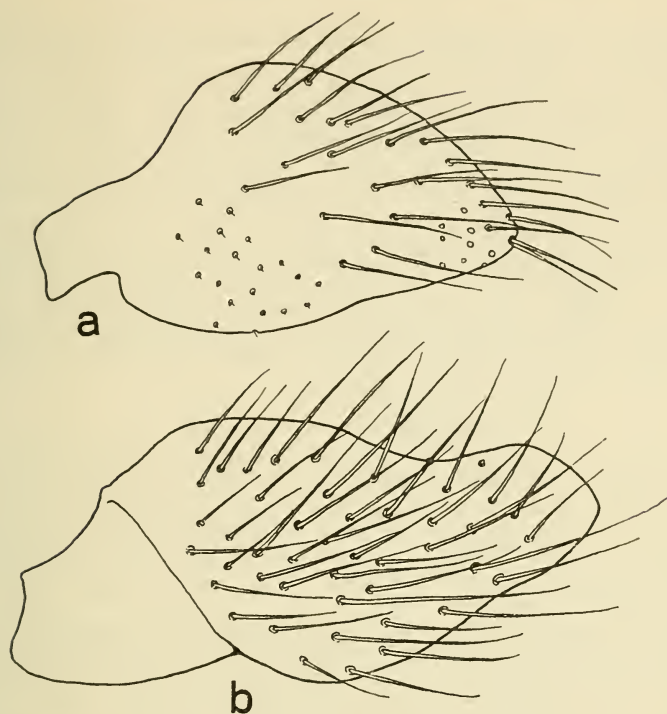


Fig. 4. Right male paramere: a, *R. thaumana*, n. sp. & *R. yacuviana*, n. sp.

spines, the base of first spine (when leg is fully extended along side of abdomen) distinctly surpasses the last tergite; tibia straight, without apical spur or ventral teeth, 1.25 mm. long. Paramere as in Figure 4a.

Female: Broader than male, with mesonotum, metanotum and abdomen (above and beneath) greatly modified, very different from that of any other member of the genus. Color and markings (orange pronotal spot larger) and antennal measurements nearly same as in male. Pronotum almost as long as an eye. Mesonotum strongly modified posteriorly, deflected almost vertically downward posteriorly from behind middle of disc, with a patch of long, brown, reclining hairs on disc (in front of deflection), the tips of which project apically beyond the deflection; metanotum very short, with exposed part on a lower level than that at apex of the deflected posterior part of mesonotum.

Abdomen strongly depressed, with tergites on a lower horizontal level than that of hind part of mesonotum, somewhat troughlike; connexiva wide, upright at base, with last three segments convexly curved inward, slightly widened and with outer edges there in contact or nearly so within, the long brown hairs on outer edge of connexiva longer and quite abundant on last three segments; beneath convexly tectiform, in-

distinctly ridged and provided with pale hairs on median line. Mesosternum very long, strongly impressed on each side opposite metasternal acetabulum; abdomen beneath 0.55 mm. long, with last ventrite at middle, behind emarginate. Hind legs with femur short, slender, not as thick as middle femur, with apex surpassing last genital segment, armed beneath on apical third with three or four very short spines.

Holotype (male) and *allotype* (female), Linha Facao, Mineral Waters, Santa Catharina, Brasil, May, 1957. *Paratypes*: 20 specimens, taken with type.

This species is closely allied to *R. paulana* Drake, though the females are easily distinguished from each other. The male of *R. thaumana*, n. sp. is slightly broader and more depressed above, and with the first spine on hind femora surpasses last abdominal tergite when legs are extended and held parallel along sides of the female abdomen. *R. paulina* is longer, abdomen much longer, and with neither pronotum nor abdomen as greatly modified as in *thaumana*.

Rhagovelia sabrina, sp. nov. (Fig. 5a)

Grayish black with a large, discal, triangular spot of mesonotum, a small, median, basal spot on pronotum and a large spot on each dorsal tergite of abdomen black and shining. Legs black, slightly shining; coxae and inferior part of acetabula of both fore and hind legs flavotestaceous. Antennae blackish with basal third of first segment testaceous. Body beneath bluish black. Length 3.50 mm, width 1.25 mm. (male) and 1.50 mm. (female).

Head with impressed, median, longitudinal line and usual basal impression. Antennae clothed with short, brownish pubescence and usual bristly hairs on first two segments, measurements: I, 95; II, 50; III, 50; IV, 40. Pronotum very short, not longer than length of an eye, with short, transverse, brownish band not prominent and not wider than width of vertex and divided at middle; mesonotum large, convex, wider across humeri than median length (100:80 male and 110:80 female) with lateral sides behind humeri obliquely converging posteriorly and with apex broad and truncate; mesonotum very short. Abdomen tapering posteriorly, more strongly so behind fourth tergite, with connexiva terminating in an acute angle, not produced beyond seventh tergite. Legs long, slender, femora not swollen in either sex.

Male: Connexiva slightly narrower than in female. Hind femora quite slender, with apices scarcely reaching apex of genital segment, armed beneath with a rather short, backwardly curved spine at basal fourth and then followed by two or three shorter ones; tibiae without ventral teeth, with a short, straight, apical spur. Anterior tibiae scarcely dilate, slightly flattened beneath on apical fourth, with short apical comb.

Female: Stoutier than male. Hind femora and tibiae unarmed. Other characters as in male. Macropterous forms unknown.

Rhagovelia stibea, new sp. (Fig. 5b)

Black, slightly bluish, especially beneath, without black spots on dorsal tergites; pronotum short, not longer than an eye, with entire median part (slightly wider than vertex) yellowish orange; antennae blackish fuscous, with basal half of first segment pale testaceous. Inferior margin of all acetabula, all coxae, all trochanters and the basal half of

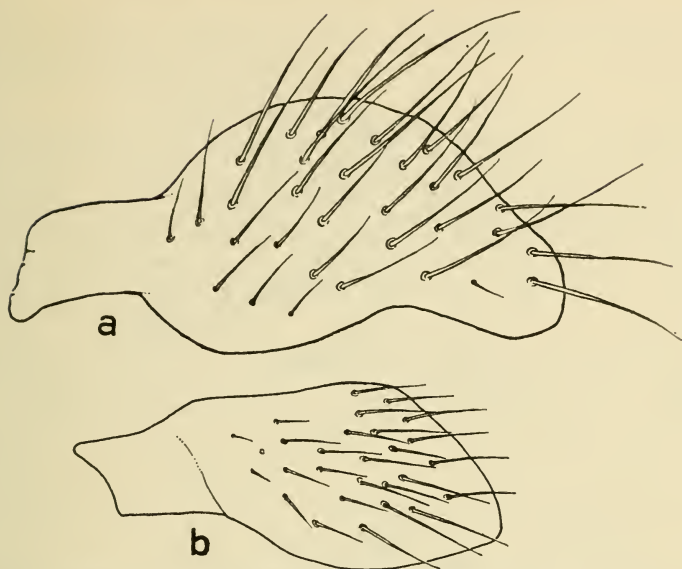


Fig. 5. Right male paramere: *a*, *R. sabina*, n. sp. & *R. tibea*, n. sp.

fore femora pale testaceous. Pubescence on dorsal surface very short, grayish black, without longer hairs. Narrow margin of connexiva black (in one paratype partly brownish). Alate form unknown. Length, 2.30-2.50 mm.; width 0.94-1.00 mm.

Male: Head with median, longitudinal, black line and usual basal impressions. Antennae pubescent, without longer hairs, except for bristly hairs usually found on first two segments, measurements: I, 0.65 mm.; II, 0.28 mm.; III, 0.38 mm.; IV, 0.35 mm. Pronotum very short, with hind margin sinuate. Mesonotum covering most of metanotum, feebly convex, 0.80 mm. long and 0.45 mm. wide, strongly concavely narrowed behind humeri, with apex wide, subtruncate and slightly less than one-third of humeral width. Abdominal tergites tapered evenly posteriorly, with apex about one-third as wide as base; connexiva reflexed obliquely upright laterally, more strongly narrowed on last three segments, with last segment ending in an acute angle at apex of last tergite. Abdomen beneath without median carina or spine. All coxae and trochanters unarmed. Fore tibia feebly dilate, not scooped out but flattened beneath apically, 0.70 mm. long, feebly longer than femur. Middle legs with femur 1.40 mm. long, tibia 1.00 mm., tarsal segment II 0.52 mm. long and III 0.52 mm. Hind femur 1.00 mm. long, scarcely more than one-third as thick as long, armed beneath with a long spine at basal five-eighteenths, thence to apex with seven to nine shorter spines gradually diminishing in length; tibia 1.20 mm. long, straight, armed on basal half beneath with a row of closely-set, very short, stout, blunt, teeth.

Female: Slightly stouter but with the general aspect, color, markings, antennae and pronotum as in male. Connexiva fairly wide, moderately

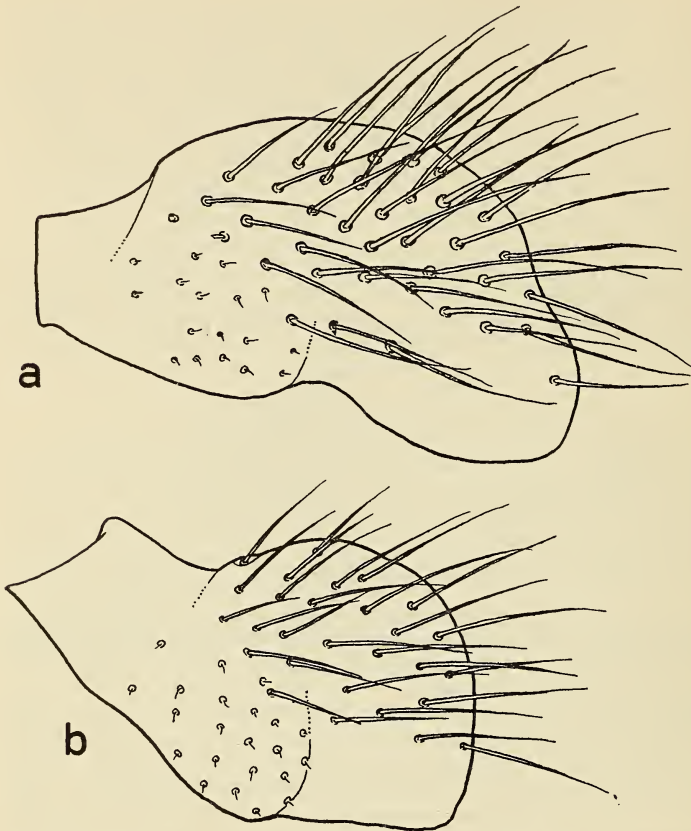


Fig. 6. Right male paramere: *a*, *R. janeira* Drake & *R. hambletoni* D. & H.

narrowed apically, turned upright posteriorly from base of tergite V, truncate at apex. Hind femora not as swollen as in male, armed at apical seven-sixteenths with a long spine, between there and apex with 5 or 6 smaller spines, all spines slightly bent posteriorly and testaceous with black tips. Other structures very similar to those in male.

Holotype (male) and *allotype* (female), Canal Zone, Panama, Feb. 10, 1939, C. J. Drake. *Paratypes*: 6 specimens, same data as type.

Very similar in size and general aspect to *R. evidis* Bacon, but really separated from it by having the entire median longitudinal part of pronotum (as wide as vertex) yellowish orange, lack of black spots on abdominal tergites and the position and number of spines on hind femora; the hind tibiae on basal half beneath armed in both sexes with short, blunt, inconspicuous teeth.

For comparative purposes, the right male paramere of *R. janeira*

Drake (Fig. 6a) and *E. hambletoni* Drake & Harris (Fig. 6b) have been illustrated. Chaetotaxy of the male parameres provides good taxonomic characters in the Genus *Rhagovelia*.

Rhagovelia yacuivana, new sp. (Fig. 4b)

Grayish-black, slightly bluish, more bluish beneath; pronotum short, not longer than an eye, with transverse orange stripe not divided and as wide as vertex at base of eyes; labium blackish with base and juga brownish testaceous. All acetabula, all coxae, all trochanters, anterior half of fore femora and sometimes basal part of inferior surface of hind femora brownish testaceous. Antennae dark fuscus with basal third of first segment brownish testaceous or testaceous. Length, 3.57-4.00 mm.; width, 1.65 mm.

Male: Head with impressed, median, longitudinal lines and usual basal marks. Antennae shortly pubescent hairs on inner face of first two segments, measurements: I, 0.90 mm.; II, 0.52 mm.; III, 0.60 mm.; IV, 0.52 mm. Mesonotum slightly convex, obliquely narrowed on each lateral side behind humeral angles, with apex subtruncate and about one-third as wide as at humeral angles; metanotum very short, subtruncate behind. Dorsal surface of thorax and abdomen provided with some short golden pubescence interspersed with longer, erect, dark hairs.

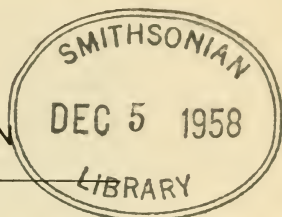
Abdomen slowly narrowed posteriorly, with tergite II about twice as wide as VII; connexivum narrowed posteriorly, reflexed obliquely upright laterally, with last three segments more sharply narrowed, terminating in an acute angle opposite apex of last tergite. Venter plump, without median carina. Anterior tibia 1.20 mm. long, feebly dilate apically, flattened beneath apically, these with short shallow groove subequal to femur in length. Middle leg with femur 2.10 mm. long, tibia 1.50 mm., tarsus II 0.90 mm. and III 0.85 mm. Hind femur 1.60 mm. long, slightly swollen at thickest point, scarcely thicker than middle femur, armed at basal third with a long spine, thence to apex with much shorter spines; tibia straight, unarmed, with a short, straight spur at apex.

Female: Slightly stouter than male; color, markings, antennae, connexiva and fore and middle legs about same as in male. Trochanters unarmed. Hind femur scarcely as thick as middle femur, equipped with a moderately long spine at apical third, thence to apex with 4 or 5 much shorter spines; hind tibia unarmed, with short apical spur. Hind femora, both male and female, only feebly thicker than intermediate ones. Alate female 4.25 mm. long. Pronotum moderately convex across humeral angles, 1.65 mm. long and 1.75 mm. wide at humeri. Hemelytra dark fuscous brown or blackish brown with veins darker.

Holotype (male) and *allotype* (female), both apterous, Yacuiva, Bolivia, Aug. 1917 (ex. Pennington Coll.) *Paratypes*: 4 specimens same data as type, 6 specimens, Piquate, Salta, Arg., Aug., 1934; and 24 specimens Santa Cruz, Bol., Oct. 17, 1957.

About the same size, color, markings and general appearance as *R. velocis* Drake and Harris. It differs, however, in having the male parameres broadly rounded at apex (not pointed as in *velocis*), shorter and thinner hairy vestiture of dorsal surface, shorter bristly hairs on legs, slightly differently shaped hind femora and distinctly shorter abdomen in male.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



ON THE OCCURRENCE OF AGROTHRIPS IN
ILLINOIS AND KANSAS, WITH A REVIEW
OF THE NORTH AMERICAN SPECIES

(THYSANOPTERA: PHLAEOTHIRIPIDAE)

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Until recently thrips of the genus *Agrothrips* in North America had been found solely in the grasslands of western United States and Mexico. It came, therefore, as a considerable surprise when in 1956 a species of this genus was taken abundantly in pastures at Sheldon, Illinois. Because the closest known record of the species involved was from Colorado, I made particular effort during a collecting trip in 1957 through Iowa, Nebraska, Kansas, and Missouri to obtain further information on the distribution of *Agrothrips*. The Illinois species of *Agrothrips* was not encountered, but at Minneapolis, Kansas, additional specimens of a new species previously known to me from New Mexico were discovered.

In order to identify and to categorize these two species of *Agrothrips* it has been necessary to review the North American members of the genus.

Acknowledgment is gratefully made to Miss Kellie O'Neill of the U. S. National Museum for the loan of two paratypes of *Agrothrips omani* (Crawford).

Agrothrips Jacot-Guillarmod

Agrothrips Jacot-Guillarmod (1939:40). Type species by original designation.—*Agrothrips priesneri* Jacot-Guillarmod, Zululand.

Head much longer than wide, smooth, just slightly constricted behind the eyes. Eyes moderate in size, not prolonged posteriorly on the ventral surface more than on the dorsal surface. Ocelli present or absent. Post-ocular setae moderately developed, pointed to dilated. Antennae eight-segmented; segment III swollen near the base into a shelflike ring, fig. 2, sense cones difficult to observe; segments VI and VII with or without well defined pedicels; segment VIII broadly attached to segment VII. Mouth cone short, broadly rounded. Maxillary stylets slen-

der, when retracted forming a V within the head. Maxillary bridge broad.

Prothorax smooth, always with anterolateral and major posterior setae well developed, usually blunt to dilated; anteromarginal and midlateral setae minute except in the case of *tenebricosus* in which the midlateral setae are moderately long. Epimeral sutures complete. Praepectal plates present. Meso- and metanotum fused or not fused. Metanotum usually smooth. Macropterous, brachypterous, or apterous. Fore wings when present narrowed beyond the middle, with accessory fringe cilia. Fore tarsi each with or without a small tooth.

Pelta usually in the form of a broad triangle, smooth. Abdominal tergite IX with major median posterior setae shorter than or longer than the tube. In males, abdominal sternite VIII with or without a differentiated glandular area; abdominal tergite IX with major lateral posterior setae reduced in size. Tube much shorter than head, not thickened or ridged.

Agrothrips is similar to *Haplothrips*, especially the subgenus *Karnyothrips*, differing principally by the form of antennal segment III. In *Agrothrips* antennal segment III has a thickened shelflike ring at the base just above the pedicel, fig. 2, whereas in *Karnyothrips* segment III gradually tapers to the pedicel.

As I have mentioned elsewhere (Stannard 1957), the name *Agrothrips* may or may not apply to the North American species. Even so this name can be used without bringing undue confusion to any system of classification because all the species, at least those from the Nearctic and the Ethiopian regions, are apparently closely related. Point by point the African type species, *priesneri*, is remarkably similar to some of our species except for a single feature, the fusion of the meso- and metanotum, a feature of degeneration that may be merely the result of extreme apterism.

The North American species of *Agrothrips* can be separated into two groups.

Group 1 can be characterized as having (a) the major median posterior setae on abdominal tergite IX longer than the tube, (b) a glandular area present on abdominal sternite VIII in the male, and (c) a slender form. This group includes *arenicola*, *tantillus* n. sp., and *palidus*. The African type species, *priesneri*, belongs nearest the aforementioned species on the basis of the predominantly yellow color, long setae on abdominal tergite IX, and by the slender appearance. The original description of *priesneri* does not indicate whether or not the male possesses a glandular area on abdominal sternite VIII.

Group 2 can be characterized by having (a) the major median posterior setae on abdominal tergite IX shorter than the tube, (b) by lacking a glandular area on abdominal sternite VIII in the male in those species in which the male is known, and (c) a more robust form than do species belonging to group 1. Group 2 includes *dimidiatus*, *omani*, and *tenebricosus*.

KEY TO THE NORTH AMERICAN SPECIES

(based in part upon information in the literature)

1. Antennae completely dark brown; midlateral prothoracic setae well developed *tenebricosus*

Antennae with several segments yellow; midlateral prothoracic setae minute	2
2. Antennal segment I brown	omani
Antennal segment I yellow	3
3. Abdomen predominantly yellow	4
Abdomen predominantly brown	5
4. Postocular and major prothoracic setae blunt to dilated; abdominal sternite VIII in the male with glandular area stated to be unlike that in <i>arenicola</i> (Hood 1938)	pallidus
Postocular and major prothoracic setae pointed; abdominal sternite VIII in the male with a medially divided, transverse glandular area	arenicola
5. Antennae with intermediate segments yellow; abdominal tergite IX with major median posterior setae shorter than the tube; abdominal sternite VIII in the male without a glandular area	dimidiatus
Antennae with intermediate segments, except III, light brown; abdominal tergite IX with major median posterior setae longer than the tube; abdominal sternite VIII in the male with a transverse glandular band	tantillus

Agrothrips arenicola (Hood)

Karyothrips arenicola Hood (1938:216). ♀, ♂. Type locality.—Aguila, Arizona.

Diagnosis (summarized from original description): Known only by the brachypterous form. Color nearly uniformly ochraceous yellow with antennal segments IV to VIII uniformly light brown, antennal segments IV to VII scarcely pedicellate. Ocelli absent. Postocular setae pointed. All prothoracic setae pointed. Fore tarsi each presumably armed with a small tooth.

Only the 16 specimens from the type locality are recorded in the literature. These were taken from the grass *Hilaria rigida*.

I have not seen this species. It has never been illustrated.

Agrothrips dimidiatus (Hood)

Watsoniella dimidiata Hood (1939:576). ♀, ♂. Type locality.—Tivoli, Texas.

Diagnosis: Known only by the macropterous and brachypterous forms. Bicolored, with antennal segments I, and III to VI, legs, thorax, and abdominal segment I, yellow; the remainder of the abdomen dark brown, head and antennal segment II yellowish brown, and antennal segments VII and VIII brown. Wings when present colorless. Ocelli present. Postocular setae pointed to blunt. All well developed major prothoracic setae blunt to dilated. Fore tarsi each armed with a small tooth.

In the original description specimens were recorded from Tivoli, Bay City, and Palacios, Texas, collected mostly from grass. Before me are two brachypterous females from Lawrence, Kansas, taken in a prairie meadow. My previous apparent record of this species from Illinois (Stannard 1957) was the result of a typographical error.

Agrothrips omani (Crawford, J. C.)

Haplothrips (Hadothrips) omani Crawford, J. C. (1947:250). ♀. Type locality.—Tucson, Arizona.

Diagnosis: Known only by the apterous form which is not particularly degenerate. Color generally dark brown except for antennal segments III to VI, apical portions of tibiae and all tarsi which are predominantly yellow. Ocelli present. Postocular setae pointed to blunt. All well developed major prothoracic setae blunt to dilated. Abdominal sternite VIII in the male (newly discovered in Illinois) without a glandular area.

Originally described from Tucson, Arizona, on Johnson grass, this species is now known from Springfield, Colorado, on range grass (INHS collection) and from Sheldon, Illinois.

The Illinois specimens, which were erroneously cited as records of *dimidiatus* (Stannard 1957), have been compared with paratypes of *omani* and have been found to be conspecific. In view of the possibility that the Illinois population is an isolated colony confined to a heavily grazed pasture area that contains few native plants, and because this population is so far out of the expected range of species in the genus, it may be presumed that *omani* of Illinois has descended from introduced stock. Attempts to secure additional specimens of *omani* from other sections of Illinois and from Missouri, Kansas, Nebraska, and Iowa have failed.

Agrothrips pallidus (Hood)

Zygothrips pallidus Hood (1912:140). ♀, ♂. Type locality.—Brownsville, Texas.

Diagnosis (summarized from original description): Known only by the brachypterous form. Color almost entirely clear, bright lemon-yellow except for antennal segments VII and VIII which are shaded with brown and except for the apical three-fourths of tube which is abruptly nearly black. Ocelli present in the female, absent in the male. Postocular setae blunt. All well developed major prothoracic setae blunt to slightly dilated. Fore tarsi each armed with a small tooth.

Although not so stated in the original description, it could be concluded by the inference given in the diagnosis of *arenicola* (Hood 1938) that the male of *pallidus* bears a glandular area on abdominal sternite VIII. Most likely this species has the median setae on the posterior margin of abdominal tergite IX longer than the tube.

The recorded specimens were taken at Brownsville and Padre Island, Texas, in grass, in one case Bermuda grass.

Hood (1912) illustrated the head, prothorax, and antennae.

I have never seen this species.

Agrothrips tantillus new species

Female (apterous).—Length distended about 1.7 mm. Bicolored brown and yellow. Head, except sometimes posterior portion; antennal segments I and III, thorax, legs, and anterior portion of abdominal segment I, yellow. Remainder of abdomen and antennal segments IV to VIII, brown; tube and unguitracors of legs, dark brown; head in

posterior half and sides of antennal segment II sometimes lightly shaded with brown.

Head, fig. 1. Ocelli absent. Postocular setae dilated. Antennal segment VI with a distinct, narrowed pedicel. Maxillary bridge considerably forward of the posterior margin of the head.

Prothorax with those major setae which are well developed dilated; anteromarginal and midlateral setae minute. Pterothorax degenerate but with a well defined suture between the meso- and metanotum. Wings and wing pads lacking. Fore tarsi each apparently unarmed.

Pelva broad nearly forming an isosceles trapezoid. Wing-holding setae not differentiated. Abdominal tergite IX with major posterior setae longer than the tube, pointed. Tube much shorter than the head.

Male (apterous).—Length distended about 1.3 mm. General color and structure similar to female. Abdominal sternite VIII with a narrow, complete, transverse glandular band, fig. 3. Abdominal tergite IX with major lateral posterior setae reduced in size.

Holotype.—Female; Minneapolis, Kansas (Rock City State Park); June 24, 1957; Evers and Stannard; from clumps of *Andropogon*. **Allotype**.—Male; same data as for holotype. **Paratypes**.—1 ♂, same data as for holotype. 1 ♀, 12.4 mi. so. of Hatcher, New Mexico, along Rio Grande; November 27, 1949; C. C. Hoff; in rotten cottonwood stump. 7 ♀, 1 ♂; 5 mi. w. of Albuquerque, New Mexico; November 6, 1954; C. C. Hoff; from roots of grasses and semi-arid plants. Types deposited in the collection of the Illinois Natural History Survey.

This species is a member of Group 1. It can be differentiated at once from the other members of this group, *arenicola* and *pallidus*, by the dark colored abdomen. In the characteristics of the longitudinally elongated prothorax and the degeneration of the pterothorax, *tantillus* tends to resemble the type species, *priesneri*.

Some paratypes of *tantillus* from New Mexico have the head slightly shaded with brown whereas the specimens of the type series from Kansas have the head entirely yellow.

Agrothrips tenebricosus (Priesner)

Haplothrips (*Hadothrips*) *tenebricosus* Priesner (1925:318). ♀. Type locality.—Los Reyes, Distrito Federal, Mexico.

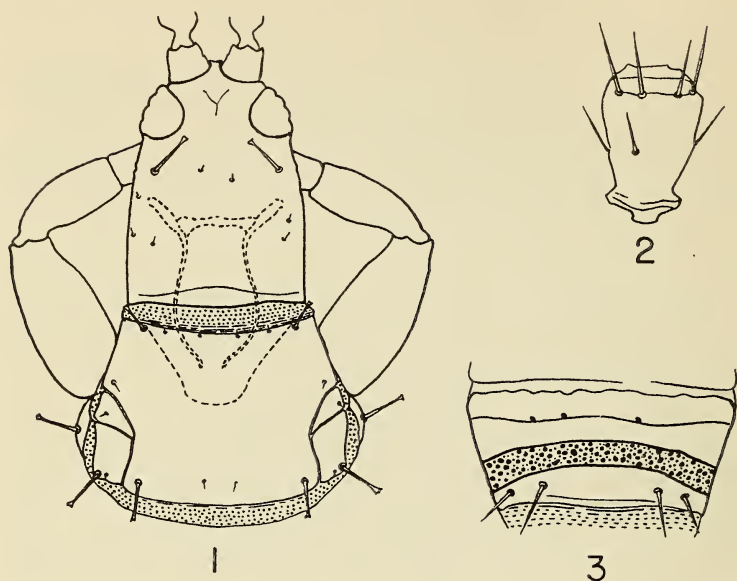
Diagnosis: Known only by the apterous form which is not particularly degenerate. General color almost entirely dark brown except the tip of the fore tibiae and all tarsi which are yellow or nearly yellow. Ocelli lacking. Postocular setae dilated. All well developed major prothoracic setae (including the midlateral setae), dilated. Fore tarsi unarmed. Male unknown.

The types which were found near Mexico City in a short grass meadow are the only specimens so far collected. In 1955 I studied one of the two original females deposited in the Priesner collection. The head, prothorax, and antennal segment III have been illustrated (Stannard 1957).

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EXPLANATION OF FIGURES

Agrothrips tantillus new species. Fig. 1. Head, prothorax, and fore legs, dorsal aspect, leg setae omitted. Fig. 2. Antennal segment III of right antenna. Fig. 3. Abdominal sternite VIII of male showing glandular area.

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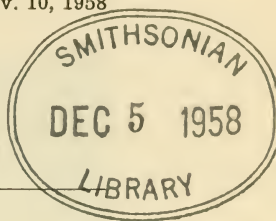
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PROCEEDINGS
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BIOLOGICAL SOCIETY OF WASHINGTON



A NEW COLEONYX FROM TEXAS

By WILLIAM B. DAVIS
and JAMES R. DIXON

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During the course of an ecological survey of the Big Bend Region of Texas, supported by the Texas Game and Fish Commission under contract with the Texas Agricultural Experiment Station, a single specimen of a large ground gecko was captured June 20, 1956, in a snap trap set for rodents. Site of capture was in a broken lava flow about half way up the ridge directly north of the headquarters of the Black Gap Wildlife Management Area about 50 miles south-south-east of Marathon. The general area is typical of the Chihuahuan Desert with such plants as chino grass, cactus, legchugilla, sotol, leucophyllum and other desert shrubs dominating the landscape.

This large gecko is most closely allied to the forest-dwelling geckos of the *Coleonyx elegans*-*C. mitratus* group of southern Mexico and Central America and its occurrence in the desert habitat of the Big Bend was most unexpected. We have thought of the possibility that the specimen may have been transported to the Black Gap by man, but this seems unlikely because of the remoteness of the area from the usual travelways of man. Special efforts have been made to find additional specimens since 1956 but we have turned up only *Coleonyx brevis* which is common in the area.

The closest known occurrence of the related *Coleonyx elegans* is in Colima on the west coast of Mexico and in Veracruz on the east coast (see Klauber, 1945, Trans. San Diego Soc. Nat. Hist., 10(11):133-216). Both of these areas are several hundred miles from the Big Bend section of Texas.

The most conspicuous characters of the Texas specimen are (1) its large size, (2) the enlarged tubercles on the dorsum and (3) the reticulated dorsal pattern. The first two place it in the *elegans-mitratus* group, but since it lacks the bold dorsal bands and differs in several other respects we believe it represents a new species. Dr. Hobart M. Smith, who has examined the specimen and compared it with other species of *Coleonyx*, supports our view. For this new species we propose the name

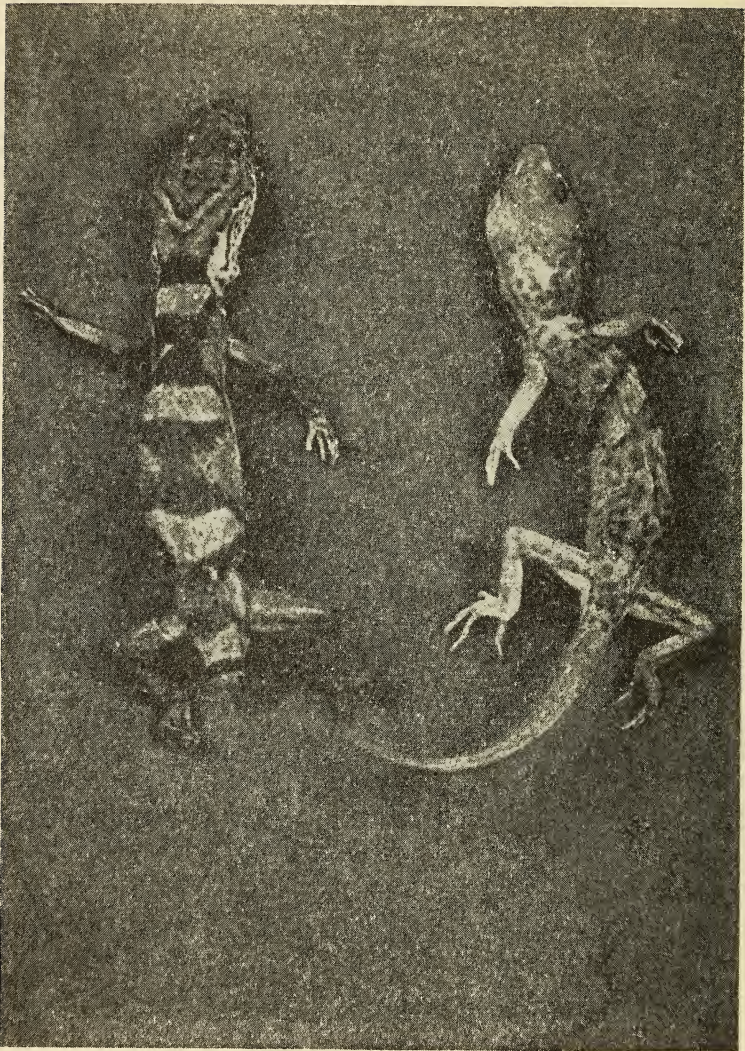


Fig. 1. Specimen on the right is the holotype of *Coleonyx reticulatus*; the one on the left is *Coleonyx elegans*. Note differences in color pattern, shape of head, and distinctness of dorsal tubercles. Diagonal black mark on animal at right is a wound caused by the snap trap in which it was caught.

Coleonyx reticulatus sp. nov.

Holotype: Adult female, No. 12855, Texas Cooperative Wildlife Collection, from Black Gap, 50 miles south-southeast of Marathon, 2500 ft. elevation, Brewster County, Texas; collected by Charles K. Winkler, June 20, 1956; original No. 6.

Diagnosis: A large *Coleonyx* with 13 irregular rows of tubercles on dorsum; 24 and 31 lamellae on fourth finger and fourth toe, respectively; tips of claws exposed by the sheath-scales; dorsum with profusion of small dark spots and reticulations; snout-vent length about 80 mm.

Description of Holotype: Adult female; snout-vent length, 82 mm.; length of tail (partly regenerated), 58 mm.; length of head, 20 mm.; width of head, 15 mm.; snout to eye, 7 mm.; snout to ear, 17 mm.; width of eye, 6 mm.; internarial width, 3 mm.; length of leg, 35 mm.; length of arm, 26 mm.; dorsal part of head covered with non-imbriate, circular granules; rostral wider than high, apex rounded and extending posteriorly to anterior edge of nostril; prenasals, 1-1; internasals, 1-1; postnasals, 2-2; subnasals, 2-2; supranasals, 1-1; supralabials 9-9; first supralabial twice the size of others in series; infralabials 12-12, last three very small, hidden by fold of skin when mouth is closed; nostrils large, subcircular; two rows of scales bordering eye lids, outer row flesh color, inner row black; ear large, 4 times longer vertically than wide; mental somewhat oval and irregularly rounded posteriorly, bordered posteriorly by 9 chin scales; mental and first infralabial on each side contacted by 13 granules.

Dorsum covered by granules similar in size to those on head, interspersed with 13 irregular rows of enlarged tubercles that become larger posteriorly; about 26 tubercles between limb insertions along mid-dorsal line; enlarged dorsal tubercles keeled or peaked, somewhat flattened laterally; ventral scales imbricate, 3 to 4 times larger than dorsal granules, about 31 scales across venter; approximately 90 scales from anterior arm insertion to enlarged preanal scales; preanal pores not in evidence but indicated by slight depressions in center of each enlarged preanal scale, the latter total 17.

Arms and legs without enlarged tubercles, size of granules equal to those on dorsum; 4th finger and 4th toe longest; lamellae on 4th finger and 4th toe 24 and 31, respectively; tail regenerated, without enlarged tubercles, but covered by rows of imbricate scales, largest ventrally; two postanal scales present; cloacal bones not evident externally.

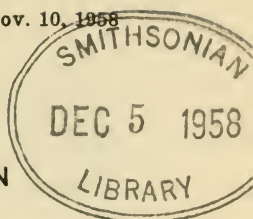
Head light brown above, spotted profusely with brown; no evidence of light nuchal loop; inner surface of eyelid black, outer edge flesh colored; chin, flesh colored; throat, yellowish-white; labials densely spotted with brown; dorsum and tail light brown with large brown spots and reticulations; venter flesh color.

Comparisons: Most closely allied to *C. elegans* (Gray) and *Coleonyx mitratus* (Peters) in having large tubercles intermixed with the granular scales on the dorsum. In *C. variegatus* (Baird), *C. fasciatus* (Boulenger) and *C. brevis* Stejneger the dorsal scales are uniformly granular. Similar to *elegans* in having scales of the claw sheath long with only the tips of the claws exposed. It differs from *elegans*, however, in having (1) a reticulated dorsal pattern (rather than bold bands), (2) dorsal tubercles in about 13 irregular rows (rather than 19 to 21), (3) tu-

bercles about half as large in basal area, (4) 24 and 31 lamellae on fourth finger and fourth toe, respectively, rather than 17 and 20 or less, etc.

Differs from *mitratus* in (1) sheath of claw long so that only the tip of the claw is exposed; (2) dorsum reticulated rather than with cross bars; (3) dorsal tubercles in 13 rows rather than 21 to 23, etc.

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A NEW AMPELOCERA FROM CUBA

C. V. MORTON

The genus *Ampelocera* is distinguished from other Cuban trees of the family Ulmaceae by its pinnately veined leaves, numerous stamens, and small, drupaceous fruits. Two species have been known from Cuba, both exceedingly rare:

AMPELOCERA CUBENSIS Grisebach, Cat. Pl. Cub. 57. 1866. Type from Pinar de Rio, *Charles Wright* 2222. Another collection is Sierra de Anafe, Pinar del Rio, *Wilson & Leon* 11398.

AMPELOCERA CRENULATA Urban, Repert. Sp. Nov. Fedde 15: 399. 1919. Type from western Cuba, *Ramon de la Sagra* 413. Known only from the type.

These species may be distinguished from the new species described below as follows:

Leaf-blades crenulate throughout; sepal glabrousA. crenulata

Leaf-blades entire: sepals densely sericeous-pilose externally.

Leaf-blades densely soft-pilosulous all over the lower surface; stipules 4.5-6 mm. longA. pubescens

Leaf-blades glabrous or bearing a few minute hairs along the midrib and primary veins; stipules 3 mm. longA. cubensis

***Ampelocera pubescens* Morton, sp. nov.**

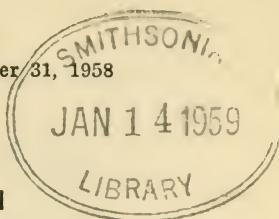
Arbor 6-10.5. alta, trunco usque ad 30 cm. diam.; ramuli graciles, ca. 2 mm. diam, grisei vel albiduli, inermes, perspicue lenticellati, juventute dense puberuli; folia simplicia, alterna, decidua; petioli nigricantes, 5-6 mm. longi, dense breviter pubescentes, supra paullo canaliculati, subtus teretes; lamina foliorum ovata ad oblonga, 7.5-15 cm. longa, 4-8.5 cm. lata, apice acuminata, basi subaequaliter cordata, integra, chartacea, supra viridis, nitens, glabra, venis lateralibus minute pubescentibus exceptis, subtus pallidior, ubique molliter pilosula, venis primariis pinnatis, 6-8-jugis, secundariis supra prominenter reticulatis; stipuli laterali, lanceolati, 4.5-6 mm. longi, 1.7 mm. lati, acuminati, crassi, externe pubescentes, mox decidui; flores hermaphroditi, sessiles, in glomerulis 2 vel 3, axillaribus, sessilibus in ramulis non foliatis positi, bracteis nonnullis, minutis, orbicularibus, brunnescentibus, coriaceis suffulti; petala desunt; sepala 4 vel 5, imbricata, ovata, ca. 2 mm. longa et 1.5 mm. lata, concava, apice rotundata, integra, externe dense sericeo-pilosa, intus parce pilosula; stamina 16, filamentis gracilibus, ca. 2 mm. longis, glabris, antheris ca. 1.2 mm. longis, oblongis, loculis longitudinaliter dehiscentibus, connectivo apiculato, loculos superante; ovarium dense puberulum, 1-loculare, ovulo singulo, ex apice pendulo; stylus

puberulus, crassus, ca. 2 mm. longus; stigmata 2, conspicua, divergentia, ca. 3 mm. longa, teretia, apice subulata, puberula; drupa globosa, 6 mm. longa, 7 mm. lata, dense pubescens, apice basi styli coronata, basi calycis lobis persistentibus suffulta, eis non accrescentibus; endocarpium laeve, parietibus vix scleroticis, ca. 0.25 mm. crassis; semina exalbuminosa, cotyledonibus foliaceis, latissimis, perspicue contortis, radícula superiore,

Type in the U. S. National Herbarium, no. 1,477,418, collected at Limones, Soledad, Province of Las Villas, Cuba, April 26, 1928, by J. G. Jack (no. 6036); a specimen with leaves and fruits. The description of the flowers is drawn from a paratype collected at the same locality, March 12, 1927, by J. G. Jack (no. 4911, U. S. Nat. Herb. no. 1,476,593). Additional collections, all from the same locality and sterile, are *Jack* 5396, 5634, and 7490. According to the notes by Dr. Jack, this is a small tree growing on rocky ridges in woods. The bark is gray and slightly rough. The fruit is yellowish.

SMITHSONIAN INSTITUTION, WASHINGTON, D. C.

PROCEEDINGS
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A NEW SPECIES OF *ESSIGELLA* FROM OREGON
(APHIDAE)

By F. C. HOTTES

I am indebted to the District Forest Ranger of the Mt. Hood National Forest for sending me the new species of *Essigella* described herewith.

Essigella oregonensis n. sp.

Apterous viviparous female.

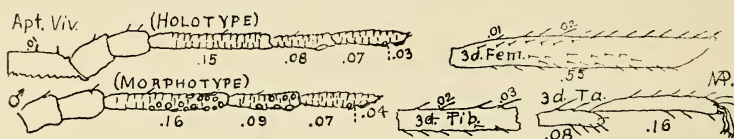
Length from vertex to end of cauda varying from 1.57-1.65mm. Color in life not recorded, most likely with body pale green, as mounted free from pigmented spots on abdomen. First antennal segment slightly darker than second, third segment pale on basal half, remainder of segment and all of fourth and fifth segments pale dusky. Femora pale dusky with anterior margins slightly darker. Tibiae dusky, quite uniform throughout. Tarsal segments dusky.

Head and thorax:—Anterior margin of head with a few very short, .01mm. long, stubby hairs which are limited to the anterior region of the head. Ventral portion of head with a few long sharp pointed hairs. Antennal segments one and two with a few short fine sharp pointed hairs. Hairs on remaining antennal segments extremely few, short, they being little if any longer than the width of the imbrications, which extend almost to the base of the third antennal segment. Length of antennal segments as follows: III .15mm., IV .08mm., V .07 + .03mm. There are no secondary sensoria, and the primary sensorium is lacking on the third antennal segment. Rostrum extending to the metathoracic coxae. Lengths of pro and metathoracic femora .405 and .55-.57mm. Lengths of pro and metathoracic tibiae .405-.45 and .82mm. Hairs on anterior margin of prothoracic femora very short. Hairs on anterior margin of metathoracic femora varying from .01-.02mm. The hairs on this margin are rather thick and blunt at the end, remaining hairs on this segment finer and sharper at the end, but only slightly longer. Hairs on outer margin of metathoracic tibiae sparse, spaced farther apart than their length, varying from .02-.03mm. in length with the longer hairs near the apex. All hairs on the outer margin of this segment coarse and blunt at the apex. Hairs on inner margin of metathoracic tibiae shorter, finer and sharp pointed. Dorsum of first metatarsal segment with two long hairs, dorsum of other segments similar. Ventral surface of first metatarsal segment with about five hairs. Dorsum of metatarsal segment with hairs longer and coarser than the hairs on the ventral surface.

Abdomen.—Cornicles with base surrounded by dusky. Anal plate with short and long hairs intermixed on outer margin. Cauda with few long hairs, median posterior tubercle poorly developed. Hair on dorsum of abdomen extremely sparse, short and blunt at the tip, hairs on the ventral surface of abdomen longer, more numerous and sharp pointed.

Apterous male.

Length 1.08mm. Color notes from living specimens not available, mounted specimen similar in color to apterous viviparous female. Length of antennal segments as follows: III .16mm., IV .09mm., V .07 + .04mm. Secondary sensoria distributed as follows: III 19 on apical two thirds of segment IV 7-9. Primary sensorium of fifth segment large, marginal sensoria few. Hairs on vertex of head similar to hairs

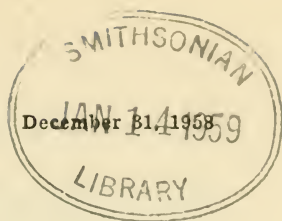


Essigella oregonensis n.sp.

on apterous viviparous female. Rostrum with last two segments extending beyond metathoracic coxae. Lengths of prothoracic femora and tibiae .315 and .345mm. Lengths of metathoracic femora and tibiae .42 and .615mm. Lengths of metathoracic tarsal segments .075 and .135mm. Median tubercle on cauda absent.

In my key to the species of *Essigella* in *Bio. Soc. Of Washington* Vol. 70, 1957 this species keys to couplet 17. It is larger than *E. pergandei* and smaller than *E. Claremontiana*. It not only differs from *pergandei* in size but has the hairs on the anterior margin of the metathoracic femora blunt, median tubercle on cauda not so well developed, hairs on inner margin of metathoracic tibiae not longer than those on the outer margin, and hairs on dorsal surface of metathoracic tarsal segment II much longer than those on the ventral surface.

Host, *Pinus albicaulis* (whitebark pine). Government Camp, Oregon Aug. 17, 1958. Collected near Timberline Lodge on Mt. Hood, by District Forest Ranger. Holotype apterous viviparous female allotype apterous male mounted on same slide as holotype. Holotype slide deposited in the United States National Museum.



PROCEEDINGS
OF THE
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A NEW SPECIES OF *CINARA* FROM CALIFORNIA
SUGAR PINE (APHIDAE)

F. C. HOTTES

The description of this species adds another *Cinara* to the list of species inhabiting our western pines.

Cinara saccharinipini n. sp.

Apterous viviparous female.

Size and general color.—Length from vertex to end of cauda varying from 3.37-3.90mm. All specimens have been over cleared, and no color notes from life were recorded. Color as represented from mounted specimens as follows: Head and thorax pale dusky, antennal segments III, IV and V pale with apical regions of segments dusky, most of VI dusky. Prothoracic femora pale at the base with the remainder pale yellowish. Prothoracic tibiae dark dusky at the base, this followed by dusky which increases to dark dusky at the apex. Metathoracic femora not as dark as the prothoracic femora and the pale region longer. Metathoracic tibiae much darker than the prothoracic tibiae, with the dark dusky area much longer. Tarsal segments dark dusky. Cornicles pale dusky, as cleared but little darker than abdomen. Cauda and anal plate dusky. Transverse pigmented spots pale.

Head and thorax.—Antennal segments with the following lengths: III .46-.48mm., IV .18-.20mm., V .26mm., VI .12 + .03mm. Sensoria distributed as follows: III 0-1 as a rule none, IV with only primary, V one secondary, plus primary. Primary sensorium on VI small, marginal sensoria few.

Hair on anterior margin of antennal segments more numerous and longer than on posterior margin. Hairs on anterior margin of third antennal segment not all of the same length, the longest which are the most numerous are about .09mm. in length, the shortest are about .03mm. long. All are set at an angle of about sixty degrees or more. The first and second antennal segments have numerous hairs. None of the antennal segments show imbrications. Rostrum extending to transverse pigmented spots. Last three segments of the rostrum with the following lengths: .215mm., .215mm, and .06mm. Eyes small, ocular tubercles well developed. Median transverse suture of head narrow, not much darker than rest of head. Hairs on vertex and dorsum of head fairly numerous, varying in length from .12-.15mm. not present on posterior margin. Mesosternal tubercle short, wide, rather rounded. Lengths of pro and metathoracic femora varying as follows: .93-1.05mm., 1.44-

1.50mm. Lengths of pro and metathoracic tibiae varying as follows: 1.35-1.50mm., 2.50-2.55mm. Hairs on femora numerous. Hairs on metathoracic tibiae numerous, set at an angle of about forty-five degrees fine. Hairs in mid region varying from .08-.10mm. in length, of about the same length and texture on both outer and inner margins, but noticeably more numerous on inner margin near apex. First metatarsal segment with about 15-17 hairs on the ventral surface, this segment is about .14mm. in length. The second metatarsal segment is about .27mm. in length, on this segment the hairs on the ventral surface are more numerous than the hairs on the dorsal, the hairs on the two surfaces are of about the same length.

Abdomen.—Cornicles about .45mm. in width, with outer margin irregular, but not greatly so. Hairs on cornicles evenly distributed except for the rim where they are more numerous, finer and shorter than elsewhere, the longest about .10mm. in length. The hairs on the dorsum of the abdomen are numerous, about .12mm in length and rather coarse. The hairs on the ventral surface of the abdomen are more numerous than those on the dorsum, and slightly shorter and finer. The transverse pigmented spots are narrow and rather long, they have two irregular rows of long coarse hairs distributed rather evenly over the surface. The genital plate is small, rather narrow, and concave on the posterior surface, about eight hairs are located near the ends. Hairs on cauda confined largely to posterior margin. Median posterior portion of cauda bluntly pointed.

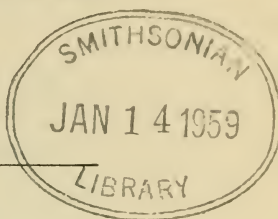
Alate viviparous female.

Length from vertex to end of cauda varying from 3.45-3.60mm. Color in life not recorded, cleared specimens similar to color of apterous viviparous female.

Head and thorax.—Antennal segments with the following lengths: III .48mm., IV .18-.20mm., V .22-.25mm., VI .12 + .03mm. Secondary sensoria distributed as follows: III 4-6 as a rule five or more, IV 1-2 as a rule only one, V 0-2 as a rule one. On the third segment the sensoria are quite large covering more than half of side, arranged in a straight row, confined to apical half of segment, slightly tuberculate. Hair on antennal segments quite similar to hair on antennae of apterous viviparous female, except that there are no short hairs on the third segment, all hairs varying only slightly from .08mm. in length. No antennal segment imbricated. First and second antennal segments with numerous hairs. Hairs on dorsum of head fairly numerous, about .09mm. in length, posterior margin of head free from hairs. Lateral lobes of thorax with numerous hairs except for more lateral regions where the hairs are few or wanting. Median posterior lobe of thorax with numerous hairs. Costal margin of fore wing dark. Radial sector straight, radial cell long and narrow. Media once branched, the branch far removed from margin of wing. Surface of wings covered with long black scale-like structures.

Rostrum almost reaching mid region of anal plate. Lengths of pro and metathoracic femora 1.05 and 1.65mm. Lengths of pro and metathoracic tibiae 1.44 and 2.77mm. Metathoracic tarsal segments .14 and .27-.28mm.

PROCEEDINGS
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TWO NEW BIRDS FROM EASTERN ASIA

By H. G. DEIGNAN*

I.

Peters (Check-list of Birds of the World, vol. 4, 1940, p. 252) records the Malayan house swift, *Apus affinis subfurcatus*, as "casual in the Philippines, Formosa and the Borodino Islands." Hachisuka (Quarterly Journal of the Taiwan Museum, vol. 4, Nos. 1 & 2, June 1951, p. 76) emendates Peters's statement, saying "A small number of this House-Swift [*subfurcatus*] is resident in Formosa, breeding probably in high mountains and descending to the low plains in winter."

I have recently obtained from Dr. Robert E. Kuntz, Head of the Parasitology Department, U. S. Naval Medical Research Unit No. 2, based in Formosa, a series of 29 adult house swifts (many of them captured on their nests) from the suburbs of Taipei. They prove to represent an undescribed subspecies, which may be called

Apus affinis kuntzi, subsp. nov.

Type: U. S. National Museum No. 469354, unsexed adult, collected at Shih Lin (a northern suburb of Taipei), Taipei Hsien, Formosa, on 26 June 1958, by C. Cheng; original number PF 5007 d.

Diagnosis: Nearest *Apus affinis subfurcatus* (Blyth) of Malaya, but easily separable by having the general coloration an almost matt black, and so far as it is glossed at all, glossed with greenish blue rather than steel blue; the throat patch and rump band ashy white, not snow white, and thus less sharply defined from the adjacent dark areas of the plumage.

Range: Northern Formosa. (Reports of the occurrence of *A. a. subfurcatus* in the Borodino Islands, the northern Philippines, and on the coast of Fukien should be reconsidered.)

II.

In course of study of the Timaliinae for a forthcoming volume of Peters's Check-list of Birds of the World, I find it necessary to name a hitherto unreported population of the blue-winged siva from the lowlands of Szechwan. I shall call it

*Published with permission of the Secretary of the Smithsonian Institution.

Minla cyanouroptera croizati, subsp. nov.

Type: U. S. National Museum No. 310764, adult male, collected at Ipin [Suiful], Szechwan, on 2 April 1928, by David C. Graham.

Diagnosis: Nearest *Minla cyanouroptera wingatei* of Yunnan, but differing by having the ground color of the crown and nape a darker, more slaty (less vinaceous), violet-gray; the mantle and upper tail coverts a deeper, richer, less fulvous, brown; the under parts (especially anteriorly) a deep vinaceous gray, rather than vinaceous-washed white.

Range: Known by 15 specimens from the type locality, taken at elevations between 1,000 and 3,000 feet.

Remarks: This race is named in honor of my friend Léon Croizat of Caracas, Venezuela.

PROCEEDINGS
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REVIEW OF MEXICAN BATS OF THE ARTIBEUS
"CINEREUS" COMPLEX

BY WILLIAM B. DAVIS

*Department of Wildlife Management Texas A. and M.
College, College Station, Texas*

In attempting to unravel the identity of three small forms of *Artibeus* we have from Guerrero, I have had occasion to review the treatment of the Mexican forms of the small members of that genus. Andersen (Proc. Zool. Soc. London, 1908: 204-319) revised the genus and recognized five species as occurring in Mexico as follows; *Artibeus toltecus toltecus* (Saussure) to which he referred specimens from Durango, Jalisco, Tepic (= Nayarit), Oaxaca, and Veracruz; *Artibeus phaeotis* (Miller) in Yucatan; *Artibeus aztecus* Andersen from Tetela del Volcan, Morelos; *Artibeus nanus* Andersen from Sinloa, Colima Guerrero, and Veracruz; *Artibeus turpis* Andersen from Tabasco.

Herskovitz (Proc. U. S. Nat. Mus., 1949, 99(3246):429-454) considers *toltecus* and *phaeotis* to be conspecific with the South American form *Artibeus cinereus* (Gervais) but recognizable as distinct subspecies. Later, Dalquest (Proc. Biol. Soc. Washington, 1953, 63:61-66), the last reviewer of the Mexican forms, reduced the number of species of small Mexican *Artibeus* to three (*A. cinereus*, *A. turpis*, and *A. nanus*) by placing *aztecus* as a subspecies of *A. cinereus*.

Because the treatments by both Herskovitz and Dalquest seemed at variance with the specimens we have accumulated from Mexico, I have attempted to reevaluate the relationships of the five "species" recognized by Andersen. I am indebted to officials of the U. S. National Museum, the Chicago Natural History Museum, the University of Kansas Museum of Natural History, and the Louisiana State Museum of Zoology for the loan of comparative material.

Although *Artibeus nanus* and *A. turpis* resemble *A. cinereus* in having a relatively wide, nearly naked interfemoral membrane, they both differ from that species in having a depressed rostrum, a highly arched cranium and a relatively short palate. *A. turpis* differs from *nanus* mainly in slightly larger size. In fact, the two appear to be geographic races of the same species, with *turpis* occupying the lowlands of eastern and southern Mexico (Veracruz: Plan del Rjo. 2, TCWC; Arroyo Azul 1, 1, UKMNH. Tabasco: 2 mi. Teapa, 5, UKMNH. Oaxaca: 2 mi. S.

Tollocito (= Tollosa), 1, UKMNH) and *nanus* occupying the lowlands of western Mexico (Guerrero: Tierra Colorado (type locality); Tres Palos, 1, TCWC; El Papayo, 1, TCWC. Colima: Hacienda Magdalena, 7, USNM. Sinaloa: Presidio, 1, BMNH). Adult specimens from Petén, Guatemala, are larger than *nanus* from Guerrero (forearm 37.5-39 mm. rather than 35.0-36.5 mm.) and appear to be referable to *turpis*. Two specimens (UKMNH 64923-24) from Astillero, Guatemala, are young individuals with forearms 35 mm. and 36.5 mm., respectively. On geographic probability they, too, should be assigned to *turpis*.

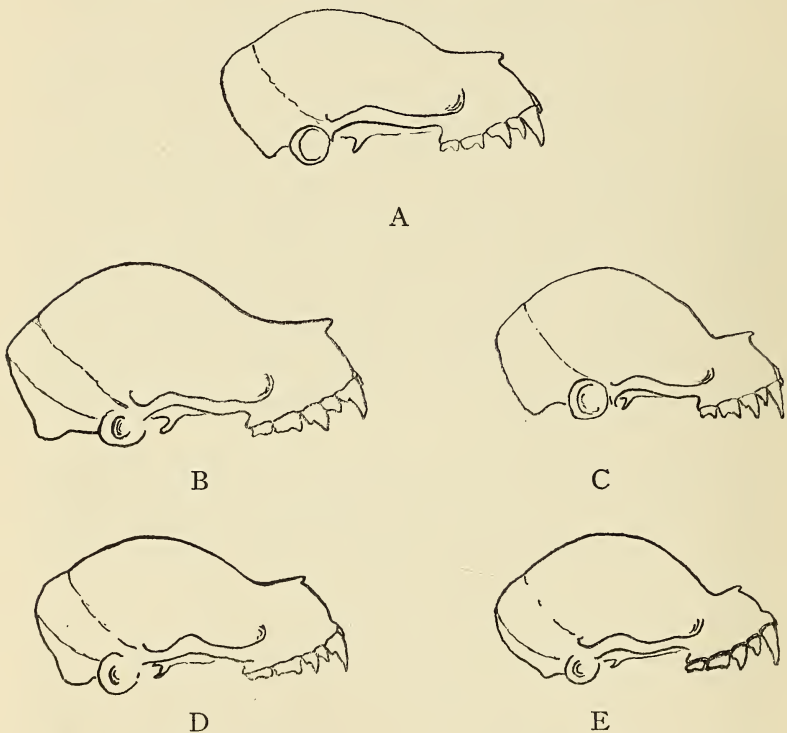


Fig. 1. Cranial profiles of five forms of Mexican *Artibeus* X2.

A. *Artibeus cinereus phaeotis*; B. *Artibeus aztecus*;

C. *Artibeus toltecus*; D. *Artibeus turpis turpis*;

E. *Artibeus turpis nanus*. Note particularly the overall size and especially the profile of the rostrum and frontal region.

The relegation of *Artibeus phaeotis* as a subspecies of *A. cinereus* seems fully justified. Both have a rather wide interfemoral membrane (8-10 mm.) which is naked or nearly so, the whitish supraorbital stripes are usually conspicuous, the slope of the frontal region of the skull is similar, and the length of the forearm is comparable. This form occurs

in the lowlands of eastern Mexico in *Veracruz* (Jesus Caranza, Minatitlán, Río Solosuchil and possibly Achotal), *Yucatan* (Chichen Itza), and *Campeche* (La Tuxpena).

I cannot concur with Hershkovitz (*op. cit.*) and Dalquest (*op. cit.*), however, in aligning *Artibeus toltecus* with *A. cinereus* or with Dalquest's (*op. cit.*) placing of *A. aztecus* as a subspecies of *A. cinereus*. That *toltecus* and *aztecus* are closely related is not questioned, but they both differ from all forms of *cinereus* I have examined (*cinereus*, *rosenbergi*, and *phaetoides*) in (1) interfemoral membrane narrow (6.5 mm. or less), deeply incised, and conspicuously hairy; (2) ears with no trace of white on the rim; (3) whitish supraorbital stripes present but rather inconspicuous; and (4) slope of the frontal region gently rising (fig. 1 b-c). These differences are sufficient, at least to me, to preclude treating them as geographic races of *A. cinereus*.

On the basis of material at hand I consider *aztecus* and *toltecus* not only specifically distinct from *cinereus*, but also from each other. The differences between *aztecus* and *toltecus* are of the magnitude that separate two larger species of Mexican *Artibeus*, namely *lituratus* and *jamaicensis*. *A. aztecus* is larger than *A. toltecus* in all measurements. The specimens from El Salto (*ca.* 2000 ft.), San Luis Potosí, which Dalquest (*op. cit.*) considered as intergrades between *aztecus* and *toltecus* are not, in my opinion, intergrades but rather are clearly referable to *toltecus*. Perhaps he was led to his conclusion because the skull of one of the specimens of *aztecus* (LSUMZ 2790), from Cerro Campanario, San Luis Potosí, approaches *toltecus* in size and is noticeably smaller than the other known specimens of *aztecus*.

All four known locality records of *aztecus* (*Morelos*: Tetela del Volcan, 6550 ft., 4, BSC. *Guerrero*: Omiltemi, 7900 ft., 4, TCWC. *Jalisco*: 2 mi. N Ciudad Guzman, *ca.* 5000 ft., 4, KUMNH. *San Luis Potosí*: Cerro Campanario, 7900 ft., 4, LSUMZ) indicate that this species inhabits mountainous areas at elevations above 5000 feet. Consequently, if *aztecus* intergrades with *toltecus* of the lowlands, such intergrades would most likely be found at middle altitudes. Specimens from near Taxco (4,000 ft.) and Agua del Obispo (3300 ft.) in Guerrero, however, are clearly referable to *toltecus*. Yet *aztecus* has been taken at Omiltemi (7900 ft.) less than 30 airline miles from the latter locality.

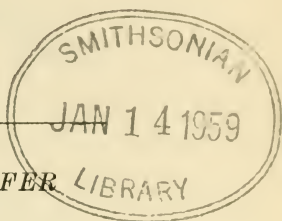
Known locality records for *toltecus* in Mexico are at elevations below 5000 feet. Thus, the two forms appear to complement each other geographically, but, until demonstrable intergradation is established, it seems wisest to adopt a conservative view and consider the two as distinct species.

In summary, the five small forms of *Artibeus* in Mexico seem to segregate as follows:

- a. Interfemoral membrane narrow (greatest width 6.5 mm. or less), deeply incised, and conspicuously hairy; ears with no trace of white on rim; whitish supraorbital stripes present but inconspicuous; frontal region of skull gently rising (see fig. 1 b-c).
- b. Forearm 43-47 mm.; 3rd metacarpal 41.3-45.3; greatest length of skull 21.5-23; length of maxillary tooth row (C-M²), 7.0-7.6 _____ *Artibeus aztecus*
- bb. Forearm 38-42 mm.; 3rd metacarpal 37-40; greatest length of

- skull 20.4-21.2; length of maxillary tooth row (C-M²), 6.6-6.9 *Artibeus toltecus*
- aa. Interfemoral membrane wider (greatest width 8-10 mm.), less deeply incised, and almost naked; whitish supraorbital stripes usually conspicuous.
- c. Rostral area of skull short, depressed posteriorly and upturned anteriorly; palatal length to posterior border of incisive foramina less than post-palatal length; ears white-edged.
- d. Forearm, 37.6-40; length of skull, 19-20; length of upper tooth row (C-M²), 5.9-6.7. *Artibeus turpis turpis*.
- dd. Forearm, 35.2-38; length of skull, 18.0-18.7; length of upper tooth row (C-M²), 5.6-6.1. *Artibeus turpis nanus*.
- cc. Rostral area of skull not depressed posteriorly; frontal region gently sloping, not highly arched; palatal length to posterior border of incisive foramina greater than post-palatal length; ears concolor, not white-edged. *Artibeus cinereus phaeotis*.

PROCEEDINGS
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THE STATUS OF THE BAT *MYOTIS VELIFER*
COBANENSIS GOODWIN

By LUIS DE LA TORRE*

*Department of Zoology, and Museum of Natural History,
University of Illinois, Urbana, Illinois.*

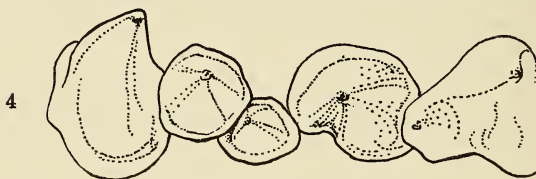
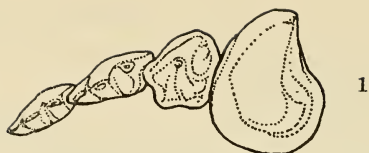
Myotis velifer cobanensis Goodwin (Amer. Mus. Nov. No. 1744: 2, 1955) was described from an individual taken in Cobán, Guatemala, and was characterized by small size, dark color, second lower premolar crowded between the first and third premolars, overlapping lower incisors, and distinct cranial characters.

The questions that immediately arise are the following: Are the previously recorded specimens from Guatemala *Myotis velifer velifer* J. A. Allen, 1890, or *Myotis velifer cobanensis* Goodwin, 1955? If both subspecies occur in Guatemala what is their distribution, and what is the evidence that they are subspecies? Is the single individual a small specimen of *M. v. velifer*?

The study of the available material of *M. velifer* from Southern México and Guatemala, including the type and topotypes of *M. v. velifer*, clearly indicates that *Myotis velifer velifer* occurs in Guatemala. The probable distribution of this bat throughout the southern highlands of México and in Guatemala is outlined in Figure 7. The Guatemalan records indicated represent the southernmost known limits of the range of *M. velifer*. I find the specimens from Panajachél, Chocoyos, and Santa Clara, in Guatemala, indistinguishable in size and color from specimens of *M. v. velifer* from La Palma, Tancitaro, and Pátzcuaro in Michoacán, México. In forearm size, for example, 64 specimens from Chocoyos, Guatemala, average 45.0 mm with a range from 42.0 mm to 47.1 mm, while a series of 60 specimens from La Palma, Michoacán, México, averages 44.3 mm and ranges from 42.1 mm to 47.1 mm. Forearm measurements of the Santa Clara specimens are 44.2 mm, 44.5 mm, and 45.4 mm. In skull size no significant difference is seen between the Mexican and the Guatemalan specimens. Six skulls from western Guatemala average 16.5 mm in greatest length, ranging from 16.3 to 16.9 mm. The single skull available (cleaned) from Santa Clara measures 17.0 mm.

The Guatemalan specimens agree with the Mexican *M. v. velifer* in color and size rather than with *M. v. cobanensis* (forearm 41.1 mm, greatest length of skull, 15.4 mm). It is of interest that even the three

*This work was begun during my tenure of the Thomas J. Dee Fellowship awarded by the Chicago Natural History Museum.



Figures 1-6. Individual variation in position of right lower incisors and right second lower premolar in specimens of *Myotis velifer velifer* from Michoacán, México (Figs. 1-4), and from Chocoyos, Guatemala (Figs. 5, 6). Drawings by E. John Piffner, approximately X 10.



Figure 7. Guatemalan locality records of *Myotis velifer velifer*, and the type locality of *Myotis velifer cobanensis*. 1. Cobán, Alta Verapáz (type locality of *M. v. cobanensis*). 2. Santa Clara, Zacapa. 3. Chocoyos, Chimaltenango. 4. Panajachél, Sololá.

specimens from Santa Clara, a locality but 50 miles southeast of Cobán (see Fig. 7), show no approach nor gradation toward the characters of *cobanensis*. In fact, one skin from this locality is the lightest of the Guatemalan series. Thus, in the absence of a gradation in morphology, one can only doubt that a genetic connection exists.

The type specimen of *cobanensis* was later examined and compared with adult and immature individuals of *M. v. velifer*. My measurements of the type, in millimeters, are as follows: Forearm, including carpals, 41.1; metacarpal III, including carpals, 39.3; foot, 9.9 tibia, 15.6; greatest length of skull, 15.4; condylobasal length of skull, 14.1; mastoid breadth, 7.8; palatilar length, 6.5; postorbital constriction, 3.8; braincase breadth, 7.2; greatest breadth across molars, including molars, 6.3; maxillary tooth row, 6.2; mandibular tooth row, 6.6; greatest length of mandible, 11.4.

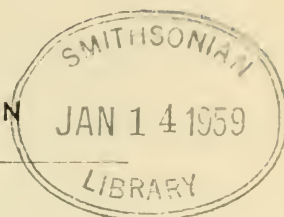
The dental characters pointed out as distinguishing this type specimen from *M. v. velifer* are extremely variable in any population of *M. velifer*.

Figures 1-6 illustrate this variation. Two specimens from the same locality may show differing degrees of overlapping of lower incisors (Figs. 1, 2), while the crowded and uncrowded condition of the second lower premolar may be found in specimens from the same locality in México (Figs. 3, 4) as well as in specimens from the same locality in Guatemala (Figs. 5, 6). These characters unfortunately cannot serve as indices of geographic variation.

The type is an adult or a near adult, since the metacarpal and phalangeal epiphyses give no clear evidence of immaturity. Even if the skull is of a young adult, the cranial characters, well described by Goodwin, do not seem to be those of a young *M. v. velifer*, since the immature *M. v. velifer* also differ from *M. v. cobanensis* in these respects. The short rostrum, the more globular braincase, and the height of the braincase above the rostrum, are characters which I do not see expressed in specimens of *M. v. velifer*.

In view of the clear occurrence of typical *M. v. velifer* in Guatemala, and in the absence in the Guatemalan populations of any evidence of morphological intermediacy between the characters of *M. v. velifer* and *M. v. cobanensis*, it seems incorrect to continue to regard *cobanensis* as a subspecies of *M. velifer*, but must be regarded as a different species, *Myotis cobanensis* Goodwin. Its relationship to other named species or its possible identity with some already described species must await further study.

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A NEW SPECIES OF CINARA (APHIDAE) FROM
NORTH DAKOTA

F. C. HOTTES

I am indebted to Prof. M. A. Palmer for her valued opinion concerning the new species described herewith, and to Miss Louise M. Russell of the United States National Museum for sending me the material from which it is described.

Cinara jucunda n. sp.

Apterous viviparous female.

Length from vertex to end of abdomen varying from 2.70-3.00mm. Color of living specimens not recorded, as represented by cleared mounted specimens as follows: first antennal segment concolorous with head which is brown, second antennal segment not quite as dark as first. Third antennal segment pale dusky, almost uniform in color, fourth antennal segment concolorous with third for most of length, but with apex slightly darker. Fifth antennal segment with basal half pale and the apical half dusky brown. Sixth antennal segment uniform brown. Prothorax with dorsum brown. Dorsum of meso and metathorax with lateral areas dark brown. All femora with basal regions pale dusky and apical regions darker. All tibiae with a short region near base dark brown, this followed by a pale region which extends beyond middle of pro and mesothoracic legs, and to middle of metathoracic tibiae. Tarsal segments brown. Cornicles brown. Dorsum of abdomen with or without small irregular pigmented spots anterior to transverse pigmented areas.

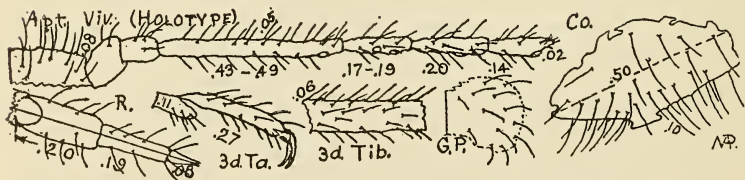
Head and thorax.—Ocular tubercles small. Median transverse suture of head pale, narrow. Antennal segments with the following lengths: III .43 — .49mm., IV .17 — .19mm., V .20mm., VI .14 + .02mm. Third antennal segment with or without one secondary sensorium, fourth and fifth antennal segments each with one secondary sensorium. Primary sensorium on third antennal segment small. Marginal sensoria on sixth antennal segment almost all basal to sensorium and more or less in a row. Hairs on dorsum of head about .08mm. in length. Hairs on antennae upstanding, comparatively few, on third segment varying from .03 — .06mm. in length. No specimen with rostrum fully extended, last three segments of the rostrum with the following lengths: .20, .19 and .08mm. Mesosternal tubercle absent. Prothoracic femora varying in length from

.72 — .82mm. Prothoracic tibiae varying in length from .93 — 1.05mm. Metathoracic femora varying in length from .97 — 1.125mm. Metathoracic tibiae varying from 1.50 — 1.87mm. Minimum lengths for these segments represented by one specimen. Metathoracic tarsal segments .11 and .27mm. in length. Hairs on anterior margin of metathoracic femora about .06mm. in length, other hairs on this segment about the same length and quality. Hairs on outer margin of metathoracic tibiae irregular in length varying from .04 to .06mm. in length, all shorter than width of segment, upstanding, but less so near apex. Hairs on inner margin of metathoracic tibiae slightly shorter, less upstanding, and finer than the hairs on the outer margin, but more uniform in length. Ventral surface of first metathoracic tarsal segment with about ten hairs. Hairs on ventral surface of second metatarsal segment more numerous than the hairs on the dorsal surface, with the hairs on the dorsal surface normally longest.

Abdomen.—Hairs on dorsum of abdomen fairly numerous, rather coarse, about .09mm. in length, hairs on ventral surface much more numerous, varying in length, the longest about .06mm. long. Cornicles with base varying in width from .45 — .52mm. Outer margin of cornicles irregular, but not deeply notched. Hairs on cornicles about .10mm. in length, the hairs on the inner surface being shorter and finer as well as more numerous than the hairs near the margin. Genital plate indented front and rear, with the hairs confined to the ends. Transverse pigmented spots long and with the ends irregular, provided with two rows of hairs along the posterior margins, the hairs being more numerous in the posterior row. Hairs on cauda confined almost totally to posterior margin which is deeply pigmented and with a setulose surface.

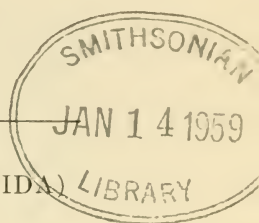
This species shows affinity to *C. pallidipes* H. and differs from that species in larger size, longer antennal segments, longer legs and larger cornicles, fewer hairs on the outer margin of the metathoracic tibiae, these hairs are also shorter.

Holotype apterous viviparous female, deposited in the United States National Museum. Data on holotype slide as follows: On Colorado and Black Hills Spruce, Bismarek, N. D. June 16, 1958 V. Goodfellow. As there are only four specimens, it is hardly likely that they were taken on two species of spruce. I suspect that the specimens were taken on Black Hills Spruce (*Picea glauca*).



Cinara jucunda n.sp.

PROCEEDINGS
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PILL MILLIPEDS (DESMONIDAE, POLYDESMIDA)
IN THE UNITED STATES

BY NELL B. CAUSEY

Fayetteville, Arkansas

Earlier papers on the millipeds of the family Desmonidae in the United States are by Bollman (1888, 1893), Cook (1898), and Loomis (1943). These writers described one species from each of the states of Alabama, Arkansas, and Oklahoma. In this paper I have added records from seven other states and descriptions of two new species and one new subspecies. The type specimens will be deposited in the American Museum of Natural History.

I am greatly indebted to Dr. David Causey, who aided in making most of the collections, and to Mr. Walter Harman, Dr. D. L. Wray, and Dr. M. L. Sanderson, for one collection each.

Millipeds representing two genera of the family Desmonidae are known from the southern United States. *Desmonus carlei*, with 20 body segments, has been collected from an area that extends from southeastern Kentucky through eastern Tennessee, Georgia, Alabama, and into western Florida. Another species with 20 body segments, *Desmonus pudicus*, is known from a limited area from central Arkansas; and two species, each with 19 body segments, occur in western Arkansas and adjacent areas of Missouri, Texas, and Louisiana. The monotypic genus *Desmoniella* has been collected only in central Oklahoma. The family is probably much more widely distributed in the southern United States than the present records indicate.

I have collected these millipeds from a variety of habitats in either deep or sparse litter, on moss, or in decaying logs in hardwood, pine, and mixed forests. They have been found in two sites with other pill millipeds of the genus *Onomeris*, order Oniseomorpha.

*Key to the Desmonidae of the United States Based on
Somatic characters of Mature Specimens*

- 1a. Lobes of the second body segment about as long and as broad as the lobes of the third segment; 19 body segments *Desmoniella curta*
- 1b. Lobes of the second body segment much shorter and narrower than the lobes of the third segment; either 19 or 20 body segments *Desmonus* 2

- 2a. 20 body segments 3
 2b. 19 body segments 5
 3a. Surface smooth, shining, without adhering mucus and soil particles; tubercles on segments 16 through 19 *pubidicus*
 3b. Surface finely granular, with adhering mucus and soil particles; tubercles, either distinct or indistinct, on segments 4 through 20..... 4
 4a. Segments 5 through 19 with prominent, erect, distinct tubercles.....
 *earlei earlei*
 4b. Most tubercles indistinct; only on segments 17, 18, and 19 are they erect and distinct *earlei mancus*, new subspecies
 5a. Tubercles usually prominent and distinct on all segments from 5 through 18 or 19. Body moderately moniliform.
 *inordinatus*, new name
 5b. Tubercles absent from all except the last three or four segments, where they are very small. Body very slightly moniliform
 *austrus*, new species

Genus *Desmoniella*

Desmoniella Loomis, 1943, Bull. Mus. Comp. Zool. Harvard, vol. 92, no. 7, p. 400 (*Desmoniella curta*).

This genus is very distinct from *Desmonus* in the shape of the lateral lobes of the second and third body segments and in the presence of lateral pits on only segments 4 through 10. The gonopods are similar in the two genera.

Genus *Desmonus*

Desmonus Cook, 1898, Proc. U. S. Nat. Mus., vol. 21, no. 1154, p. 463 (*Desmonus earlei*).

This genus is unusual in that some species have 19 body segments and others have 20. The body length is between 4.5 and 8.5 mm. The shape of the lateral lobes of the adult stadium is constant throughout the genus. The gonopods and the J-shaped third article of the first legs of the male are almost constant in shape throughout the genus. The lateral pits begin on segment 3 in all species and continue through the last segment in some species; in others it has not been possible to determine definitely where the lateral pits leave off. All species except *D. pudicus* have the body surface sparsely to thickly covered with mucus and soil particles. All species have tubercles on one or more segments. The tubercles are arranged in transverse series of from 6 to 12, with the one or either side of the medial pair always a little anterior to the others in the series. Tubercles may be conspicuous, erect, and conical, or they may be flattened and inconspicuous. Each tubercle has a seta at its apex.

The larvae lack mucus and have very few tubercles. The lateral lobes of the second segment are broader and longer than in the adult stadium, closely resembling the shape of those lobes in the last stadium of the genus *Desmoniella*.

Desmonus earlei earlei

Desmonus earlei Cook, 1898, Proc. U. S. Nat. Mus., vol. 21, no. 1154, 463-465, pl. 32, figs. 1a-1n (Auburn, Lee Co., Alabama).

The adult specimens in my collection conform closely to the descrip-

tion of the species. The larvae are smooth, shining, and with tubercles on only the last three or four segments.

New records: *Georgia*: DeKalb Co., Stone Mountain, 1 ♀, June 16, 1958; tubercles less conspicuous than observed in any other specimens of this subspecies: larvae, Sept. 14, 1954, D. L. Wray. Fulton Co., Bankhead Lake, 1 ♂, 2 ♀, June 16, 1958.

Kentucky: Bell Co., Pine Mountain State Park, 1 ♂, June 16, 1940. Whitley Co., Cumberland Falls State Park, 1 ♂, 1 ♀, larvae, June 17, 1940.

Tennessee: Campbell Co., Norris Park, 1 ♂, June 18, 1940.

Desmonus earlei mancus, new subspecies

Diagnosis: Differs from *Desmonus e. earlei* in the smaller size of the body, the degenerate tubercles, and shorter setae.

Description of female holotype: Body width 1.8 mm. In alcohol without color except the sparse patches of tan mucus. Surface of tergites unevenly granular. Segments 5 through 16 each with a transverse row of 8 or 10 very obscure tubercles, the position of each one marked by a short seta. Segments 17, 18, and 19 have more distinct, conical tubercles; on segment 19 the tubercles are nearly as large as on that segment of *D. e. earlei*. On the anal tergite there is a pair of low, irregular tubercles. Lateral pits can be seen distinctly on segments 3 through 16.

Type locality: *Florida*: Jackson Co., Florida Caverns State Park, 1 ♀, in moss on rock in dense woods at entrance to natural bridge, May 27, 1958.

Other record: *Georgia*: Polk Co., Highway 161, 9 miles west of Centerton, hardwood forest, 1 ♀, June 17, 1958. This specimen has light brown antennae; in all other characters it is like the holotype.

Desmonus pudicus

Figure 1

[*partim*] *Spheriodesmus pudicus* Bollman, 1888, Ent. Amer., vol. 4, p. 3; 1893, Bull. U. S. Nat. Mus., no. 46, p. 75 (Little Rock, Pulaski Co., and Okolona., Clark Co., *Arkansas*).

[*non*] *Desmonus pudicus* (Bollman). Cook, 1898, Proc. U. S. Nat. Mus., vol. 21, no. 1154, pp. 465-466, pl. 32, figs. 2a, 2b.

Restricted type locality: *Arkansas*: Pulaski Co., Little Rock.

In life the color is pink above, fading to cream below. In alcohol the pink fades quickly and narrow gray bands appear on the head, antennae, and across the tergites. Surface of tergites smooth and shining, without colored mucus and adhering soil particles. Segments 16 through 19 each with a transverse series of about 8 small tubercles. They are largest on segment 19 and progressively smaller on the preceding segments. Segment 20 and the segments anterior to 16 have no indication of tubercles except a single seta in the position that is occupied by each tubercle in the other species. Lateral pits on segments 3 through 20, very difficult to see on segments 14 through 20.

The gonopods (Fig. 1) are very similar to those of the other species of the genus except that the tibiotarsal region is slightly broader; the apical region of each of its two rami is divided into three minute divisions, which are rounded on the posterior ramus and acute on the lateral or anterior ramus.

New record: *Arkansas*: Pulaski Co., Sweet Home, mixed woods, 2 ♂,

6 ♀, many larvae, Dec. 22, 1949. This site is now occupied by a new housing development.

As discussed more fully in the section of *Desmonus inordinatus*, neither Bollman nor Cook realized that the two pill millipeds in Bollman's collection from Arkansas represent two different species. Bollman's description was based on the Little Rock specimen, which was lost before Cook studied the remaining specimen from Oklona.

***Desmonus inordinatus*, new name**

Figure 2

Desmonus pudicus (Bollman). Cook, 1898, Proc. U. S. Nat. Mus., vol. 21, no. 1154, pp. 465-466, pl. 32, figs. 2a, 2b.

Diagnosis: Similar to *D. earlei earlei* in the size of the tubercles; distinguished from that species by having 19 body segments instead of 20.

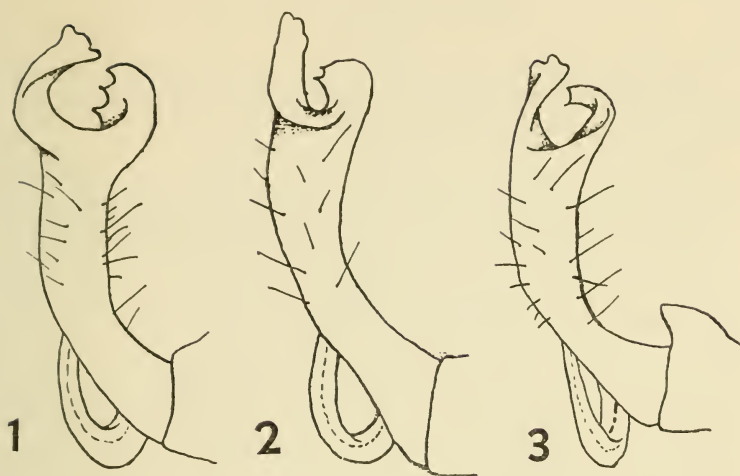
Type locality: *Arkansas*: Clark Co., Okolona.

Description of female holotype: Length about 6.5 mm. In alcohol the body is without pigment other than the abundant tan mucus and adherent soil particles. Surface of tergites finely granular. Beginning indistinctly on segment 4 and continuing much more distinctly on segments 5 through 18, each metatergite has a transverse series of 8, 10, or 12 tubercles. As in *D. earlei earlei* each tubercle has a seta at its apex, and the tubercles on each side of the middle pair in each series is somewhat smaller than those between which it stands and is slightly in front of them. Dorsal tubercles larger than the lateral ones in each series. On the 3 or 4 segments preceding the caudal segment the tubercles are acute and have a distinctly caudal slant. Caudal tergite with a pair of low, broad tubercles. Lateral pits on segments 3 through 13 easily seen; pits continue through segment 19.

In this species the gonopods (Fig. 2) are almost indistinguishable from others in the genus. The posterior ramus of the tibiotarsus is divided into three minute, rounded divisions, and the lateral or anterior ramus into two minute acute divisions.

Variations: The specimens from Clark, Pike, and Polk counties all have large, conspicuous tubercles. In collections made north of the Arkansas River, there is some variation in the tuberculation. Occasional specimens have very flat tubercles. Both strongly and weakly tuberculate forms may appear together in the same collection. Both forms are moderately moniliform, a character which easily distinguishes the weakly tuberculate form from the very weakly moniliform species *D. austrus*. In the following list of collections, all mature specimens have strong, conspicuous tubercles except those specifically mentioned as having degenerate tuberculation.

Records: *Arkansas*: Benton Co., Monte Ne, 1 ♀, Nov. 19, 1949; Cave Springs, larvae, May 8, 1951. Carroll Co., Lake Leatherwood, 1 ♂, 1 ♀, June 30, 1950. Clark Co., roadside park 4 miles east of Arkadelphia, hardwood forest, thin litter, gravelly soil, 2 ♂, 3 ♀, Sept. 11, 1950; 15 miles east of Okolona on highway 51, under cedar tree, 1 ♀, larvae, Sept. 11, 1950; Johnson Co., 1 ♀, tubercles degenerate, May 30, 1951. Newton Co., Compton, 1 ♀, tubercles degenerate, larvae, July 13, 1940. Pike Co., Antoine, mixed woods, sandy soil, 3 ♂, June 8, 1951. Polk Co., Rich Mountain, west side near summit, hickory forest, 1 ♂, Sept. 7, 1950. Sebastian Co., 3 miles north of Hackett, highway 71, thin oak litter, 1 ♀,



Explanation of Figures

Figure 1. *Desmonus pudicus* (Bollman), Sweet Home, Pulaski Co., Arkansas.

Figure 2. *Desmonus inordinatus*, new species, Fayetteville, Washington Arkansas.

Figure 3. *Desmonus austrus*, new species, Claiborne Par., Louisiana.

All figures are of the left gonopod, sublateral view, and are drawn to the same scale.

Sept. 1, 1950, Washington Co., numerous collections from Devil's Den State Park, Mount Sequoyah, West Fork, Farmington, Goshen, and Spring Valley; in most collections there are specimens with degenerate tubercles as well as specimens with very distinct tubercles. Conway Co., Petit Jean State Park, 1 ♂, 4 ♀, larvae, May 5, 1950.

Missouri: Barry Co., Mark Twain National Forest, oak-hickory forest, 2 ♂, May 3, 1951.

Bollman's collection which he named *Speriodesmus pudicus* consisted of two specimens, one from Little Rock and the other from Okolona. The male, which was designated as the type of the species, was subsequently lost; my specimens from Sweet Home, south of Little Rock, agree with its description. The female was therefore the specimen collected at Okolona; Cook found it in the United States National Museum and described it as follows:

Closely allied to the preceding [*D. carlei*], but distinct in the much less prominent elevations of the segments. The surface itself, however, seems to be rougher than in *D. carlei* and the adherent matter is more abundant, giving the creature a more uniform and darker color.¹

¹Cook (1898, p. 466)

Cook noted the discrepancy between his description of the female and Bollman's description of the male, but explained that it was due to the latter's description having been drawn partly from living material.

***Desmonus austrus*, new species**

Figure 3

Diagnosis: Similar to *D. pudicus* in the almost complete absence of tubercles and in the weakly moniliform appearance; distinguished from that species by having 19 body segments instead of 20.

Type locality: *Arkansas*: Columbia Co., Magnolia.

Description of male and female syntypes: Length of male 5 mm., length of female 6 mm. Shape of lateral lobes as in other species of the genus. In alcohol the color is light tan. Surface of tergites slightly roughened, shining under the thin layer of mucus. The two or three segments preceding the caudal segment have four or six very small erect tubercles on the caudal margin. Segment 19 with a pair of low, irregular tubercles. All segments with a transverse series of about 12 short setae. Lateral pores on segments 3 through 19.

The gonopods are almost indistinguishable from those of *D. inordinatus*.

Variation: The specimens from Sevier county were pale pink when collected. Those from Cass county are the smallest seen, the length being about 4.5 mm.; they have no tubercles.

Records: *Arkansas*: Columbia Co., 4 miles east of Magnolia, mixed woods, deep litter, several of each sex, Dec. 22, 1949 (type collection); Lumber, 1 ♀, Dec. 22, 1949. Sevier Co., Wilton, 1 ♂, several ♀, larvae, Dec. 23, 1950.

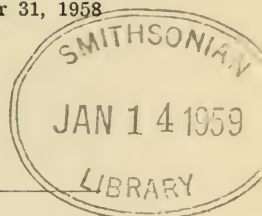
Louisiana: Claiborne Par., about 5 miles south of Junction City, several of each sex, larvae, Dec. 24, 1949. *Lincoln* Par., 1 ♀, Oct., 1950, W. Harman. Winn Par., 1 ♀, June 11, 1951.

Texas: Cass Co., Linden, 2 ♂, Apr. 9, 1950, Smith and Berger.

Desmonus sp.

Tennessee: Sevier Co., Great Smoky Mountains National Park, larvae, June 21, 1940.

PROCEEDINGS
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NEW RECORDS AND DESCRIPTIONS OF A NEW
GENUS AND A NEW SPECIES OF MILLIPEDES OF
THE FAMILY STRIARIIDAE (CHORDEUMIDA)

NELL B. CAUSEY
Fayetteville, Arkansas

The seldom collected, very slow moving, little millipeds of the North American family Striariidae are known from two areas, one eastern and the other western. The genera *Amplaria Striaria*, and *Vaferaria*, n. gen., occur in Oregon and California, while only the genus *Striaria* has been found in an area extending from Maryland to Indiana and south into Georgia. This family has been the subject of two papers (Cook 1899, Loomis 1936), but most of the records are fragmentary, and much work remains to be done on the group, both collection and description.¹

Most collections of striariids have been made in damp humus of hardwood forests, but Cook (1899) reported that in rather dry open woods in the District of Columbia *Striaria columbiana* outnumbered all other millipeds. The three species that have been collected in caves do not show obvious modification to cave life other than reduction of pigment of the body or of the ocelli. One species is known from fossils, probably of Pleistocene time, as well as from recent collections.

Mature specimens have been collected in all seasons, but mature males are very scarce in collections and are unknown for some species. The anterior gonopods are complex, with the coxite and the telopodite about the same length and each usually with several branches. The coxite is easily seen and is a reliable taxonomic character. Somatic characters, such as color, size, number of ocelli, number and height of crests, density of granules, and shape of the anal tergite, are useful taxonomic characters for both sexes.

KEY TO THE GENERA OF STRIARIIDAE

1. Dorsal surface of body strongly flattened, especially at the anterior end. Mature males without labral spines ——— *Vaferaria*, n. gen.

¹I am very grateful to the following people for the opportunity of studying the specimens of millipeds recorded in this paper: Dr. T. C. Barr, Jr., Dr. H. P. Chandler, Dr. Robert deSaussure, Dr. Eugene N. Kozloff, and Dr. D. L. Wray. The assistance of Dr. H. F. Garner with the fossil specimens is also gratefully acknowledged.

Dorsal surface of body usually rounded, if flattened, only slightly.

Mature males with labral spines in all species in which males have been described

2. Eyes with 2 or 3 ocelli. Medial pair of crests thinner and more depressed than any others on all body segments. Collum with a deep transverse furrow. Not known whether males have labral spines

Eyes with 5 or more ocelli. Medial pair of crests as large as any others on all segments except the first. Collum without a deep transverse furrow. Mature male with 2 labral spines..... *Striaria*

Genus *Amplaria* Chamberlin

Amplaria Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no.5, p. 9.

This genus includes the species *eutypa* Chamberlin and *nazinta* (Chamberlin). The presence of 12 crests on the collum is not a good diagnostic character for this genus.

Amplaria nazinta (Chamberlin)

Striaria nazinta Chamberlin, 1910, Ann. Ent. Soc. Amer., vol. 3, no. 4, pp. 242-243, pl. 35, figs. 2-6 (Portland, Oregon). Loomis, 1936, Jour. Washington Acad. Sci., vol. 26, no. 10, p. 408.

Amplaria nazinta, Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 5, p. 9.

Oregon record.—Multnomah Co.: Portland, Skyline Blvd., in leaf mold in burned over forest, 1 ♂ of 28 segments, Apr. 28, 1957, Dale B. Monroe. This larva differs from the description of the female holotype in that on the collum there are 10 rather than 12 crests, the labrum has three teeth rather than two, and the eyes are composed of three distinct ocelli. The most striking characters of this species are the thick transverse ridge across the anterior surface of the collum and the reduction in height and thickness of the medial pair of crests on all segments.

Genus *Striaria* Bollman

Striaria Bollman, 1888, Ann. New York Acad. Sci., vol. 4, p. 108. Cook, 1899, Proc. U. S. Nat. Mus., vol. 21, pp. 671-672. Loomis, 1936, Jour. Washington Acad. Sci., vol. 26, no. 10, pp. 405-406.

This genus includes the species *californica* Cook, *carmela* Chamberlin, *eldora* Chamberlin, *nana* Loomis, and *shastae*, n. sp., from California, *antica* Causey from Indiana, *causeyae* Chamberlin from North Carolina, *columbia* Cook from the District of Columbia and Maryland, and *granulosa* Bollman from Tennessee, Kentucky, North Carolina, and Georgia.

Striaria antica Causey

Striaria antica Causey, 1952, Proc. Biol. Soc. Wash., vol. 65, p. 112, figs. 1-3 (Montgomery Co., Indiana).

Several corrections and additions should be made to the description of this species. The length of the collum is twice the length of the posterior subsegment of the second segment. The collum has 12 dorsal crests, of which the ventral one on each side is rudimentary; the other 10 crests are as thick as crests on the second segment. The ventral margin of the second segment is almost parallel with the sixth dorsal

crest of that segment, and the distance between them is very slightly greater than the distance between the fifth and sixth crests; the anterior-ventral corner of the ventral lobe is a right angle. Both the anterior and posterior margins of the posterior subsegments of segments 2, 3, and 4, as observed from a dorsal view, are in the form of broad obtuse angles instead of being straight or slightly rounded.

Striaria californica Cook

Striaria californica Cook, 1899, Proc. U. S. Nat. Mus., vol. 21, p. 675, pl. 53, fig. 2a (Marin Co., California). Loomis, 1936, Jour. Washington Acad. Sci., vol. 26, no. 10, p. 409, fig. 1f (Santa Cruz and Solano Cos., California).

California record: Marin Co., Lagunetas, 1 ♀, Apr. 7, 1943, H. P. Chandler. Length about 18mm., width 1.8mm., eyes composed of 9 or 10 ocelli, body pale brown in alcohol, ventral margin of collum with a shallow emargination near the posterior angle, angle formed by projection of ventral crest and sixth dorsal crest of second segment about 60 degrees.

Striaria causeyae Chamberlin

Striaria causeyae Chamberlin, 1940, Canadian Ent., vol. 72, p. 58 (Durham Co., North Carolina).

North Carolina record: Wake Co.: Raleigh, 1 ♂ of 28 segments, in leaf mold, May 10, 1950, D. L. Wray. This larva differs from the description of the male holotype in that the sixth pair of dorsal crests of the collum are rudimentary and the eyes have six ocelli. All crests and marginal ridges are lighter in color than the background color; posterior subsegments and collum darker than anterior subsegments; posterior subsegments have near their posterior margin a dark line that is emarginate between the crests; no longitudinal lateral bands. The sinuses that separate the three lobes of the anal tergite are deep and narrow, with the apices of the sinuses narrowly rounded.

Striaria granulosa Bollman

Striaria granulosa Bollman, 1888, Ann. New York Acad. Sci., vol. 4, p. 103 (Jefferson Co., Tennessee); 1893, Bull. U. S. Nat. Mus., no. 46, p. 83. Cook, 1899, Proc. U. S. Nat. Mus., vol. 21, no. 1169, pp. 672-674, pl. 53, figs. 1a-1j. Loomis, 1936, Jour. Washington Acad. Sci., vol. 26, no. 10, p. 409.

Striaria zygoleuca Hoffman, 1950, Jour. E. Mitchell Sci. Soc., vol. 66, no. 1, pp. 16-17, pl. 5, fig. 3 (Macon Co., North Carolina).

Georgia record: De Kalb Co.: Stone Mountain, 5462 Memorial Drive, 1 ♂ of 28 segments, in leaf mold, June 16, 1958, N. B. Causey.

Kentucky record: Bell Co.: Pine Mountain State Park, 2 larvae of 28 segments, June 17, 1940, N. B. Causey.

North Carolina records: Cabarrus Co.: Mount Pisgah, 1 ♀, Sept. 28, 1950; 2 ♂, Oct. 5, 1949. Henderson Co.: Bat Cave, 1 ♀ of 28 segments, May 15, 1950. Watauga Co.: Grandfather Mountain, larvae of 26 segments, Nov. 15, 1950. Yancey Co.: Mount Mitchell, 1 ♂ of 28 segments, Sept. 29, 1950; larvae of 26 segments, July 25, 1951. All of the North Carolina collections were made by D. L. Wray.

***Striaria shastae*, new species**

Diagnosis: A cavernicolous species, the largest of the genus, distinguished by the reduction of body pigment, by the shallow body crests, and by the reduced number of crests, five pairs instead of six pairs, on the segments of the posterior half of the body.

Description of female syntypes: Length of largest specimen about 25mm., width 2.4mm. Color in alcohol from light tan to nearly white. Eyes with 7 or 8 black ocelli in 2 irregular rows.

Collum with 5 pairs of crests of equal height; below them is a sixth pair of shorter, or rudimentary, crests of the same height, but not reaching the posterior margin; in front of the middle three pairs of crests is the usual swollen area that is typical of the genus. Crests of segments 2 through 4 of equal height, slightly higher than those of the collum. Beginning with segment 5 the crests, especially the sixth pair, become progressively shallower; the sixth pair drops out entirely by segment 13 or 14, leaving only 5 pairs on segment 14 through 29. Ventral or marginal crests unusual in that at the anterior end they turn back and up, forming an acute tooth. Distance between the sixth crest of middle body segments and ventral crests is 4 or 5 times the distance between crests 5 and 6. Ventral lobes of second segment nearly horizontal, the antero-ventral angle oblique, its apex rounded; distance from ventral margin to sixth crest, as measured along the posterior margin of the posterior subsegment, 3 times the distance between crests 5 and 6; along the anterior margin, the distance is twice the distance between crests 5 and 6. Posterior margins of segments 2, 3, and 4, as viewed from above, straight. Segmental setae aciculate, about one-fourth the length of the dorsal crests. Surface of collum between crests thickly and coarsely granular; on the following segments the granules become progressively smaller and slightly sparser; much sparser on the sides, which are shining. Caudal tergite thickly granular, its medial lobe twice as wide and slightly longer than the lateral lobes, the sinuses between them relatively deep, open, the sides parallel and the apices narrowly rounded.

Mature males are unknown.

Type locality: California: Shasta Co.: Samwel Cave, from guano solution bowl, passage to guano solution bowl, and bottom of a pit 90 feet deep; all collections in total darkness; larvae of 23 segments, Jan. 7, 1957; larvae of 18, 28 segments, June 8, 1958; 1 ♀, larvae of 15, 18, 28 segments, June 11, 1958; all collections by R. deSaussure and R. Graham. Fossilized fragments of 3 specimens, in bone and dirt rubble from a filled crack, June 7, 1957, N. Slusser.

Striaria spp.

California record: Contra Costa Co.: Mount Diablo, altitude 3000 feet, 1 ♀ of 28 segments, May 8, 1947, H. P. Chandler. Length about 12mm., width 1.4mm., eyes with 5 ocelli in 2 uneven series.

Kentucky record: Franklin Co.: Hoy Cave 1 ♀ of 28 segments, L. Hubricht. Length about 12mm., width 1.1mm., eyes with 6 and 5 black ocelli in 2 uneven series, color tan, very near *S. columbiana* in many somatic features.

Genus *Vaferaria*, new genus

Diagnosis: Distinguished especially by the absence of spines on the

labrum of mature males and by the flattened dorsal surface.

Type species: Striaria imberbis Loomis.

Description: Similar to other genera of the family in body size and in the arrangement of ocelli, granules and striae. Differs in the flattened dorsum, the narrowed head, and in the mature male, the absence of labral spines and the presence of a very large, bluntly conic lobe on the second segment of the second legs. The gonopods have not been described carefully.

Vaferaria imberbis (Loomis), new combination

Striaria imberbis Loomis, 1936, Jour. Washington Acad. Sci., vol. 26, no. 10, pp. 408-409, fig. 1D (San Luis Obispo Co., California).

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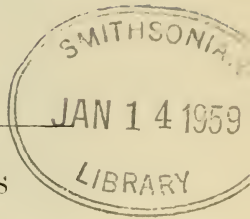
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OCCURRENCE OF THE CHILOPOD GENUS
ETHMOSTIGMUS IN AMERICA

RALPH V. CHAMBERLIN

In a collection of chilopods from California received for identification from the University of California, is a single specimen of a distinctly new species of the scolopendrid genus *Ethmostigmus*. This is of special interest from the point of view of distribution since the fifteen or so species heretofore known in the genus occur in the Ethiopian and Indo-Australian areas exclusively. The new species is here described.

***Ethmostigmus californicus* n. sp.**

Dorsum olive brown in color, the posterior legs a lighter green or olive.

The antennae comparatively long, composed in the type of 19 articles all of which are longer than broad; the first three articles only are naked on the left antennae of the type, but on the right the fourth article is also naked except on the outer distal area where the fine short hairs are present as on subsequent articles, the absence of hair elsewhere on this article quite likely due to rubbing.

Prosternal teeth 3 — 3, the outermost tooth on each side small; dental plates set off by a transverse suleus which forms a nearly right angle at the middle; a median longitudinal suleus extending caudad nearly to middle of prosternum. (Cf. fig. 1.)

First sternite without sulci, but those from second to the penult marked with paired longitudinal sulci which are incomplete posteriorly.

Last ventral plate elongate trapeziform, its caudal margin incurved; Coxopleural processes long, these moderately converging caudad but not distally in contact, each with a single point or spine at distal end, behind which on the dorsal line are three denticles, with in addition two sublateral denticles of which the more distal one is subventral in position; upper margin of process viewed in profile is straight back to beginning of acuminate portion. Pores small and densely arranged, the poriferous area extending caudad close to end of the process. (Cf. figs. 2 and 3.)

Tarsal spines single on legs 1 to 19. Prefemur of anal legs with the caudal process ending in a single tooth which is moderately large; two spinules on the dorsomesal line, two on mesal side, two on ventromesal line and three on ventral line.

Length, 60mm.

Locality.—California, El Dorado Co., Snowline Camp. Holotype taken June 28, 1948.

This species is like *E. waiainus* of the Solomon Is., and *E. coonoranus* of India in having only the first three articles of the antennae naked or glabrous. From the first of these species it differs in having the apex of the coxopleural process with a single point instead of two, in having three dorsal spinules instead of one, and in having a tarsal spine on the nineteenth leg. From *coonoranus* it differs in having none of the legs with two tarsal spines, in not having the coxopleural process convex above, etc.

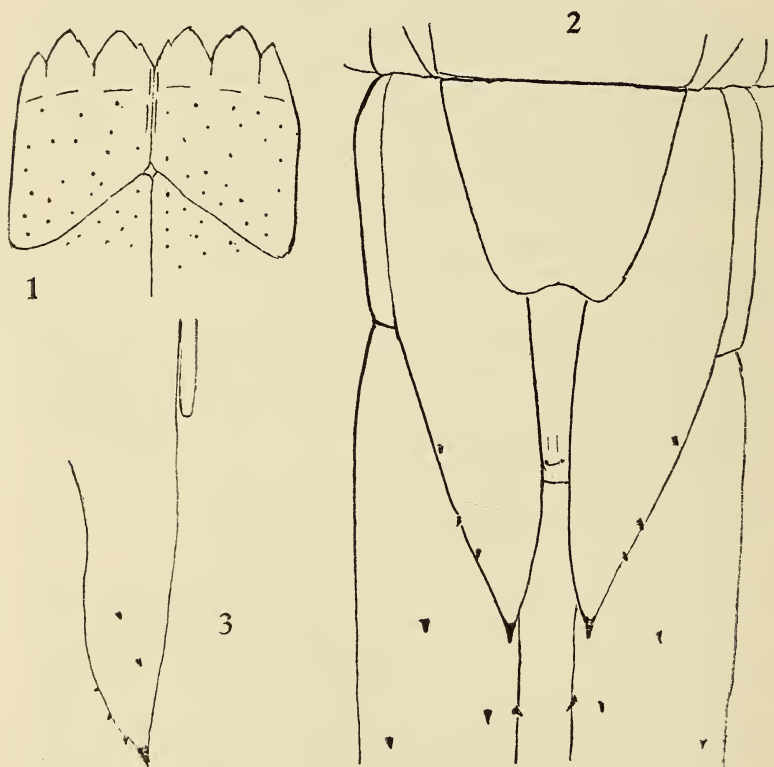
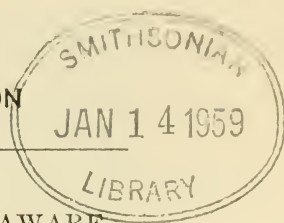


Fig. 1. Anterior portion of prosternum.
Fig. 2. Caudal end of body, ventral view.
Fig. 3. Lateral view of coxopleural process.

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A NEW SPECIES OF CINARA FROM DELAWARE
(APHIDAE)

F. C. HOTTES

I am indebted to Miss Louise M. Russell of the United States National Museum for sending me the material from which this new species is described and to Mr. H. E. Milliron for collecting it.

Cinara tunicula n.sp.

Aptecrous viviparous female.

Size and general color.—Length from vertex to end of cauda varying from 3.15 - 3.33 mm. Color in life not recorded, as represented by cleared mounted specimens as follows: head and thorax dark dusky brown with margins slightly darker. Thorax with pigmented areas large, more or less united along mid line. Posterior dorsal pigmented area of the thorax less extensive, more fragmented in outline. Dorsum of abdomen covered for the most part by a large pigmented area which extends forward in the middle, and which engulfs the cornicles on the dorsum so that they are not differentiated from it except by form. Antennal segments one and two concolorous with head, segments three and four pale dusky with apical regions darker. Fifth antennal segment with basal half pale dusky, remainder of segment pale brown. All of sixth antennal segment pale brown. All femora yellowish at base shading to brown, the brown being more extensive and darker on the metathoracic femora. Pro and mesothoracic tibiae with a short region near base brown, this followed by an extensive pale dusky region which shades into brown near the apex. Metathoracic tibiae with a short region near base brown, this followed by a short pale region which shades quickly into brown, so that more than one half of this segment is brown. Tarsal segments brown.

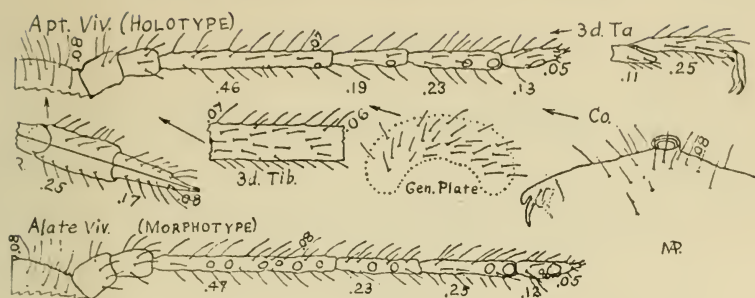
Head and thorax.—Width of head through the eyes .66 mm. Ocular tubercles small but well developed. Median transverse suture not dark, narrow, more or less incomplete on anterior half. Hair on dorsum of head not numerous, failing to reach posterior margin of head and region adjacent to eyes, about .08 mm. in length. Antennal segments with the following lengths: III .34 - .49 mm., IV .18 - .21 mm., V .21 - .24 mm., VI .13 + .05 mm. Third antennal segment with or without primary sensorium. Fourth antennal segment with primary sensorium and with or without one small secondary sensorium. Fifth antennal

segment with primary sensorium, with a wide rim, and one secondary sensorium. Primary sensorium on sixth antennal segment with wide rim, marginal sensoria in a row. Sixth antennal segment weakly imbricated at base, the imbrications better developed towards apex. Hair on antennae sparse, very fine, longer on anterior margin where they vary in length from .03 - .07 mm. rather upstanding, slightly more numerous on posterior margin. Rostrum reaching mid region of cornicles, last three segments with the following lengths: .25, .17 and .08 mm. Hairs on rostrum quite numerous as well as long. Mesosternal tubercle a rounded hump provided with some hairs. Lengths of prothoracic femora and tibiae as follows: .93, 1.29 mm. Lengths of metathoracic femora and tibiae as follows: 1.46, 2.52 - 2.58 mm. Hairs on metathoracic femora few, fine, upstanding, more numerous on anterior margin. Hairs on metathoracic tibiae fine, much shorter on basal region than near apex, also fewer and finer on this region. Much more numerous on inner margin near apex than on outer margin. Hairs on outer margin in mid region varying from .06 - .07 mm. in length. First metatarsal segment .11 mm. in length, with about twelve hairs on the ventral surface. Second metatarsal segment varying in length from .25 - .27 mm. Hairs on the ventral surface of this segment more numerous than the hairs on the dorsal surface, but of the same quality.

Abdomen.—Pigmented area on dorsum almost free from hairs, the few present, too short to measure, arising from clear areas. Hairs on lateral portions of abdomen and non pigmented areas very fine, sparse, about .06 mm. in length. Hairs on cornicles very sparse, except on constricted area where they are not numerous. Hairs on cornicles similar as to type, fine, varying in length from .06 - .08 mm. Extent of cornicle difficult to determine from the dorsum, but this can be determined from the ventral surface. The cornicles are quite shallow. Transverse pigmented spot anterior to cauda wide, provided with very fine setulae, hairs confined to a row along the posterior margin, the hairs are few and fine. Hairs on cauda confined to posterior margin. Cauda and anal plate with setulae. Hairs on ventral surface of abdomen numerous, similar to those on the sides. Genital plate broadly rounded on anterior, deeply excavated on the posterior. Hairs on genital plate covering surface.

Alate viviparous female.

Length 3.09 mm. Antennal segments darker than in the apterous viviparous female. Median transverse suture of the head dark, well developed. Ocular tubercles small but well developed. Width of head through the eyes .66 mm. Color of legs quite similar to legs of apterous viviparous female. Pigmented spot on dorsum of abdomen lacking. Antennal segments with the following lengths: III .47 - .51 mm., IV .23 mm., V .23 - .25 mm., VI .12 + .05 mm. Secondary sensoria on third antennal segment arranged in a row, varying in number from four to six, not all of the same size. Secondary sensoria on fourth antennal segment varying in number from one to two. The fifth antennal segment has one secondary sensorium. All secondary sensoria have rather wide rims. Hairs on anterior margin of third antennal segment more numerous than hairs on this margin in the case of the apterous viviparous female. The hairs on the third antennal segment are set at an

*Cinara tunicula* n.sp.

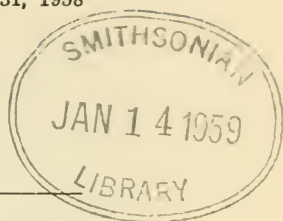
angle of about 60 degrees on the anterior margin and about 45 degrees on the posterior margin. On the anterior margin they are about .08 mm. in length. Hairs on lateral lobes very sparse, fine, confined more or less to a row on the inner margin, middle region of lobe with only a few hairs. Rostrum reaching to posterior edge of cornicles. Second fork of media closer to margin of wing than to first fork. Hairs on metathoracic tibiae slightly more numerous than the hairs on this segment in the apterous female. Length of prothoracic femora and tibiae .93, 1.29 mm. Lengths of metathoracic femora and tibiae 1.46, 2.52 - 2.58 mm. Cornicles at base .39 mm. Hairs on cornicles sparse, but more numerous on constricted area. Cornicles of this form higher than the cornicles of the apterous form. Outer margin of cornicles irregular. Hairs on dorsum of abdomen not numerous, fine, about as long as the hairs on the cornicles varying from .08 - .09 mm. in length, spaced for the most part closer together than their length. Hairs on ventral surface of abdomen much more numerous than the hairs on the dorsum, slightly shorter and much coarser. Transverse pigmented spot anterior to cauda wide, with very few hairs on its posterior margin. Anterior to this spot there is a small pigmented spot with very short setulae and a few short hairs.

In Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region" which does not cover the region from which this species came, it keys to *C. glabra* (G&P.) It differs from *glabra* in not having the dorsum of the abdomen clothed with setulae, and in having the cornicles incorporated in the dorsal pigmented spot. In *glabra* the genital plate is much larger and has fewer hairs.

The unguis of *tunicula* is also too short for *glabra*. This species will not key in Tissot's key to the genus *Cinara* Florida Entomologist Vol. XXII, 1939.

Holotype apterous viviparous female, morphotype alate viviparous female, both deposited in the United States National Museum. Host, *Pinus virginiana*, taken on older branches, by H. E. Milliron Petersburg, Delaware May 22 and May 29, 1957.

PROCEEDINGS
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DESCRIPTIONS OF TWO ALLIED SPECIES OF
CINARA (APHIDAE)

F. C. HOTTES

It is now almost forty years since Wilson described *Lechniclla pinivora* a species which has since been placed in the genus *Cinara*. Since that time, I am aware of no other material of this species having been taken. It has been keyed but once, by Wilson, in Hemiptera of Connecticut and has never been illustrated. I am indebted to the United States National Museum for the loan of the "type" slide, and to J. O. Pepper for sending me the material from which the new species is described, which he had determined as *pinivora*.

Cinara pinivora (Wilson)

Alate viviparous female.

Size and general color.—Length of uncleaned specimens from vertex to end of cauda varying from 3.00-3.07mm. Color in life not recorded, as represented by mounted material as follows: Head and thorax dark dusky brown. Abdomen brown, with cornicles darker, the constricted area of the cornicles much so. First and second antennal segments concolorous with head. Third antennal segment with base pale, the extent of this region varying, but it may extend to middle or to second or third secondary sensorium, remainder of segment dusky. Fourth, fifth and sixth antennal segments uniform dusky, or with the basal portions of the fourth and fifth segments somewhat paler. Femora with basal halves yellowish, remainder of segment brown. Tibiae with basal region brown, or dark brown, this region about equal in length to the tarsal segments. This dark region is followed by a pale region which gradually shades into brown, this region may equal slightly more or less than one half of the total length. Tarsal segments concolorous with ends of tibiae. Transverse pigmented areas anterior to cauda divided, brownish, only slightly setulose. A few hairs on dorsum of abdomen arise from small irregular pigmented areas, these areas are larger towards the posterior.

Head and thorax.—Width of head through the eyes about .69mm. Length of antennal segments as follows: III .48 — .60mm., IV .18 — .225mm., V .22 — .28mm., VI .11 + .04mm. Hair on antennae not numerous, set at angle of about forty-five degrees, longer and coarser on anterior margin where the hair on the third segment vary from

.06 — .09mm. in length. Third and fourth antennal segments not smooth but not imbricated. Fifth antennal segment rougher than third and fourth, sixth segment imbricated, the imbrications being very distinct. Secondary sensoria distributed as follows: III 4 — 6 arranged in a row, varying in size, IV 0 — 1 as a rule none, V 0 — 1 as rule one. Only primary sensoria on fifth and sixth segments with wide rims. Marginal sensoria on sixth segment confined to a row not much longer than sensorium. Median transverse suture well developed, dark. Hairs on dorsum of head about .08mm. in length. Ocular tubercles fairly well developed. No specimen with rostrum fully extended. Last three segments of the rostrum with the following lengths: .19, .15, .08mm. Lateral lobes of thorax with numerous hairs on median half. Median posterior lobe of thorax almost free from hairs on anterior half. Triangular area between lateral and median posterior lobes with two hairs. Media twice forked, the second fork varying in position. All femora with numerous long fine hairs. The hairs on the anterior margin of the metathoracic femora being about .12mm. in length. Hairs on metathoracic tibiae numerous, set at an angle varying from 45-60 degrees, in length varying from .10 — .12mm. Hairs on inner margin of metathoracic tibiae numerous, set at an angle varying from 45-60 degrees, slightly shorter, with the hairs near the inner apex much shorter. Metathoracic tarsal segments .07 and .22 — .25mm. in length. Hairs on ventral surface of first metatarsal segment numbering about twelve. Hairs on dorsal surface of second metatarsal segment reclinate much longer than hairs on ventral surface.

Abdomen.—Hairs on dorsum of abdomen not numerous, varying slightly in length with the longest towards the posterior, spaced for the most part as far apart as their length which is about .09mm. Hairs on ventral surface of abdomen more numerous than those on the dorsum, and slightly finer. Hairs on transverse pigmented spots about .12mm. in length, confined to a row along the posterior margin. Cornicles with outer margin somewhat irregular, more or less oval in shape, being longer than wide, and with the constricted area closer to the posterior than to the anterior. The constricted area is rather high, and is sharply distinguished from the base. The hairs on the cornicles are fine, about .08mm. in length, evenly distributed over the surface and very few in number, the total number being about twenty. The surface of the abdomen is finely reticulated. The setulae on the transverse pigmented areas and on the genital plate are very poorly developed. The genital plate is quite small with the hairs confined largely to the ends, it is concave on its anterior and posterior margins. Hairs on cauda confined to posterior margin. Both the cauda and anal plate have setulae on the surface.

Lectotype alate viviparous female indicated by arrow on slide indicated as "type" by Wilson. Host *Pinus sp.* New York. 1908. Hopkins 7422. Slide on deposit in the United States National Museum.

Cinara harmonia n. sp.

Apterous viviparous female.

Size and general color.—Length from vertex to end of cauda varying from 3.67 — 3.90mm. Color notes taken from living specimens not

complete, but described on slide as "dark," "greenish brown," "brownish" with the cornicles black. Color as represented by cleared mounted specimens as follows: Head, first and second antennal segments, and pro and mesothorax dusky brown. Mid region of metathorax with irregular patches of dusky brown. Third, fourth and fifth antennal segments very pale dusky with apical ends darker. All of sixth segment dusky brown. Basal fourth of pro and mesothoracic femora pale brownish, remainder brown. Basal half of metathoracic femora pale brownish but darker than basal region of other femora, remainder brown. Basal region of pro and mesothoracic tibiae dark dusky brown for a distance about equal to the length of the fourth antennal segment, this dark region followed by a pale dusky to pale brown region which gradually grows darker towards the apex, beyond the middle. Metathoracic tibiae similar to other tibiae except that the apical brown area is more extensive. Dorsum of abdomen with varying number of pigmented areas which vary greatly in size, number and shape, the larger being closer to posterior end.

Head and thorax.—Width of head through the eyes about .69mm. Ocular tubercles small but very protuberant. Median transverse suture well developed, brown. Hairs on dorsum of head fine, long varying from .10 — .11mm. in length. Antennal segments varying in length as follows: III .53 — .60mm., IV .21 — .27mm., V .27 — .30mm., VI .12 — .15 + .04mm. Secondary sensoria distributed as follows: III 0 — 1 as a rule one, IV 0 — 2 as a rule one, V 1 — 2 as a rule one. Hairs on antennal segments about .09mm. in length with those on the anterior margin more numerous, set at an angle of about sixty degrees. Brownish portion of fifth and all of sixth antennal segments imbricated, the imbrications being strongly developed on the sixth. Marginal sensoria in a row, extending basal to primary sensorium. Only primary sensoria on the fifth and sixth segments with wide rims. Rostrum when extended reaching to the cornicles, last three segments with the following lengths: .21, .19 and .10mm. Mesosternal tubercle present, with a very wide base, in shape more or less a rounded hump. Pro and metathoracic femora varying in length from 1.05 — 1.65 and 1.65 — 1.68mm. Only one specimen had prothoracic femora as long as 1.65mm. Lengths of pro and metathoracic tibiae varying in length as follows: 1.42 — 1.50 and 2.65 — 2.95mm. Hairs on outer margin of metathoracic tibiae quite similar to those on the inner margin, set at an angle of about 45 degrees, shorter than width of segment, about .09mm. in length. Hairs on dorsal surface of second metatarsal segment but little longer than those on ventral surface. Length of metatarsal segments about .105 and .30mm.

Abdomen.—Cornicles with base more or less oval, the outer margin irregular or slightly fragmented, measuring about .48 — .56mm. front to rear. Hairs on constricted area of cornicles much more numerous than hairs elsewhere, near the margin they are scarce. Dorsum of abdomen reticulated. Hairs on dorsum of abdomen rather sparse, farther apart than their length, varying from .08 — .09mm. Hairs on ventral surface of abdomen more numerous than the hairs on the dorsum, also shorter. Transverse pigmented spots anterior to cauda wide, almost joined by teeth, hair on these confined to a row along the posterior margin. Two pigmented areas are as a rule interior to these,

they vary in size and shape. All such pigmented areas have very well developed setulae.

Alate viviparous female.

Size and general color.—Length from vertex to end of cauda varying from 2.92 — 4.2mm. Color of cleared specimens much like that of the apterous viviparous female, except that the metathoracic tibiae are apt to be darker, the pale area not so pale, or extensive, nor are the cornicles so dark.

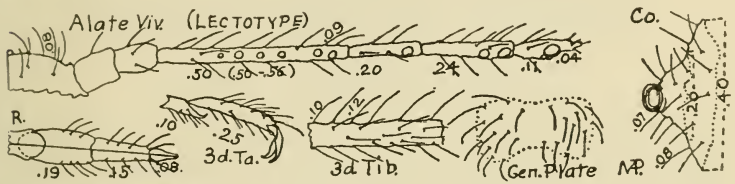
Head and thorax.—Ocular tubercles small but protuberant. Width of head varying from .69 — .75mm. Antennal segments with the following lengths: III .52 — .60mm., IV .23 — .26mm., V .30 — .33mm., VI .12 — .13 + .04mm. Secondary sensoria distributed as follows: III 5 — 9, IV 1 — 3 as a rule one, V 0 — 1 as a rule one. On the third segment the secondary sensoria are arranged in a straight row, they are slightly tuberculent and vary in size. Hair on antennae not numerous, set at an angle of about 45 degrees, on third segment varying in length from .075 — .10mm. Hair on posterior margin of third segment less numerous than the hair on the anterior margin and only about .05mm. long. Rostrum when extended reaching to the middle of the cornicles and in one case to the genital plate. Last three segments of the rostrum with the following lengths: .21, .18 and .09mm. Hairs on lateral lobes of thorax numerous, covering slightly more than half of lobe. Triangular area between lateral lobes and median posterior lobe often with as many as four hairs. Lengths of pro and metathoracic femora varying as follows: 1.05 and 1.42 — 1.65mm. Lengths of pro and metathoracic tibiae varying as follows: 1.50 and .262 — 2.70mm. Hairs on metathoracic femora long and fine, numerous, more numerous on anterior margin, but no longer than hairs on posterior margin. Hairs on metathoracic tibiae varying in length from .10 — .11mm., numerous, same on outer and inner margins, except for shorter hairs on inner margin near apex. Metatarsal segments about .12 and .30mm. in length. Ventral surface of first metatarsal segment with about 12 hairs. Hairs on second metatarsal segment similar to those of viviparous female. Media twice forked, second fork as a rule closer to first fork than to margin of wing, base of media 1 and 2 often missing.

Abdomen.—Cornicles with outer margin in the form of a rounded oval with irregular outline. Constricted portion acentric, closer to posterior margin. Hairs on constricted area much more numerous than elsewhere, they being scarce near the outer margin. Constricted area of the cornicles not sharply distinct from base, the slope being quite gradual. Transverse pigmented areas anterior to cauda with well developed setulae. Hairs on these areas, with one or two exceptions confined to a row along posterior margin. Genital plate rather large with mid anterior and posterior regions recessed. Hairs on genital plate confined largely to ends. Hairs on dorsum of the abdomen for the most part closer together than their length which is about .07mm. Hairs on ventral surface of abdomen much more numerous, and only about .06mm. long.

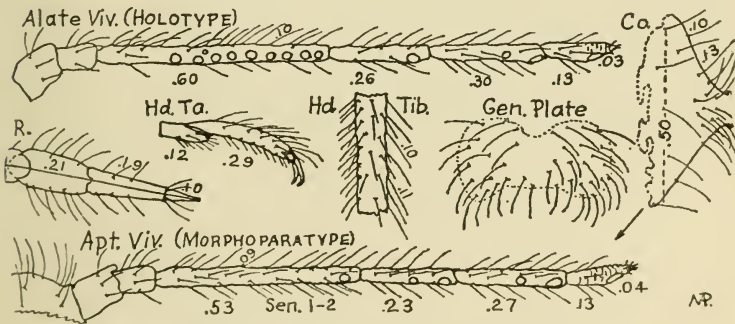
This species is closely allied to *C. pinivora* (W) and keys to this species in Wilson's key, in Hemiptera of Connecticut. Only alates of Wilson's species are known. Alates of this species differ from alates

of pinivora in the longer segments of the rostrum, more numerous hairs on the cornicles, and the uneven distribution of these hairs. The number of hairs on the cornicles being thirty or more, not twenty or less. The cornicles also differ in size and shape. The antennal segments of harmonia are longer, and there are more secondary sensoria on the third antennal segment. The metathoracic tibiae are darker.

Holotype alate viviparous female, morphotype apterous viviparous female. Host, red pine (*Pinus resinosa*) taken on two or three years old wood. J. O. Pepper, July 4, 1947, Philipsburg, Pennsylvania (Black Mosh. Dam). Type slides deposited in the United States National Museum.

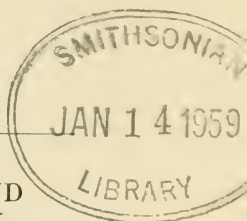


Cinara pinivora (W)



Cinara harmonia n.sp.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A SUPPLEMENTARY LIST OF SPECIES AND
RECORDS OF DISTRIBUTION FOR NORTH
AMERICAN FRESHWATER OSTRACODA

EDWARD FERGUSON, JR.
Grambling College, Grambling, La.

The most recent list of North American freshwater ostracods was published by Tressler (1947). He records 204 species. This paper reports twenty-one new species of freshwater ostracods recorded from North America during the eleven year period 1947-1957 inclusive. Included also are three species, one by Klugh (1923) and two by Blake (1931), not mentioned by Tressler in his 1947 paper.

The classification followed is essentially that suggested by Hoff (1942).

New Species of North American Freshwater Ostracoda

Suborder Podocopa

Family Cypridae

Subfamily Candoninae

Genus *Candona* Baird 1845

C. hoffi Ferguson 1952—Maryland

C. patzcuaro Tressler 1954—Mexico

C. michoa Tressler 1954—Mexico

C. niplotensia Tressler 1954—Mexico

C. orangeburgensis Ferguson 1958—South Carolina

Subfamily Cycloeyprinae

Genus *Candonocypris* Sars 1895

C. deevyi Tressler 1954—Texas

Genus *Cycloocypris* Brady and Norman 1889

C. castanea Klugh 1923—Canada

Subfamily Cyprinae

Genus *Cypricercus* Sars 1895

C. serratus Tressler 1950—Wyoming

C. tressleri Ferguson 1954—South Carolina

C. cheboyganensis Ferguson 1957—Michigan

Genus *Cyprinotus* Brady 1885

C. sulphureus Blake 1931—Utah

C. carolinensis Ferguson 1958—South Carolina
Genus *Cypriconcha* Sars 1926

C. macra Blake 1931 (= *Cypris grandis* Chambers 1877)—Col.
Subfamily Cypridopsinae

Genus *Cypridopsis* Brady 1867

C. potamis Tressler 1954—Texas

C. phantomensis Tressler 1954—Texas

C. musquizensis Tressler 1954—Texas

C. toyensis Tressler 1954—Texas

Genus *Herpetocypris* Brady and Norman 1889

H. pattersoni Tressler 1954—Texas

Family Cytheridae

Subfamily Limnocytherinae

Genus *Limnocythere* Brady 1867

L. itasca Cole 1949—Minnesota

Subfamily Entocytherinae

Genus *Entocythere* Marshall 1903

E. caudata Kozloff 1955—Oregon

E. daphnoides Hobbs 1955—West Virginia

E. ericksoni Kozloff 1955—Oregon

E. occidentalis Kozloff and Whitman 1954—Oregon

E. runki Hobbs 1955—North Carolina; Virginia (Hobbs 1955);
West Virginia (Hobbs 1955)

New Records of Distribution for North American Freshwater Ostracoda

Included in the following list are records of distribution for ostracods from Canada and Alaska not previously reported in any summary. These records were revealed unexpectedly by the discovery on pages 12 and 13 of G. O. Sars' 1926 paper on "Canadian and Alaskan Freshwater Ostracods" of a "List of Literature Recording Recent Freshwater Ostracods from Canada and Alaska" compiled by Frits Johansen. The following list is arranged in alphabetical order by genera and species.

Suborder Podocopa

Family Cypridae

Genus *Candona* Baird 1845

C. crogmaniani Turner 1894, Michigan (Kenk 1949)

C. decora Furtos 1933, Michigan (Kenk 1949)

C. elliptica Furtos 1933, South Carolina (Ferguson 1948)

C. fabaeformis (S. Fischer 1851), South Carolina (Ferguson 1958)

C. indigena Hoff 1942, Michigan (Ferguson 1957)

C. intermedia Furtos 1933, Texas (Tressler 1954)

C. simpsoni Sharpe 1897, Michigan (Moore 1939 and *C. exilis* Furtos 1933, and as *C. reflexa* Sharpe 1897)

Genus *Chlamydothea* Saussure 1858

C. texasiensis (Baird 1862), Texas (Tressler 1954)

Genus *Cypria* Zenker 1854

C. exsculpta (S. Fischer 1855), Newfoundland (Alm 1914)

C. inequivalva Turner 1893, South Carolina (Ferguson 1958)

C. lacustris Sars 1891, Texas (Tressler 1954)

C. obesa Sharpe 1897, Michigan (Ferguson 1957)

- C. ophthalmica* (Jurine 1820), South Carolina (Ferguson 1952b and 1958); Michigan (Ferguson 1957)
- C. turneri* Hoff 1942, Michigan (Kenk 1949 as *C. exculpta*), Cole 1953 as *C. exculpta*, and (Ferguson 1957); South Carolina (Ferguson 1952b and 1958)
- Genus *Cyclocypris* Brady and Norman 1889
- C. castanea* Klugh 1923, New Brunswick (Klugh 1923)
- C. forbesi* Sharpe 1897, South Carolina (Ferguson 1952b)
- C. laevis* (O. F. Müller 1785), Ontario (Klugh 1921 and 1923)
- C. serena* (Koch 1838), Ontario (Sars 1915)
- C. sharpei* Furtos 1933, South Carolina (Ferguson 1958)
- Genus *Cypricercus* Sars 1895
- C. reticulatus* (Zaddach 1894), Ontario (Klugh 1921); New Brunswick (Klugh 1923)
- C. tincta* Furtos 1933, Michigan (Kenk 1949)
- C. tuberculatus* (Sharpe 1908), Ontario (Bigelow 1923); Michigan (Ferguson 1957)
- Genus *Cypridopsis* Brady 1867
- C. vidua* (O. F. Müller 1776), Ontario (Klugh 1921); New Brunswick (Klugh 1923); Michigan (Kenk 1949), and (Ferguson 1957); Kansas (Leonard and Ponder 1949); Texas (Tressler 1954)
- Genus *Cyprinotus* Brady 1885
- C. dentatus* (Sharpe 1910), Ontario (Klugh 1921); Texas (Tressler 1954)
- C. incongruens* (Ramdohr 1808), Michigan (Ferguson 1957)
- C. salinus* (Brady 1862), Texas (Tressler 1954)
- Genus *Ilyocypris* Brady and Norman
- I. biplicata* (Koch 1838), Texas (Tressler 1954)
- Genus *Ilyodromus* Sars 1894
- I. pectinatus* Sharpe 1909, Ontario (Bigelow 1923); South Carolina (Ferguson 1958)
- Genus *Physocypris* Vávra 1897
- P. pustulosa* (Sharpe 1897), Kansas (Leonard and Ponder 1949); Michigan (Cole 1953), and (Ferguson 1957); Georgia (Ferguson 1952a); South Carolina (Ferguson 1952b)
- Genus *Potamocypris* Brady 1870
- P. smaragdina* (Vávra 1891), South Carolina (Ferguson 1952b); Texas (Tressler 1954)
- Family Cytheridae
- Genus *Entocythere* Marshall 1903
- E. humesi* Hoff 1944, North Carolina (Hobbs 1955); West Virginia (Hobbs 1955)
- Genus *Limnocythere* Brady 1867
- L. reticulata* Sharpe 1897, Saskatchewan (Huntsman 1922), and (Moore 1953).

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