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NEW RECORDS AND SPECIES OF SCOLYTIDAE (COLEOPTERA) FROM COLOMBIA

Stephen L. Wood[1]

A large collection of Colombian bark beetles recently submitted for examination by Drs. R. F. Ruppel and I. Sanabria, Rockefeller Foundation, Bogota, contained a number of records of special interest from Colombia, in addition to three previously undescribed species. The species new to science represent *Hylocurus*, *Thamnophothorus*, and the previously undescribed genus *Hoplitoplithorus*. The genus *Hoplites* Eggers, a junior homonym, is renamed, and additional notes on *Phloeocleptus* Wood are included.

Records

Cnesinus robai Blackman.—El Bosque and La Selva, Crucero, Caicedonia, Valle (del Cauca), June 29, 1959, by J. Restrepo; Rio Suarez, Pte. Nacional, Santa S., June 29, 1959, by G. Niño;Chinchina, Caldona, June 14, 1959, by M. Benavides; Las Esperanza, Tabor Briceño, Boyaca, May 20, 1959, by F. Giraldo; all from café.

Corthylus compressicornis Ferrari.—La Rivera, Caicedonia, Valle, June 18, 1959, by J. Restrepo, from guamo.

Corthylus rubricollis Blandford.—Manzanillo, Sevilla, Valle, June 20, 1959, by J. H. Lasso, from guamo.

Cryptocarenus adustus Eggers.—El Bosque, Palogrande and Montegrande, Caicedonia, Valle, June 19, 1959, by J. Restrepo; Chinchina, Caldona, June 14, 1959, by M. Benavides; all from café.

Micracisella nigra Wood.—El Bosque, Caicedonia, Valle, July 10, 1959, by J. Restrepo, from guamo.

Stephanoderes puncticollis Hopkins.—La Rivera and Palogrande Caicedonia, Valle, June 18, 1959, by J. Restrepo, from café.

Xyleborus allinis Eichhoff.—San Jose, Timbio Cauca; Montegrande, El Bosque, Caicedonia, Manzanillo, and Sevilla, Valle, numerous collections on many dates.

Xyleborus brasiliensis Eggers.—Chinchina, Caldas, May 20, 1959, by J. Prieto; Finca Varsovia, Tucopi, Cundinamarca, Apr. 27, 1959, by A. Diaz; El Bosque, Caicedonia, Valle, June 1959, by J. Restrepo; all from café.

1 Contribution no. 175, Zoology and Entomology Department, Brigham Young University, Provo, Utah. Scolytoidea contribution no. 20.

Xyleborus corniculatus Schedl.—Palmira, Valle, Mar. 3, 1956, by C. Camerona, from cacao; La Laguna Coromoro, and San Vincente, Santa S., June 26, 1959, by A. Benavides, from guamo, and J. Betancourt, from cacao; Sta. Cecelia, Caldona, Sept. 1955, by L. Garcia, from cacao; Salento, Caldona, June 1, 1959, by J. A. Garzon, from guamo.

Xyleborus ferrugineus (Fabricius).—Pto. Tejada, Palmira, and El Bosque, Caicedonia, Valle; Los Mango, Palermo, Huila; Florencia, Rio Negro, Sant. S.; numerous collections on many dates.

Xyleborus (Ambrosiodmus) guatemalensis Hopkins.—El Bosque, Caicedona, Valle, June 20, 1959, by J. Restrepo, from café.

Xyleborus horridus Eichhoff.—La Plata, Huila, Apr. 28, 1959, by B. Humides, from naranjo.

Xyleborus morigerus Blandford.—Las Lomitas, La Cumbre, El Piñal Daqua, La Virginia, Palo Alto, Centella, La Rivera Santa Fe, La Palma, Bitaco, La Tebaida, La Maria, La Luisa, Puente Palo, and El Piño, all in Valle, March to June 1959, from café.

Xyleborus posticus Eichhoff.—Palmero and La Plata, Huila, Apr. 30, 1959, by B. Herrera, from cacao; San Jose, Timbio Cauca, May 28, 1959, by N. A. Narvaez, from café; Los Santos, Santa S., June 26, 1959, by G. Niño, from caretos; San Vincente, Santa S., June 26, 1959, by J. Betancourt, from cacao; Manzanilla, Sevilla, Valle, June 20, 1959, by J. H. Lasso, from guamo.

Xyleborus princeps Blandford.—Chami, Caldas, by B. Losada; Santa Cecilia, Caldas, Sept. 1955, by E. Garcia, from cacao.

Xyleborus volvulus (Fabricius).—Monte Bello, Santa S.; Versalles, Timana, and Palmero, Huila; numerous collections on many dates.

Hoplitontus, n. n.

The name *Hoplites* was used by Eggers (1923, Zool. Meded. 7:141) to designate a monotypic genus from the Philippine Islands (type species *H. banosus* Eggers). The name had been used previously by Dejean (1833, Catal. Coleopt., ed. 2:150), and has been used several times since then to designate various other animal genera. Since Eggers' name is a junior homonym the new generic name *Hoplitontus* is proposed to replace it.

Hoplitoplithorus, n. g.

This genus is very closely allied to *Hoplitontus* Wood but may be distinguished by the seven-segmented antennal funicle, by the acutely raised lateral margins of the pronotum, and by the slightly larger scutellum. Other characters may have generic value, but at present appear to have specific value only; for example, in the type species described below, the posterior portion of the costiform ninth interspace curves ventrad to join the raised costal margin approximately at the end of the third declivital interspaces. Although specimens have not been examined, it is supposed that Eggers' South American *Hoplites corumbensis* (Brazil), *interruptus* (Guadeloupe), and *major* (Guadeloupe), belong to this genus.

Description.—Frons convex above, flattened below; eye coarsely faceted, shallowly emarginate; antennal scape short, funicle slightly longer, seven-segmented, club subspherical and unmarked by sutures except the first and second partly indicated by rows of setae. Pronotum punctate, without lateral asperities; lateral margins poorly but acutely raised forming a somewhat irregular line; proepisternal area wih very feebly raised acute ridge extending from coxal cavity to anterior margin. Scutellum small, depressed. Anterior margins of elytra weakly elevated and bearing broad marginal and a few submarginal crenulations. Tibiae broad, bearing about five teeth, similar to *Hoplitontus banosus*. Anterior coxae contiguous.

Type species.—*Hoplitoplithorus sentus*, n. sp.; monobasic.

Hoplitoplithorus sentus, n. sp.

Female.—Length 2.1 mm.; 2.4 times as long as wide; body color dark brown.

Frons convex above, rather strongly flattened below; epistomal margin weakly raised, extended somewhat medially in front of mandibles; surface coarsely, deeply punctured, the interspaces smooth and shining; vestiture fine, hairlike, visible only along epistoma. Eye coarsely faceted, shallowly emarginate; oval, twice as long as wide. Antennal scape short, about twice as long as pedicle; funicle seven-segmented, slightly longer than scape, segment seven very slightly wider than two; club subspherical, only slightly compressed, without indications of sutures except for rows of sparse hairlike setae.

Pronotum 1.1 times as wide as long; widest on basal third, the sides evenly arcuate, constricted just behind the rather broadly rounded anterior margin; surface smooth and shining with rather coarse deep punctures uniformly distributed and separated from one another by slightly more than half their diameters, glabrous. Lateral margins acutely, irregularly raised on slightly more than middle two-thirds.

Elytra 1.6 times as long as wide; sides subparallel on basal three-fourths, broadly rounded behind; basal margins each bearing about seven low very broad crenulations, the median three somewhat fused to form a continuous costa, the others slightly overlapping; striae very wide, not impressed, the punctures separated by less than their own diameters; interspaces less than half as wide as striae, smooth, shining, with a single somewhat irregular row of fine punctures; a few submarginal crenulations at bases of interspaces two to four. Declivity rather abrupt, convex, vertical; strial punctures greatly reduced, about one-third as large as on disc; sutural interspace elevated and bearing a sparse row of rather fine, pointed tubercles, one or two interstrial punctures between and in line with the teeth, the punctures as large as those of striae; interspace two narrower than one and three, unarmed and impunctate (except near apex); three bearing about six rather coarse widely spaced teeth; four, five and seven each bearing a few smaller teeth; six and eight unarmed; nine sharply elevated from elytral base, becoming serrate near

middle of elytra, the widely spaced serrations becoming larger posteriorly, the elevation curving ventrad just behind declivital base and reaching the feebly elevated costal margin at a point in line with declivital interspace three, the raised costal margin continuing to apex; interspace ten weakly elevated on basal half.

Male.—What appears to be the male of this species is identical to the female except somewhat more coarsely sculptured.

Type locality.—La Cuchilla, Sevilla, Colombia.

Host.—Citrus sinensis (orange).

Type material.—The female holotype, male allotype and six paratypes were taken at the type locality on June 19, 1959, by J. H. Lasso, from "naranjo seco."

The holotype, allotype and some of the paratypes are in the collection of the writer, other paratypes are in the U. S. National Museum.

Phloeocleptus Wood

The genus *Phloeocleptus* was described (Wood, 1956, Canadian Ent. 88(4):147) to include two species from Mexico. Recently, Schedl (1959, Ent. Blätt. 55(1):42) placed it in synonymy under *Hylocurus*, calling attention to the supposed superficiality of generic characters. *Phloeocleptus* is readily distinguished by the transverse sutures of the small slender antennal club which are indicated by setae only at the sides, by the distinct transverse impression behind the summit of the pronotum, by the absence of tubercles on the posterior face of the anterior tibiae, and by the posterior portion of the elevation of the ninth declivital interspace which declines in height gradually and terminates by fusing with the costal margin; in addition, the species are phloeophagous. In *Hylocurus* the antennal sutures are procurved, the transverse pronotal impression is absent, the posterior face of the anterior tibiae are tuberculate, the ninth declivital interspace terminates abruptly without meeting the costal margin, and the species are xylophagous. The superficial character to which Schedl referred concerns the sexually dimorphic armature of the elytral declivity which was not used, nor intended for use, as a generic character, since it does not even occur in one of the two described species.

The genus *Phloeocleptus* is mentioned here because the following species superficially resembles *P. caudatus* Wood very closely and emphasizes the significance of the generic characters mentioned above.

Hylocurus minor, n. sp.

This species is quite different from other species of *Hylocurus* known to the writer. The most distinctive characters include absence of sutures and setae on the antennal club except at the sides, absence of tubercles on the declivital face inside of the circumdeclivital ring of the tubercles in the male, and the simple structure of the

female declivity. Superficially it resembles *Phloeocleptus caudatus* more closely than it does other *Hylocurus*.

Female.—Length 1.6 mm., 2.8 times as long as wide; color black.

Frons broadly, subconclavely impressed on a pentagonal area between upper limits of eyes and epistomal margins, more strongly, narrowly impressed on a small median circular area just above epistoma; convex above the rather abrupt upper margin of impression; surface coarsely reticulate and finely punctured above and at sides of impressed area, smooth and shining at center of impression; vestiture scanty, visible along epistomal margin, median half of convex area above impression forming two subtriangular areas of erect reddish yellow scalelike or subplomose setae, upper side of triangles almost horizontal and touching at inner ends, lower angles acute and moderately separated. Eye oval; finely granulate. Antennal scape sparsely setose; funicle six-segmented; club small, oval, sutures clearly indicated only at sides by setae, procurved, the first suture almost obsolete at center, but extending slightly less than half the length of club.

Pronotum 1.1 times as long ts wide, sides straight and subparallel on basal half, rather broadly rounded in front; anterior half closely asperate, coarsely reticulate and finely, sparsely punctured behind; not impressed behind summit; vestiture hairlike, inconspicuous.

Elytra 1.7 times as long as wide; sides straight and subparallel on basal three-fourths, then abruptly narrowed to the acute, rather long mucro; striae not impressed, the punctures small, rather deep; interstriae wider than striae, smooth and shining, the punctures about two-thirds as large as and slightly less abundant than those of striae. Declivity abrupt, steep; strial and interstrial punctures somewhat reduced in size but clearly impressed to mucro; interspace three bearing two rather small pointed tubercles, the first on upper third, the second at junction with interspace seven; each interspace bearing two or three small rounded granules at base of declivity, those on three extending to upper tubercle, those on eight and nine slightly larger; nine elevated, irregularly granulate, terminated abruptly behind by combined ninth and tenth striae. Vestiture limited to declivity, consisting of erect, yellow, curved interstrial bristles, each about as long as the distance between rows; and rows of short, fine, erect strial hair.

Male.—Similar to female except frons narrowly, more shallowly impressed below, with a short transverse carina at upper level of eyes, pubsscent areas absent; interspaces one to eight each bearing one large, blunt tubercle of equal length at margin of declivity forming a circumdeclivital ring; interspace three with an additional slender, sharply pointed tooth immediately below and almost touching marginal tubetrcle, and one additional smaller, pointed tubercle at junction with interspace seven; strial and interstrial punctures clearly evident to mucro; and vestiture shorter, more nearly scalelike.

Type locality.—Alto Bonito, Caicedonia Valle, Colombia.

Hosts.—"Guamo" and Coffee.

Type material.—The female holotype, and six female and one male paratypes were taken at the type locality on April 30, 1959, from "guamo bejuco ramas secas," by J. Restrepo. The male allotype is labelled "Caicedonia Valle, May 20, 1950, en Café," and was collected by J. Mesa. Four female paratypes came from El Bosque, Caicedonia Valle, June 1959, en Café, collected by J. H. Lasso. Two female paratypes were collected at Montegrande, Caicedonia Valle, June 19, 1959, from guamo and coffee, by J. Restrepo.

The holotype and allotype and some paratypes are in the collection of the writer; other paratypes are in the U. S. National Museum.

Thamnophothorus impensus, n. sp.

This is the largest species in the genus. Apparently it is more closely allied to *volastos* Schedl than to other representatives of the genus, but may be distinguished by the larger size, by the stouter body form, and by the more strongly impressed second declivital interspace.

Male.—Length 3.2 mm. (paratypes 2.7-3.3), 2.3 times as long as wide; body color brown with a yellowish or reddish cast.

Frons convex above, shallowly, broadly, transversely impressed on lower half well above epistomal margin, with a slightly raised median line; surface smooth and shining, finely, sparsely, sharply punctured; vestiture short, moderately fine, hairlike, not conspicuous, not more abundant or longer along epistomal margin. Eye very shallowly, broadly emarginate; coarsely granulate. Antennal club 1.5 times as long as wide, devoid of sutures except for septate anterior half of first.

Pronotum 1.04 times as wide as long; widest just behind middle, sides on basal half arcuate, very strongly constricted laterally on anterior third, anterior margin rather narrowly rounded; anterior half finely asperate, the asperites decreasing in size posteriorly; posterior half smooth with rather numerous minute pores and rather small, moderately abundant, deep punctures. Vestiture very short, semirecumbent, hairlike.

Elytra 1.4 times as long as wide; sides straight and subparallel on basal two-thirds, rather broadly rounded behind; striae not impressed except the first moderately at base and strongly at declivity, the punctures rather small, in somewhat indefinite rows at least anteriorly; interstriae about three times as wide as striae, smooth, the punctures rather sparse, irregular, confused with those of striae. Declivity moderately steep, rather strongly bisulcate; sutural interspace moderately elevated, sutural striae strongly impressed above, second interspace as wide as three and gradually becoming flattened and impressed above, flat on lower half causing third interspace to appear abruptly raised on middle half of declivity; one and two devoid of punctures, three and four with a few small median punc-

tures. Vestiture very scanty, consisting of a few very sparse, short, erect hairs, none equal to more than half the width of an interspace.

Female.—Similar to the male except frons more nearly flattened and without a raised median area.

Type locality.—Bogota, Colombia.

Type material.—The male holotype, female allotype and 35 paratypes bear the following data: "Bogota, Col., Sept. 1949, Pino Romeron."

The holotype, allotype and some paratypes are in the collection of the writer, other paratypes are in the U. S. National Museum.

A NEW *DACTYLIPALPUS* (COLEOPTERA: SCOLYTIDAE) FROM THE PHILIPPINE ISLANDS

Stephen L. Wood[1]

Several years ago a series of large, black, apparently greasy bark beetles was selected from a long series of *Dactylipalpus transversus* Chapuis submitted for study by Mr. H. B. Leech of the California Academy of Sciences. In order to draw attention to this species, the second known Oriental *Dactylipalpus*, and to make the name available for use it is described below.

Dactylipalpus unctus, n. sp.

This species is allied to the African species *cicatricosus* Blandford and *parricida* Eggers, but differs conspicuously in declivital sculpture and in features of the pronotum. From *transversus*, the only other known Australian or Oriental representative of the genus, it differs by the somewhat shorter, stouter body form; by the darker color; by the greasy appearance; by the narrower more weakly impressed elytral striae with the punctures larger, deeper and separated by partitions of variable length but none greater than the diameter of one puncture; by the wider and more closely granulate interspaces, with about four ranks of granules across each.

Female.—Length 9.5 mm., 1.8 times as long as wide; body color black, appearing greasy.

Frons weakly convex, except flattened on broad area between and above eyes, and arcuately impressed just above epistoma; surface shining with rather abundant, coarse, sharply impressed, shallow punctures, a small setiferous granule at center of each puncture; vestiture consisting of short, stout, semierect setae. Eye 3.0 times as long as wide, finely granulate, rather deeply, broadly emarginate on the distinctly narrower lower half. Antenna shorter than eye, similar to that of *transversus*.

Pronotum 0.63 times as long as wide, subquadrate, only slightly wider posteriorly; anterior margin almost straight, posterior margin very strongly bisinute; a deep, narrow, straight transverse groove one-sixth of distance from anterior margin and occupying slightly more than the median third (0.40 times greatest width), in *transversus* the groove is shorter (0.28 times) and slightly procurved; surface with median third finely, rather indistinctly punctured, most of punctures granulate, the granules larger and more abundant in lateral areas, becoming asperate in anterolateral areas, granules narrower and more abundant than in *transversus* and asperites more slender.

Elytra 1.3 times as long as wide, 2.1 times as long as pronotum; sides almost straight and subparallel on basal two-thirds, rather

1. Contribution no. 176, Zoology and Entomology Department, Brigham Young University, Provo, Utah. Scolytoidea contribution no. 21

broadly rounded behind; each elytron subangulately produced at base, the broad, obtuse angle occurring at base of fourth interspace, the mesal portion of bases forming a 90 degree angle at the very small scutellum; striae feebly or not at all impressed except near declivity, the punctures small, deep, rather indistinct and somewhat irregular; interstriae three to four times as wide as striae except one much narrower, all weakly convex to flat, closely granulate, about four ranks of confused granules on each interspace. Declivity steep, convex; all striae narrowly impressed ; interstriae one and two narrow, three and nine wider and weakly elevated, the granules as on disc, not formed into distinct rows. Vestiture consisting of very short, dark, inconspicuous stout setae.

Male.—Similar to female except: much smaller, length 7.7 mm., 1.7 times as long as wide; frons broadly, concavely impressed between eyes from vertex to epistomal margin; epistomal margin not elevated on median third and armed by a pair of prominences lateral to the non-raised area; pronotum finely, closely granulate, devoid of asperities except one or two very small ones at anterolateral angles; the transverse groove absent.

Type locality.—Mt. Makiling, Laguna, Philippine Islands.

Host.—Unknown.

Type material.—The female holotype, male allotype, and twelve paratypes were taken at the type locality on May 11, 1932, at elevations of 300, 800, and 2000 feet, by F. C. Hadden.

The female holotype and male allotype are in the British Museum of Natural History; paratypes are in the collections of the California Academy of Science and of the writer.

UNDESCRIBED SPECIES OF WESTERN NEARCTIC TIPULIDAE (DIPTERA). IV.

Charles P. Alexander[1]

The preceding part under this general title was published in THE GREAT BASIN NATURALIST, 18: 31 - 36; 1958. The species discussed at this time are from Arizona, California, Idaho, and Texas, taken by various collectors as acknowledged under the individual species. Through their appreciated interest I am permitted to retain the types in my personal collection.

Tipula (*Trichotipula*) *hedgesi* n. sp.

Size large (length of male about 25 mm., of which the abdomen comprises about 18); antennae short; mesonotal praescutum light brown with four poorly differentiated brownish gray stripes; wings brownish yellow, stigma and costal field pale brown; abdomen of both sexes very long; male hypopygium with the notch of tergite U-shaped, its margins with very abundant erect black setae; inner dististyle with beak bidentate, the outer basal lobe produced into a long erect horn; eighth sternite provided with long erect yellow setae, the posterior margin with a small median quadrate lobe.

Male.—Length about 23-27 mm.; wing 15-18 mm.; abdomen alone 17-20 mm.; antenna about 2.2-2.4 mm.

Female.—Length about 23-25 mm.; wing 15-16 mm.; abdomen alone 17-18 mm.

Frontal prolongation of head obscure yellow, including the slender nasus; palpi yellowish brown. Antennae short; basal three segments yellow, succeeding segments weakly bicolored, the scarcely enlarged bases darker than the outer half, outer segments uniformly brownish black; flagellar segments subequal in length to their longest verticils. Head above brownish gray; front, the conspicuous vertical tubercle and narrow posterior orbits clearer gray, genae and ventral surface light brown.

Pronotal scutum brownish gray, narrowly darkened medially, scutellum and pretergite light yellow. Mesonotal praescutum light brown, with four poorly differentiated more brownish gray stripes that are barely indicated by darker borders, the most evident being a median vitta; scutal lobes darkened, median region and remainder of mesonotum light yellow; pleurotergite yellowish white, confluent with the similarly colored pteropleurite, meron and metapleura; mesepisternum yellow, extensively patterned with brownish gray on the anepisternum and ventral sternopleurite; dorsopleural membrane yellow. Halteres with stem yellow, knob infuscated. Legs with coxae yellow, sparsely pruinose; trochanters obscure yellow; femora yellow, tips blackened; tibiae obscure brownish yellow, their tips and the tarsi brownish black to black; claws small, simple. Wings brown-

1. Amherst, Massachusetts.

ish yellow, prearcular and costal fields, with the stigma, pale brown; veins brown. Macrotrichia in outer ends of cells R_5, M_1 and *2nd* M_2. Venation: Cell *1st* M_2 elongate, its inner end pointed; cell M_1 deep, its petiole from about one-half to subequal to *m*; *m-cu* on M_1 beyond the base.

Abdomen of both sexes very long, as shown by the measurements; tergites yellow, with a virtually continuous brown central stripe, on the proximal segments barely interrupted at extreme base; eighth tergite dull orange, trivittate with brownish black; hypopygium light brown above, more yellowed laterally; basal sternites reddish yellow, outer segments slightly more darkened. Ovipositor with cerci straight, relatively stout, their tips narrowly obtuse. Male hypopygium with the tergal notch narrowly U-shaped, the adjacent angles slightly produced; margin of notch with very abundant erect black spinoid setae, on lower face of lobes with dense areas of blackened spicules. Outer dististyle broad, apex obtuse; inner style with beak bidentate, formed of two long blackened points; outer basal lobe a long erect horn. Eighth sternite distinctive; posterior border gently emarginate, with a small quadrate median lobe; surface on either side of midline with very conspicuous long yellow setae.

Habitat.—Arizona (Pima County).

Holotype, ♂, Madera Canyon, Santa Rita Mountains, October 10, 1959 (William A. Hedges). *Allotopotype*, ♀, pinned in copula with the type. *Paratopotypes*, ♂♂ ♀♀.

This interesting fly is named for the collector, Mr. William A. Hedges, student of the Lepidoptera. The fly is quite distinct from *Tipula* (*Trichotipula*) *prolixa* Alexander, of this same general region, in the large size, very long abdomen, and especially the structure of the male hypopygium, including the tergite, inner dististyle and eighth sternite.

Tipula (*Yamatotipula*) *footeana* n. sp.

Allied to *albocaudata;* mesonotal praescutum yellowish gray with three darker stripes that are bordered by darker; antennal scape brownish black, pedicel orange, flagellum entirely black; flagellar segments strongly incised; pleura light gray; wings suffused, patterned with darker; abdominal tergites yellow medially, with two broad brownish black stripes; male hypopygium with the inner dististyle distinctive, especially the outer basal and intermediate lobes, the latter a curved slender spine; aedeagus before apex with a circlet of four strong spines.

Male.—Length about 13-15 mm.; wing 13-15 mm.; antenna about 4.7-5 mm.

Female.—Length about 15-16 mm.; wing 15-17 mm.; antenna about 3 mm.

Frontal prolongation of head light brown on sides, gray dorsally; nasus elongate, with long setae; palpi black. Antennae of male with scape brownish black, pedicel fulvous to brownish black, flagellum

black; flagellar segments rather strongly incised, beyond the first with outer lobe subequal in size to the basal swelling, verticils shorter than the segments; antennae of female shorter. Head brown, the front and broad orbits light gray; a group of long pale setae on lower part of head.

Pronotum gray, scutum patterned with brown, scutellum and pretergites variegated with yellow. Mesonotal praescutum yellowish gray, with three darker stripes that are bordered by darker to produce the effect of six darkened lines, the median vitta not or scarcely indicated; posterior sclerites of notum light gray, each scutal lobe with two brownish gray areas that are vaguely margined with darker, parascutella paler; pleurotergite variegated brownish gray and yellow, the latter color on the posterior end of the anapleurotergite and dorsal edge of the katapleurotergite. Pleura light gray, dorsopleural region conspicuously light yellow; sclerites surrounding the root of the halteres light yellow. Halteres with stem reddish brown, brightest at base, knob dark brown. Legs with coxae light gray, with long conspicuous white setae; trochanters obscure yellow; femora brownish yellow, the tips passing into black; tibiae and tarsi brownish black; claws of male toothed. Wings rather strongly suffused, prearcular and costal fields more yellowed; stigma oval, dark brown, conspicuous; dusky seams along vein *R* in cell *R*, along *M* and *m-cu*, in cell *M*, and less evidently in outer radial field; obliterative areas before stigma and across base of cell *1st* M_2, separated by a darkening at fork of *Rs*; veins brownish black, paling to brown in the brightened fields. Venation: *Rs* long, from about 1.5 to 1.7 times *m-cu*; petiole of cell M_1 subequal to *m*; *m-cu* shortly beyond the short perpendicular base of M_4.

Abdominal tergites yellow medially, with very broad and conspicuous brownish black sublateral stripes that are much wider than the central ground area; lateral borders adjoining the dark stripes yellowed, paling through gray to white; sternites brownish yellow, darker laterally; seventh and succeeding segments black, sparsely pruinose; hypopygium dark, excepting the pale outer dististyle. Male hypopygium with the tergal lobes relatively broad, about twice as wide as the intervening notch, apical spicules abundant. Outer dististyle of moderate size, apex obtuse, setae small; inner dististyle distinctive, with three lobes or spines additional to the beak, the latter obtuse, at its base on outer face with six or seven long powerful setae; outer basal lobe stout, at apex with several appressed points or scales; intermediate lobe a strong sclerotized arm, broad at base, curved and very gradually narrowed into a long straight spine, the outer part with a series of about five strong setae; third lobe a pale flattened blade, its apex very obtuse. Aedeagus relatively slender, near apex with a circlet of four strong spines.

Habitat.—Idaho (Latah County).

Holotype, ♂, Robinson Lake, April 29, 1959 (H. Homan). *Allotopotype*, ♀, pinned with the type. *Paratopotypes*, ♂♂ ♀♀, with

the types, including material reared from pupa, emerged April 5-May 1, 1959.

I am pleased to dedicate this fly to Dr. Benjamin A. Foote, who reared the material while on the staff in Entomology at the University of Idaho. An account of the immature stages will be published by Dr. Foote. The similar species are *Tipula* (*Yamatotipula*) *albocaudata* Doane and *T.* (*Y.*) *colteri* Alexander, distinguished by the coloration of the body and antennae and, especially, by the structure of the male hypopygium, particularly the inner dististyle.

Tipula (*Hesperotipula*) *chumash* n. sp.

Belongs to the *streptocera* group; thorax uniformly fulvous yellow; wings pale brown, stigma darker, veins narrowly bordered by white; abdomen yellow, basal tergites with a continuous darkened stripe and sublateral basal markings; male hypopygium with the spine of the basistyle long and slender; inner dististyle massive, beak stout; basal lobe very large, subquadrate, provided with abundant long setae; eighth sternite with a small median setiferous lobule at base of the apical notch.

Male.—Length about 15 mm.; wing 15 mm.; antenna about 4.2 mm.

Frontal prolongation of head brownish black, subequal in length to remainder of head; nasus short but slender; palpi with proximal segment brown, remainder brownish black to black. Antennae with proximal three segments yellow, apex of first flagellar segment weakly darkened, remainder of antennae brownish black, bases of second and third flagellar segments vaguely brightened; segments conspicuously incised, subequal in length to the longest verticils. Head dark gray, vertex with a more infuscated central line.

Thorax light fulvous yellow, scutal lobes weakly infuscated; vestiture of notum sparse, longer on praescutal interspaces and posterolateral parts of the mediotergite. Halteres with stem dirty white, knob brownish black. Legs with coxae and trochanters fulvous; femora medium brown, bases restrictedly brightened, tips narrowly blackened, the amount subequal on all legs, preceded by a very vague yellowed ring; tibiae light brown, tips narrowly infuscated; tarsi brown, passing into darker brown; claws of male toothed. Wings with ground pale brown, stigma darker brown, cell *Sc* more yellowed; obliterative areas before and beyond stigma and across cell *1st* M_2; veins narrowly bordered by whitish, restricting the ground color to the centers of the cells; veins brown, prearcular veins, *Sc*, *R* and both branches of *Cu* more yellowish brown. Macrotrichia in outer wing cells from R_1 to *2nd* M_2 more sparse behind; trichia on longitudinal veins based almost to arculus, lacking on bases of *M* and Cu_1; strong trichia on prearcular sections of both Anal veins; dilated prearcular base of $R+M$ with two isolated groups of small circular punctures. Venation: Petiole of cell M_1 longer than *m*; *m-cu* at fork of M_{3+4}.

Abdominal tergites yellow, with a continuous brown central stripe and small basal sublateral brown areas, lateral borders pale; sternites and hypopygium yellow. Male hypopygium with tergal lobes small, blackened, cylindrical, tips obtuse, separated from one another by a narrow notch. Basistyle extended into a slender spine, slightly more dilated on less than the proximal half. Outer dististyle small, as in the subgenus; inner style distinctive, body massive, apex stout, not produced into a slender beak as is common in the group; outer crest of style with strong setae, the more posterior ones very long, erect; basal lobe very large, conspicuous, subquadrate, provided with abundant long setae. Eighth sternite narrowed posteriorly, apex with the usual two triangular lobes, the tips and mesal faces with dense yellow setae; at base of notch with a small tubercle that is tipped with a few strong setae, their apices more dilated and membranous.

Habitat.—California (San Luis Obispo County).

Holotype, ♂, San Simeon Creek, May 3, 1958 (Dennis Hynes).

The specific name, *chumash*, is that of a Californian Amerind stock, now extinct, belonging to the Hokan family, formerly occupying the present area of Santa Barbara and San Luis Obispo counties. The fly is readily told from all other described members of the *streptocera* group by the hypopygial structure, particularly the tergal lobes and inner dististyle.

The majority of the known species of *Hesperotipula* belong to the *streptocera* group, having the basistyle of the hypopygium produced into a strong spine. Other species without such a modification of the style are allied and may be placed in a second group, the *californica*, including besides the typical species, *californica* (Doane, 1908), also *aitkeniana* Alexander, *derbyi* Doane, *sanctae-luciae* Alexander and *sweetae* Alexander, all of California.

Pedicia (*Tricyphona*) *hynesiana* n. sp.

Belongs to the *rubiginosa* group; mesonotum buffy, praescutum with four poorly indicated more reddish brown stripes; antennae 17-segmented; wings fulvous, stigma brown, conspicuous; vein R_4+_5 present; male hypopygium with the lateral tergal arms dilated into a triangular head, interbase small, slender.

Male.—Length about 9.5 mm.; wing 10 mm.; antenna about 1.4 mm.

Rostrum brownish gray, palpi brownish black; mouthparts large, pale brown. Antennae of male 17-segmented; scape dark brown, remaining segments yellowish brown to light brown; flagellar segments beyond the first oval, progressively smaller outwardly, slightly exceeding their verticils. Head gray; anterior vertex nearly twice the diameter of the scape.

Pronotum buffy yellow. Mesonotum buffy, praescutum with four very poorly indicated more reddish brown stripes, the intermediate pair indistinctly separated; scutal lobes light brown; pos-

terior sclerites and pleura more yellowish brown; dorsopleural membrane yellowed. Halteres with stem yellow, apex of knob brown. Legs with coxae brownish yellow; trochanters yellow; remainder of legs obscure yellow, proximal two tarsal segments yellow, tips narrowly blackened, outer segments black. Wings fulvous, cell *Sc* clearer yellow; stigma brown, conspicuous; veins yellow, macrotrichia dark brown. Macrotrichia of veins long and conspicuous, lacking on bases of *M*, Cu_1 and the Anals. Venation: R_4+_5 present, longer than the basal section of R_5; cell M_2 open by atrophy of *m*; *m-cu* oblique, shortly beyond midlength of M_3+_4.

Abdomen medium brown, outer segments somewhat darker, sternites and hypopygium more yellowed. Male hypopygium with the tergite large, the posterior border almost truncate, vaguely emarginate at the midregion, the low lobes with long setae; apex of each tergal arm dilated into a large subtriangular head, shortly before tip produced laterad. Basistyle with outer apical angle extended into a strong lobe that narrows to a point, the lobe with few scattered setae; inner apical angle produced into a longer and larger lobe, its margin expanded into glabrous sclerotized flanges, one dorsal, the other ventral in position. Interbase a small slender rod. Dististyle lying in the notch of the lobes of the basistyle, shorter than either of the latter, appearing as a stout cylinder, the length about two and one-half times the diameter, outer end obtuse, with numerous blackened spinoid setae. Phallosome small and inconspicuous.

Habitat.—California (Monterey County).

Holotype. ♂, Salmon Creek, April 25, 1958 (Dennis Hynes).

I am very pleased to name this interesting fly in honor of the collector, Dr. Dennis Hynes, who is engaged in a study of the biology and ecology of the Tipulidae of the southern coast ranges of California. The fly is quite distinct from the two species of the group hitherto made known, *rubiginosa* Alexander, of the Canadian Rockies, and *fulvicolor* Alexander, known from British Columbia, Idaho and western Oregon. In the retention of the vein R_4+_5 the fly is more like *fulvicolor* from which it is readily distinguished by the smaller size and conspicuously darkened stigma. The male sex of *fulvicolor* is not known to me; the male hypopygium of *rubiginosa* is quite distinct, including especially the tergal arms, interbase, lobes of the basistyle, and the dististyle.

Gonomyia (*Idiocera*) *flintiana* n. sp.

General coloration of thorax light gray, the praescutum with four brown stripes, pleura extensively variegated with pale yellow; femora yellow, tips darkened; wings whitish subhyaline, restrictedly patterned with brown; cell R_1 at margin closed by the approximation or fusion of veins $R_1 + _2$ and R_3 *m-cu* about one and one-half times its length before the fork of *M*; male hypopygium with the aedeagus relatively short and stout, not constricted beyond the base.

Male.—Length about 5.5-6 mm.; wing 5-6 mm.

Female.—Length about 6.5 mm.; wing 6 mm.

Rostrum and palpi blackened. Antennae with basal segments yellowed, more darkened on lower surface, outer segments black; basal flagellar segments oval, the outer ones much smaller and proportionately longer, verticils slightly exceeding the segments. Anterior vertex yellowed, more strongly so behind, center of posterior vertex restrictedly darkened.

Pronotum dark gray, yellowed on sides; pretergites yellow. Mesonotal praescutum light gray with four narrow brown stripes, the intermediate pair widened behind, separated by a broad ground stripe; pseudosutural foveae castaneous, a small yellow humeral spot; scutum brownish gray, the central area and scutal lobes marked longitudinally with dark brown; scutellum dark brown; postnotum dark brownish gray, with a light yellow area over the postnotal suture. Pleura dark gray, variegated with light yellow, including the dorsopleural membrane, dorsal sternopleurite and metapleura. Halteres elongate, stem white, knob dark brown. Legs with fore coxae darkened, remainder broadly yellowed; trochanters yellow; femora yellow, tips brown to brownish black; tibiae brownish yellow, apices narrowly blackened; tarsi black. Wings whitish subhyaline, prearcular and costal fields light brown; a restricted but conspicuous brown pattern, including the stigma and narrow seams at origin of *Rs*, cord, *m-cu* and outer medial fork; more than the outer half of cell R_3 paler brown; veins brown, pale in the yellowed fields. Venation: *Sc* short, Sc_1 ending about one-fifth to one-sixth the length of *Rs;* cell R_1 closed by the approximation or short marginal fusion of $R_1 + _2$ and R_3; *m-cu* from about one an done-fourth to one and one-half times its length before the fork of *M*.

Abdomen dark brown, including the hypopygium; posterior borders of tergites very narrowly pale. Male hypopygium with the apical lobe of basistyle narrowed and twisted outwardly. Dististyles blackened, subterminal; inner style with the spine apical, slightly recurved. Aedeagus relatively short and stout, its length about five times the diameter at base, not conspicuously narrowed beyond the base, as in *hoogstraali*.

Habitat.—Texas (Val Verde County).

Holotype, ♂, San Felipe Spring, Del Rio, September 21, 1960 (O. S. Flint). *Allotopotype*, ♀, pinned with the type. *Paratopotypes*, 2 ♂♂.

This interesting fly is named in honor of the collector, Dr. Oliver S. Flint, Jr., of the United States National Museum. The nearest described relative is *Gonomyia* (*Idiocera*) *hoogstraali* Alexander, of Michoacan, Mexico, which differs especially in hypopygial characters, particularly the inner dististyle and aedeagus. The most similar Nearctic species is *G.* (*I.*) *gaigei* Rogers, which differs more evidently in the pattern of the wings, venation, and in hypopygial structure.

A NEW SPECIES OF *CINARA* FROM COLORADO (APHIDIDAE)

F. C. Hottes[1]

Cinara caliginosa, n. sp.

Apterous viviparous female.—Length from vertex to end of cauda 2.54 (2.20-2.70) mm. Width of head across eyes 0.28 mm. Color of living specimens as remembered from specimens taken in 1954 as follows: Head pale tan, color rather faded or washed out. Thorax and abdomen dull black with no powder. Color as indicated by cleared mounted specimens as follows: Head pale dusky with margins and median transverse suture much darker. Thorax dusky due to pigmented areas. Abdomen pale with cornicles dark brown. First antennal segment concolorous with head, second antennal segmen not as dark as first segment. Third antennal segment pale with apical fourth dusky. Fourth antennal segment pale with apical half dusky. Fifth antennal similar to fourth. Sixth antennal segment uniform dusky. All femora pale yellowish dusky on basal half with remainder brownish. Meta-thoracic tibiae with short region near base brownish, this followed by a lighter area about 0.99 mm. long remainder of tibiae and tarsal segments dark brown. Pro- and mesothoracic tibiae not as dark as the metathoracic tibiae and with the pale area much more extensive.

Head and Thorax. Antennal segments with the following lengths: III 0.75 (0.63-0.94), IV 0.345 (0.30-0.35), V 0.36 (0.30-0.45), VI 0.15 + .045 (0.10-0.18 + .06). Sensoria distributed as follows: III 2 (0-3), IV 2 (2-3), V 2-3 (2). All antennal segments very coarsely imbricated. Hair on antennae sparse, very fine, sharp pointed, on anterior and posterior margins spaced further apart than their length which is about equal to the width of segment or about one third longer than the width of segment. Hair on dorsum of head about 0.08 mm. in length distributed over entire surface, numerous on either side of the median transverse suture over which they crisscross. Rostrum extending to just beyond the cornicles. Last three segments of the rostrum with the following lengths 0.30, 0.24, 0.09 mm. Median mesosternal tubercle so poorly developed that it might be considered absent. Ventrolateral regions of the meso and metathorax with three well developed teeth, the natrior pair being much longer than the other two. Metathoracic femora 2.10 (1.87-2.10) mm. in length. Metathoracic tibiae 3.30 (3.37-3.67) mm. in length.Metathoracic tarsal segments 0.15 and 0.42 mm. long. Hairs on anterior and posterior margins of the metathoracic femora spaced not much closer than their length, very fine and sharply pointed. Hairs on metathoracic tibiae about 0.06 mm. long when sharply pointed, when dull at the end only 0.03 mm. long. Surface of tibiae wrinkled. Ventral surface of first metathoracic tarsal segment with from 16-20

1 F. C. Hottes, Grand Junction, Colorado.

hairs, all of which are sharply pointed and at times longer than the width of segment.

Abdomen. Hair on dorsum of abdomen exceedingly sparse, for the most part spaced 0.15 mm. apart, very fine, and most 0.02 mm. or less in length. Cornicles 0.60 mm. across outer margin, which for the most part is quite regular or only slightly broken. Cornicles in side view 0.30 mm. high. Hairs on cornicles for most part confined to a ring about 0.09 mm. wide near apex. These hairs are 0.70 mm. long. Pigmented areas anterior to cauda wide, often united by a very narrow bridge. The pigmented areas have a row of very fine, sharply pointed hairs along the posterior margin. Cauda and anal plate with very long hairs. Genital plate indented on anterior and posterior margins, with middle region almost free from hair. Hairs on ventral surface of abdomen fairly numerous, about 0.06 mm. in length. Dorsolateral region of abdomen with two rows of small wax pore plates.

Alate viviparous female.—Length from vertex to end of cauda varying from 3.97-4.00 mm. Color similar to apterous viviparous female. Length of antennal segments as follows: III 0.66-0.82 mm., IV 0.27-0.30 mm., V 0.30-0.38 mm., VI 0.15 + .06 mm. Sensoria distributed as follows: III 5.9, IV 2-4, V 2-3. On III the sensoria are arranged in a row, they are only slightly tuberculate. Hair on antennae sparse, fine, sharply pointed, not longer than width of segment. All antennal segments coarsely imbricated. Ocular tubercles well developed. Hair on dorsum of head similar to hair on head of apterous viviparous female. Lateral lobes of thorax with very few hairs. Media of forewings twice branched, the second branch far removed from the margin of the wing. Length of metathoracic tibiae 3.60 mm. Metathoracic tarsal segments 0.125 and 0.39 mm. Hairs on metathoracic tibiae all blunt, and shorter than hairs on apterous female. Hairs on dorsum of abdomen not so far apart as hairs on dorsum of apterous female. Cornicles 0.40-0.48 mm. otherwise as in apterous female.

There is no question about this special being closely allied to *C. coloradensis* (Gillette) and I had so determined it until I checked it with a drawing of that species by Dr. Palmer. It differs from *C. coloradensis* by having numerous crisscrossing hairs on either side of the median transverse suture, in *coloradensis* there hairs are absent. The antennal segments are somewhat longer, especially segment five of the apterous form and three of the alate. The cornicle base is also as a rule larger and more regular. I have seen several of the "type" slides of *coloradensis* from the Colorado collection, they show the hairs on the cornicles similar to the hairs on the cornicles of *caliginosa*. Other slides determined as *coloradensis* show the hairs evenly distributed over the cornicles. Such specimens have the outer margin of the cornicles much broken. Gillette in the original description gives the color of the head as more or less rufous. This does not hold for *caliginosa*. I noted but dismissed this differ-

ence when I first collected my material. Gillette lists both *Picea parryana* (*Picea pungens*) and *Picea engelmanni* as hosts. Dr. Palmer now considers only *P. pungens* the host of *coloradensis*. I am inclined to think that another species is involved in this complex, but Dr. Palmer thinks not.

Holotype apterous viviparous female, morphotype alate viviparus female. Both types mounted on the same slide, in my collection. Host *Picea engelmanni*, July 21, 1954, Glade Park, Colo. (Fruita Reserve). This species lives in large colonies on young branches and the terminal portions of the trunks of young trees.

A NEW SPECIES OF *CINARA* FROM DELAWARE (APHIDIDAE)

F. C. Hottes[1]

Cinara lunata, n. sp.

Apterous viviparous female.—Length from vertex to end of anal plate 3.22 (3.00) mm. Width of head through the eyes .70 mm. Color of cleared mounted specimens as follows: Head dusky brown, transverse suture very much darker. Antennal segments I and II concolorous with head. Antennal segment III pale except for slightly dusky apex. Antennal segment IV with apical one third dusky. Antennal segment V with apical half dusky. All of antennal segment VI dusky. Prothorax with dorsum dusky. Meso and metathorax each with two dusky areas on the dorsum. All femora pale at the base, the pale area more extensive on the metathoracic femora, remainder of femora dark brown. Tibiae dark brown at the base, this followed by a pale region which gradually becomes dark brown. The dark area is much more extensive on the metathoracic tibiae. Tarsal segments dark brown. Dorsum of the abdomen with a few small scattered pigmented spots. Cornicles dusky brown, pigmented area anterior to cauda similar.

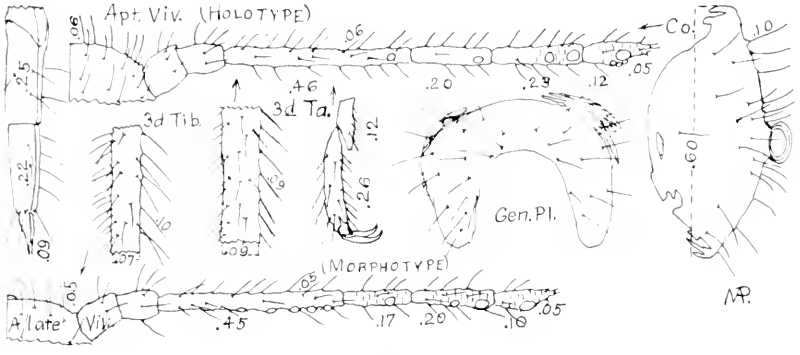
Head and Thorax. Antennal segments with the following lengths: III .46 (.48)mm., IV .20 (.18) mm., V .23 (.21)mm., VI .2 + .05 (.09 + .05)mm. Third and fourth antennal segments each with a small sensorium. Fifth antennal segment with two small sensoria. Hair on antennae sparse, fine, set at an angle slightly more than 45 degrees, shorter than width of segment, on III .06 mm long. Sixth antennal segment club shaped, primary sensorium very distinct. Fifth and sixth antennal segments strongly imbricated. Rostrum not fully extended, last three segments with the following lengths: .25, .22 and .06 mm. Ocular tubercles small, but very distinct. Anterior margin of head very much arched. Dorsum of head with coarse rather spinelike hairs, the hairs not so numerous on the posterior half. Mesoternal tubercle very poorly developed. Metathoracic femora 1.27 (1.23) mm. long. Metathoracic tibiae 2.13 (2.25) mm. long. Hairs on tibiae not numerous, fine, more upstanding on basal half. Hairs on tibiae about .09 mm. long but not all of the same length, hairs on inner margin of tibiae less upstanding and more numerous. All hairs on tibiae shorter than width of tibiae. Metatarsal I .12 mm. long. Metatarsal II 0.26 mm. long. First metatarsal with about twelve hairs on the ventral surface. Hairs on dorsum of metatarsal II fewer than on ventral surface.

Abdomen. Cornicles with base .60 (.61)mm. Apex of cornicles with distinct rim. Hairs on cornicles few, scarse on basal half. Hairs on dorsum of abdomen sparse, spinelike, not all of the same length, the shortest very short, the longest about .06 mm. the short hairs

1. 357 Orchard Ave., Grand Junction, Colo.

being the more numerous. Hairs on ventral surface of the body very numerous fine, about .07 mm. long.

Genital plate very narrow, with the posterior margin very deeply excavated, distinctly crescent shaped, imbricated. Pigmented area anterior to cauda not divided, imbricated, with about ten hairs on the posterior margin, these hairs are sharp pointed and about .09 mm. long. Anterior to this pigmented area there is a smaller area with a few short, rather spinelike hairs.



Cinara lunata n. sp.

Alate viviparous female.—Length from vertex to end of cauda 3.03 mm. Color similar to that of apterous female. Length of antennal segments as follows: III .45 mm., IV .17 mm., V .20 mm., VI .10 + .05 mm. Hair on antennae sparse, slightly longer than width of segment, set at an angle of about 45 degrees. Fourth antennal segment with four small secondary sensoria plus the primary sensorium. Fourth antennal segment with only the primary sensorium. Fifth antennal segment with one secondary and the primary sensorium. Sixth antennal segment distinctly imbricated. Lateral and median lobes of thorax with hairs uniformally distributed over the surface. Wings not well mounted, but the media seems to be only once branched. Metathoracic femora 1.20 mm. long. Metathoracic tibiae 2.13 mm. Hairs on metathoracic tibiae about .10 mm. long, fine, with the hairs on the inner margin more numerous and those near the apex set at a lesser angle. Cornicles .45 mm. with a distinct restricted area. Hairs on cornicles few. Genital plate less deeply excavated than in the apterous female. Hairs on dorsum of abdomen not as spinelike as those on the dorsum of the apterous form. Hairs on ventral surface of the abdomen numerous, about .075 mm. long. Pigmented area anterior to cauda not as wide as in the apterous form.

In Tissot's key to apterous and alate females, Florida Entomologist 22: 34-35. 1939. this species keys with difficulty and with numerous questions to *Cinara carolina* Tissot. It differs from the

species described by Tissot in numerous ways. The genital plate is more of a crescent, the dorsum of the abdomen has fewer spots, the cornicles fewer hairs, fewer hairs on the tibiae. The hairs on the dorsum of the abdomen are also fewer and shorter.

Host: *Pinus virginiana*, Petersburg, Delaware, May 29, 1957. Collected by H. E. Milliron. Holotype apterous viviparous female *morphotype* alate viviparous female, both mounted on same slide deposited in the United States National Museum.

DESCRIPTION OF A NEW SPECIES OF SALAMANDER FROM PANAMA

Wilmer W. Tanner[1] and Arden H. Brame, Jr.[2]

A series of forty-seven specimens of the genus *Magnadigita* from the crater of Volcán Baru, Chiriquí Province, Panama, represents an unique new species for this genus. We are indebted to Captain Vernon J. Tipton for having collected the type and paratypes, at Brigham Young University (BYU), and to the following for a loan of additional type specimens: Charles M. Bogert and Richard G. Zweifel, American Museum of Natural History (AMNH), Alan E. Leviton, California Academy of Sciences (CAS) and James E. Böhlke, Academy of Natural Sciences in Philadelphia (ANSP).

Because this salamander has a marbled color pattern, it is to be known as

Magnadigita marmorea sp. nov.

Type.—Brigham Young University No. 17704, from the crater of Volcán Baru (Chiriquí), elevation 10,500 feet, Chiriquí Province, Panama. Collected May 1, 1960 by Vernon J. Tipton.

Paratypes.—BYU 17700-3 and 17705-11 all topotypes; AMNH 54392-9 taken between December 10 and 12, 1948 by Vladimir Walters, P. F. Scholander, and Carlos E. Hooker at 11,300 feet elevation; ANSP 20846, taken by Enders, 1937 at 11,480 feet; CAS 79621-34 and 79637-46, taken between August 10 and 12, 1939, by J. R. Slevin and Robert Terry. All from the Volcán Baru, Chiriquí Province, Panama.

Diagnosis.—A medium-sized species, seemingly more closely related to *subpalmata* but differing in having longer legs, in which the toes of the adpressed legs usually touch; and with fewer maxillary and mandibular teeth and more vomerine teeth. The new species is different from other Costa Rican and Panamanian species in having an increase of vomerine teeth with little space between the series, caudal grooves faint or obliterated and with a marbled color pattern over the entire body.

Description of Type.—Head flattened, its diameter between eyes (4.3 mm.) only half of widest part (9.8 mm.); eye large, its diameter (3.5 mm.) greater than distance to nostral (3.0 mm.), eyelid (2.7 mm.) narrower than interorbital distance (3.2 mm.); snout truncate, distance between nostrals, 3.1 mm.; head without grooves or folds, subnarial grooves and swellings small; gular fold prominent, extending to a dorsolateral position; 13 costal grooves counting one each in axilla and groin, grooves not extending onto abdomen; caudal grooves, 33, not distinct; maxillary teeth, 34-34; premaxillary teeth, eight; vomerine teeth, 16-16 on two ridges which extend lateral to choanae, the two series forming a median V-pattern, and separated

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medially by a distance equal to two teeth, separated from paravomerine teeth by a distance greater than diameter of choanae; para-

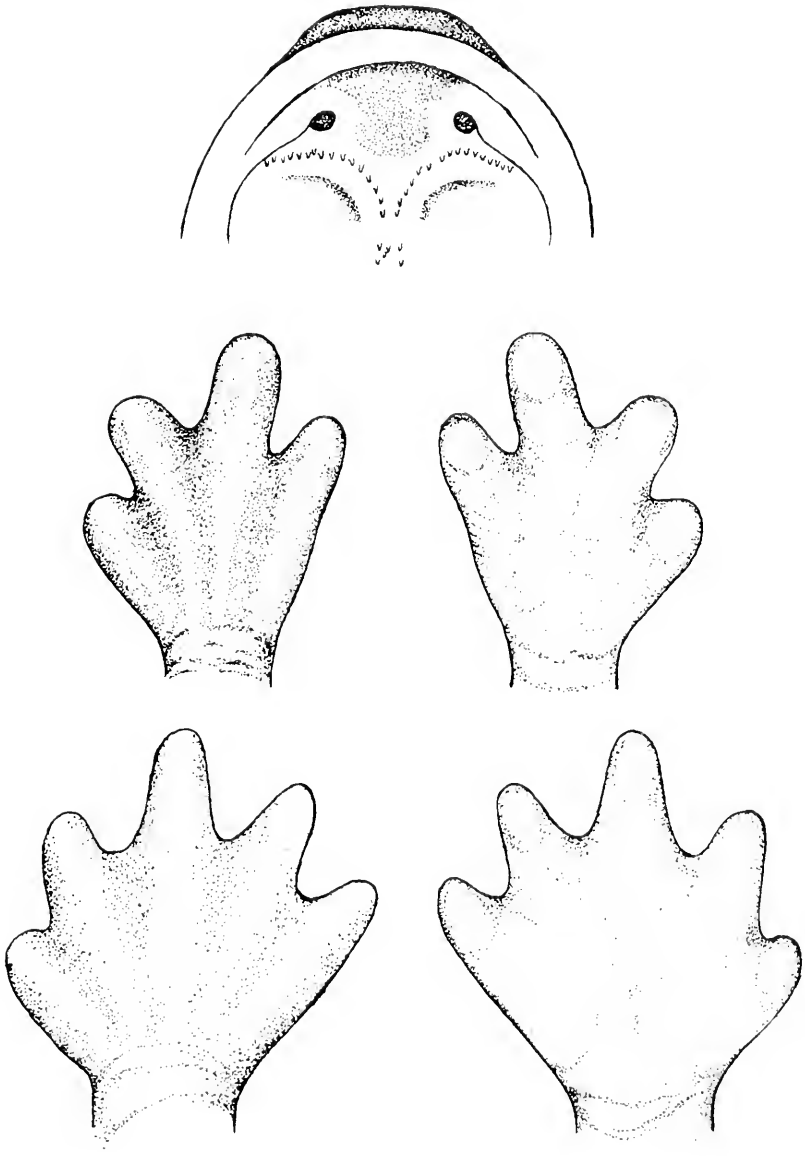

Fig. 1. Type of *Magnadigita marmorea*, BYU No. 17704. Top, roof of mouth showing position, numbers of teeth and spacing. Middle, right hand, dorsal and ventral views. Bottom, right foot, dorsal and ventral views. × 5.

vomerine teeth in one group of 161 teeth, narrowly separated posteriorly; mandibular teeth, 36-36; tongue free, no trace of a sublingual fold; body subcylindrical, tail laterally compressed; skin smooth ventrally and finely corrugated dorsally; no postiliac gland; and tail constricted posterior to vent. First finger and toe fully webbed, middle ones with the terminal two phalanges free, outer ones with only one phalanx free; all digits with a subterminal pad ventral to the first phalanx.

Measurements in mm.—Snout to anterior end of vent, 60.1; total length, 130; fore leg, 16.2; hind leg, 17.0; axilla to groin, 35.3.

Color.—Entire dorsal surface a dark slate, marbled with a rusty buff. Sides with large irregular blotches of yellowish (perhaps with some buff in life) venter of abdomen and tail mostly slate black, gular and throat a uniform dark gray.

Variation.—The largest specimen in the type series is a female, CAS 79632, 68.6 mm. snout to posterior end of vent and with a total length of 132.6 mm. The largest male, CAS 79625, is 65.5 mm. snout to vent and with a total length of 128.8 mm. The males have a large hedonic gland on chin, and prominent swellings at the base of naso-labial groove. In adults the tail is slightly longer than the head and body but in juveniles (BYU 17710-11) the tail is shorter (33.2 S-V, total 58 mm.). Proportionate lengths of the front and hind legs are nearly equal, but with the fore limbs slightly shorter. Adpressed legs ranging from approximately one fold between toes to an overlapping of the first phalanx, in others the toes touch. An age variation in proportionate leg and body size is not apparent in this series.

Costal grooves are usually thirteen, but in some specimens of the BYU series it is difficult to count more than twelve grooves. In both axilla and groin the grooves are faint or obscure, however, this has been taken into consideration and questionable specimens have been given an extra groove, the tail does not exhibit clearly the grooves. In only three specimens is it felt that the count may be reliable. In these the grooves range from 32-35. At the base and end a few grooves are clearly discernible, but the middle section is usually obscure. First groove on the tail forms a slight but obvious constriction.

Maxillary teeth range from 24-40 in all specimens over 50 mm. in snout to vent length, with an average of 32. Premaxillary teeth 4-8; mandibular teeth, 30-36; vomerine teeth, 11-19, average 13.3. In specimens with fewer than 26 teeth there is a reduction medially producing a wider V-pattern pointing toward the paravomerines. A full set of vomerines appears to be 14 to 16 teeth. Paravomerine teeth appear as one group joined anteriorly and separated posteriorly by a deep notch, range 135-181, average 164 teeth.

The basic ground color is dark slate to black. There are two exceptions: BYU 17703 is a rusty buff with only fine stipplings of dark pigment; BYU 17706 is a yellowish cream with larger areas of marbled dark color. Venters are usually dark with only small ir-

regular light spots and marblings. Both pair of appendages and the tail are involved in the basic color pattern.

Remarks.—This species, as well as many other salamander species from Central America, was taken from under rocks in the crater of an old volcano. The genus *Magnadigita*, as well as other genera of Plethodontidae, has been shown by the works of several Central American collectors (E. R. Dunn, Karl Schmidt and E. H. Taylor) to represent a widespread group of species in which through adaptive radiation many of the ecological niches are now occupied by distinct species. We suspect, therefore, that the *marmorea* is related not only to *subpalmata* but also to other Costa Rican species such as *pesrubra*, *torresi* and perhaps *cerroensis*.

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A NEW BEETLE MITE FROM UTAH
(*Oribatei: Gymnodamaeidae*)

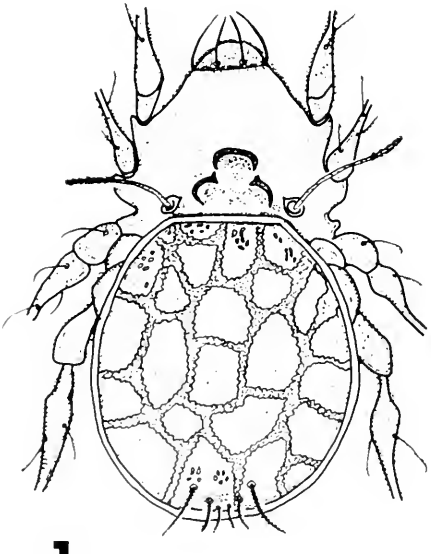
Harold G. Higgins[1]

Hammer (1952, Acta Arctica 4:27-28) described *Gymnodamaeus ornatus* from withered leaves collected at Reindeer Station in the Mackenzie delta Northwest Territories, Canada. In recent years another species of this genus has been found in decaying leaves from several localities in Utah. This species is here described as *Gymnodamaeus veriornatus* because the markings on the dorsal surface superficially resemble those of the previous species. Sincere thanks are extended to Dr. Marie Hammer, Strodam, Hillerod, Denmark, for comparing this new species with her Canadian species.

Gymnodamaeus veriornatus, n. sp.

Diagnosis.—Large size; color reddish-brown; dorsum with a pattern of irregular ovals with roughened borders.

Description.—Propodosoma slightly wider than long, about one-third the total length, and distinctly separated from the hysterosoma. Rostrum blunt with four bristles in a straight line all of which curve over the end of the rostrum. Pesudostigmata heavy, cup-shaped. Pseudostigmatic organs about the same length as the distance be-



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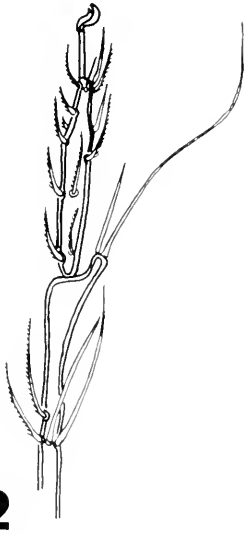

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Fig. 1. *Gymnodamaeus veriornatus* n. sp., from dorsal aspect.
Fig. 2. Distal segment of leg I.

1. Granger High School, Salt Lake City, Utah

tween them, becoming only slightly larger toward the tip and covered with fine hair-like bristles. Interlamellar hairs apparently missing. There are several heavy, curved chitin ridges between and antrior to the pseudostigmata as shown in Fig. 1.

Hysterosoma oval, with three pair of setae near the distal margin. The anterior pair of bristles is longest and curve slightly outward over the posterior end of the body; the two posterior pairs of setae much shorter and may be almost cemented to the posterior edge of the body by a granular secretion. Several irregular groupings of areae porosae are found along the anterior border of the hysterosoma and in the vicinity of the setae. Dorsal surface with a distinct, but irregular pattern of ovals with roughened borders.

Ventral surface of propodosoma and hysterosoma separated by distinct chitin ridges. Camerostome oval. Tectopedia I and II strong and pointed. Genital and anal plates touching along their entire margin; genital plates nearly as wide as long, with flattened sides, and about two-fifths the length of the larger anal plates. A heavy chitin ridge lies just anterior to the genital plate and then curves distally before extending to the region of legs IV.

Legs long, not conspicuously swollen. Leg IV about as long or slightly longer than body, but much longer than leg I. Leg I with distal tip of tibia projecting over tarsus; projecting tibia with two long setae the longest of which extends beyond the end of leg. Legs with three claws born on a stalk, the middle claw largest.

The entire body is covered with a veil of granular secretion.

Length of type, 0.93 mm.; width 0.54 mm. Five Utah specimens have the following minimum, average, and maximum measurements: Length, 0.84, 0.89, 0.93 mm.; width, 0.50, 0.52, 0.54 mm.

The type specimen was taken from decaying aspen leaves, *Populus tremuloides*, Farmington Canyon, Davis County, Utah, August 2, 1956, by J. R. Higgins. Six additional specimens from Lost Lake, Wasatch National Forest, Wasatch County, August 2, 1954.

Discussion.—Mites of this species have been found in decaying deciduous leaves at several locations in Utah at elevations above 7,000 feet. In the small collection at hand, there appears to be considerable individual variation in this species, especially in the length of legs, dorsal patterns of hysterosoma and propodosoma, and size, number, and location of areae porosae.

This species is easily separated from *G. ornatus* Hammer by its larger size, completely touching genital and anal plates, proportionally shorter pseudostigmatic organs, and its dorsal pattern with roughened borders.

STUDIES IN NEARCTIC DESERT SAND DUNE ORTHOPTERA

PART III. A NEW SPECIES OF *CIBOLACRIS* FROM NORTHERN CHIHUAHUA, MEXICO

Ernest R. Tinkham[1]

In recent months two parts of my new series of studies have appeared and in this third one I propose to describe a new arenicolous acridid from the great Samalayuca Dunes of northern Chihuahua and the El Paso region.

On a trip to southwestern Texas in June, 1948, I collected briefly on the mesquite-stabilized sand hummocks about 10 miles east of El Paso (at that time) and some years later when studying this material discovered that a new *Cibolacris* Hebard was represented. Not until the third summer of my three-year summer grant with the National Science Foundation to study the Desert Sand Dune Biotae of the North American Deserts did an opportunity present itself to search for additional material of the new species.

Unfortunately, in late June of 1959, I could find no trace of the new *Cibolacris* in the mesquite hummock area east of El Paso, probably due to the drastic reduction of all Orthopteran life during the terrible six-year West Texas drought. On the night of June 25, 1959, I crossed into Chihuahua with my travelling companion, Mr. Ralph Carbone, at Juarez.

During the morning reconnaissance on the semistabilized dunes I found *Dactylotum variegatum* (not a dune acridid) and later a small colony of the new *Cibolacris*. A study of this area indicated dunes 40 to 50 feet in height about one mile south of La Noria. These dunes extended to the northwest up a valley and also about 3 to 5 miles east of the highway joined the main mass of the great Samalayuca dunes. These commence about 3 miles east of Samalayuca (5 miles north of La Noria) and as a great mountain of sand with six high peaks, estimated at 300 to 400 feet or more, continue southeasterly with their main axis parallel to the sierras, of unknown name, some miles to the east. These dunes with the La Noria arm form a "Y." The dunes have been formed by the winds that sweep down these two valleys from the northwest (a mountain lies west of the highway between La Noria and Samalayuca and divides them) or by the hot winds that sweep up the valley from the southeast. The sand is reddish and similar in color to that of the extensive El Paso sand region. The Samalayuca Dunes are the greatest in height, and perhaps in area, of all the sand dune areas to be found in the Great Chihuahuan Desert of northeastern Mexico, Trans-Pecos Texas and south-central and southeastern New Mexico.

As there were no side roads going into the main mass of the higher Samalayuca dunes, which by binoculars looked pretty barren,

1. Indio, California

I was content to collect on those of the La Noria arm and which were traversed by the main highway going to Chihuahua City.

The dune vegetation at La Noria was not very interesting at that time of the year before the summer rains commence, if they do. Here and there were large scattered clumps of mesquite (*Prosopis juliflora Toreyana*), scattered shrubs of Silver Sagebrush (*Artemesia filifolia* and an overabundance of dead prickly Russian Thistle which made collecting difficult.

Later, in mid September, 1959, after summer rains had fortunately arrived, the reddish sand dunes were quite beautiful in their greenery of growing plants. Then, there were tall clumps of the grass *Sporobolus*, white-flowered primrose, orange-yellow flowered flax or *Linum*, clumps of yellow flowered *Psilotrophe* and *Baileya*, *Croton* sp., the blue-flowered *Gilia longiflora*, *Atriplex* sp., *Sphaeralcea* on which *Tropidolophus formosus* was feeding, and other plants as well as green mats of young Russian thistle everywhere.

Shortly after my collecting began on June 26, I was quite pleased to find a small colony of the new grasshopper. The species was quite localized and rare, inhabiting a sort of low depression in the gentle undulating dunes covered with short dead *Salsola*. Considerable search garnered a dozen males but only several females. Later, on September 21, 1 male was taken 15 miles north of La Noria where the small sand dunes first commence or about 18 miles south of El Paso, these representing the northwestern tip of the main arm of the Samalayuca Dunes.

Cibolacris samalayucae, n. sp.

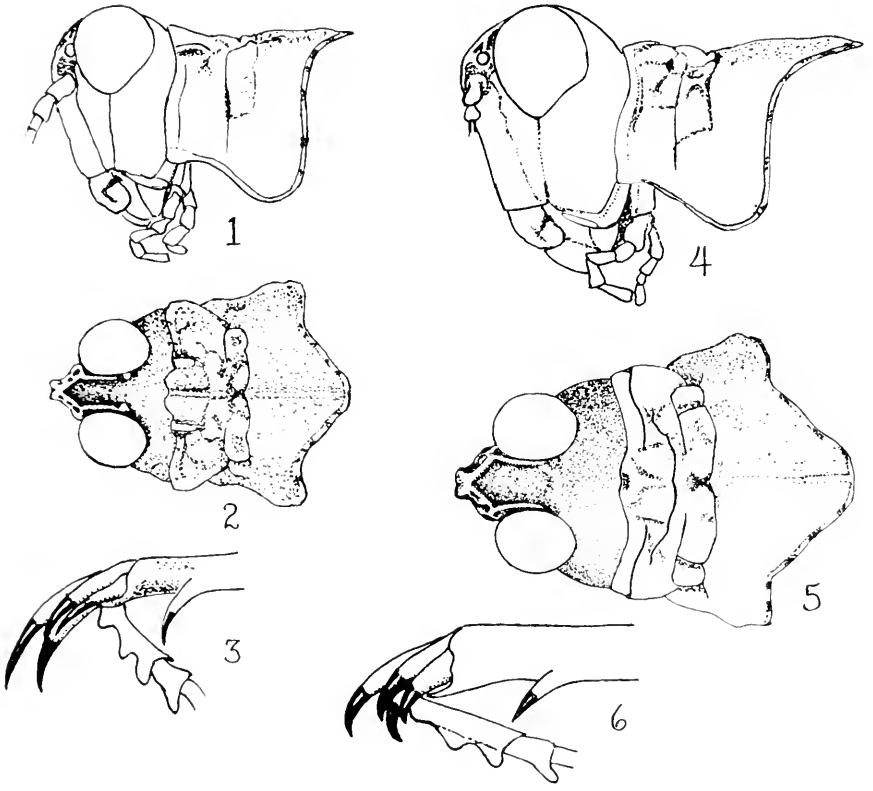
Size of the new species smaller than *Cibolacris parviceps* (F. Walker), the only known species; in size closely approximating that of *Coniana snowi* to which it bears no close relationship. The form of the fastigium, pronotum, lateral lobes of the pronotum, tegmina and spination of the caudal tibiae definitely prove the new species to be a *Cibolacris* and not an ammophilous *Heliastus* which it closely resembles in coloration.

From *C. parviceps*, the new series is amply distinct in the following features: uniform isabelline in coloration lacking the usual black patches on the posterior portion of the pronotum, the tegmina and caudal femora so typical of *parviceps*, by the more impressed lateral foveolae of the vertex and the fastigium, the greater rugosity of the pronotum, the relatively more slender teeth of the caudal tibiae and the delicate and more elongate calcariae and lesser features as well.

Male.—Head with carinae of the occiput commencing about the posterior three-quarters of the compound eyes and continuing forward, parallel, to the posterior edge of the lateral foveolae of the vertex where they suddenly converge in a straight line to a point, meeting at the upper extremity of the frontal costa. From here they diverge again to just above the median ocellus, continue parallel to

just below the median ocellus, thence diverging as they evanesce. Eyes prominent, subglobular, typical of the genus. Lateral carinae of the face, distinct, percurrent, from immediately below the lateral ocelli to the clypeal margin. Antennae, short and typical.

Pronotum typical in form, cut trasversely by the principal sulcus just cephalad of center, with another culcus arising just laterad and cephalad of the median carina, and angling forward to sharply and finely cut the lateral margin of the prozona about the posterior two-fifths, thence extending straight downwards, to terminate below the terminus of the main sulcus. The anterior half of the prozona bear definite short lateral carinae. Posterior margin of the pronotum with



EXPLANATION OF PLATE

Cibolacris samalayucae, n. sp. Male holotype: 1, Lateral view of head and pronotum; 2, view of head and pronotum; 3, Lateral view of calcariae of caudal tibiae.

Cibolacris parviceps aridus (Br.). Chinati Mts., Presidio Co., Texas. Male: 4, Lateral view of head and pronotum; 5, Dorsal view of head and pronotum; and 6, lateral view of calcariae of caudal tibiae.

All figures are greatly enlarged.

a rolled edge, slightly more than right-angled, the angle broadly rounded. Lateral lobes of the pronotum, typical, with the anterior tooth well enlarged and strongly formed, the posterior angle of the lateral lobes deep and circularly rounded, the lateral lobe as deep as broad on the metazonal portion. Tegmina typical of the genus.

Legs very slightly more slender than in *C. parviceps*. The teeth of the caudal tibiae relatively more slender and longer, and the calcariae definitely longer and more slender than in *parviceps*.

Coloration: very pale reddish gray; isabelline, with the tegmina showing numerous small darkish spots covering one to three or four cells. Wings very pale greenish yellow in the basal half without trace of any banding; the apical 2/5th with the network of veins black. There is a trace of pale smoky infuscation in the apical portion of the wing centering around the cells of M2 and M3, first and second Anals and the fourth and fifth Anals which are the areas where the cell walls are black. All legs bear traces of minute grayish specking. Caudal tibiae almost white with the faintest tinge of purplish blue.

Holotype Male.—Chihuahua, Mexico, Samalayuca Dunes at road station La Noria, 33 miles south of El Paso, Texas, June 26, 1959, Ernest R. Tinkham, collector. Glogau calliper measurements in millimeters: body length 13.9; total length to apex of tegmen 18.0; length to apex of caudal femur 15.2; pronotum 2.7 x 2.3 on metazona; depth of lateral lobe of pronotum 2.0 x 1.9 in breadth; tegmen 14.6; caudal femur 8.7; antennae 4.8 mms. Holotype deposited in the Tinkham Eremological Collection.

Female.—Larger but closely similar to the male in morphological features except as follows: carinae, edging the lateral foveolae of the vertex not as convergent to an apex as in the male, but somewhat separated at the apex before diverging to margin the frontal costa. Pronotum with the metazona definitely more rugose than in the male, otherwise closely similar to it in features. In all other characteristics the female is closely similar to the male other than in size which is larger and build more bulky.

Coloration as in the male, the dark patches on the tegmina most conspicuous at the distal end of the middle cell and at the angulation on the fore margin which in the closed tegmen is just above the base of the caudal femur.

Allotype Female.—Same data as the Holotype. Calliper measurements in millimeters: body length 23.4; length to tip of tegmen 26.2; length to apex of caudal femur 21.7; pronotum 4.3 x 3.6 in breadth; lateral lobes of the pronotum 3.5 x 2.5 in breadth; tegmen 21.4; caudal femur 12.0 mms. Allotype deposited in the Tinkham Collection.

Paratype males.—11 ♂, same locality as the Holotype and same date. 2 ♂, mesquite-sand hummocks, 10 miles east of El Paso, Texas, June 12, 1948; 1 ♂, 18 miles south of El Paso on northwest arm of Samalayuca dunes, Chihuahua, Mexico, Sept. 21, 1959; all Ernest

R. Tinkham collector. Range in millimeters: body length 4.8—14.8; length to apex of tegmen 18.0—19.9; tegmen 14.2—16.5; caudal femur 8.8—8.8; pronotum 2.8 x 2.2—2.9 x 2.3; lateral lobes 2.3 x 1.8—2.3 x 1.9 mms. Paratype males very closely similar to the Holotype Male in every respect. The type locality series is very constant in size and coloration; the two El Paso males are slightly larger and redder and account for the size range as given above.

Paratype females.— 2 ♀. same data as the Allotype. Range in measurements in millimeters: body length 22.6—23.2 (apex of abdomen somewhat decurved); length to apex of tegmen 25.2—27.0; tegmen 20.5—22.2; caudal femur 12.1—12.3; pronotum 3.9 x 3.5—4.1 x 3.5 (measured under microscope); lateral lobes 3.2 x 2.5—3.2 x 2.8 mms. Paratypes identical to the Allotype in every respect. Paratype males and two female Paratypes will be deposited in the three major Orthopterological museums (Michigan, Philadelphia. Smithsonian).

ORTHOPTERAN ASSOCIATES: In June these consisted of *Dactylotum variegatum* Sc. (the only North American dunes where *Dactylotum* found) and *Arethaea semialata* Rehn and Hebard. At night *Ammobaenetes phrixonemoides* (Caudell) was taken on the low dunes. In mid-September, after the summer rains. a new Orthopteran fauna had appeared such as *Tropidolophus formosus* (Say) on the mallow *Sphaeralcea*, *Trimerotropis texana* Bruner, *Melanoplus aridus*, *Aeoloplides elegans* on *Atriplex canescerns*, *Schistocerca shoshone* (Thomas), the stick insect *Diapheromera v. velii* (Walsh), *Stagmomantis limbata* (Hahn) and *S. califronica* Rehn and Hebard. At night *Ammobaenetes*, the sand treader was very rare, and at lantern light came rarely the sand roach *Arenivaga* and *Insara e. elegans* (Sc.). *Oecanthus* sp. and *Gryllus assimilis* (Fab.) were singing at night.

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1960. Studies in Neararctic Desert Sand Dune Orthoptera, Part II. Two new species of the genus *Trimerotropis* from the Utah Deserts. Great Basin Nat., 20(3 & 4): 49-58. 6 figs.

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A REVIEW AND KEY OF NORTH AMERICAN *CINARA* (HOMOPTERA: APHIDIDAE) OCCURRING ON *PICEA*

F. C. Hottes[1]

This is the fourth of a series of papers on species of *Cinara* having Coniferae for hosts. It is probably the last of the series, which I have financed personally, and for which I am unwilling to sacrifice further.

Cinara acadiana Hottes Fig. 1

Cinara acadiana Hottes, 1956, Proc. Biol. Soc. Washington, 69: 63-64, figs. (original description apterous viviparous female).

Holotype in the Canadian National Collection (apterous viviparous female.

Size range apterous viviparous females 2.92-3.15 mm.

Host *Picea glauca.*

The genital plate of this species suggests that of an oviparous female, but I find no sensoria on the metathoracic tibiae. The specimens have been cleared, and show no embryos. The cornicles vary greatly in size.

Cinara atripes Hottes Fig. 2

Cinara atripes Hottes, 1958, Proc. Biol. Soc. Washington 71: 7-8, figs. 6 (original description apterous viviparous female).

Holotype, apterous viviparous female in U. S. National Museum.

Size range apterous viviparous females 1.67 - 2.25 mm.

Host *Picea glauca.*

This species may be easily differentiated from other species in this group by the uniformly dark tibiae.

Cinara bonica Hottes Fig. 3

Cinara bonica Hottes, 1956, Proc. Biol. Soc. Washington 69: 228-229, figs. 229 (original description apterous viviparous female).

Holotype apterous viviparous female in U. S. National Museum. The host is not indicated on the type slide.

Size range apterous viviparous females 3.38 - 3.60 mm.

The host of this species is presumed to be *Picea.*

Cinara bonita Hottes Fig. 4

Cinara bonita Hottes, 1956, Proc. Biol. Soc. Washington 69: 227-228, figs. 229 (original description apterous viviparous female).

1 Grand Junction, Colorado

PLATE NO. I

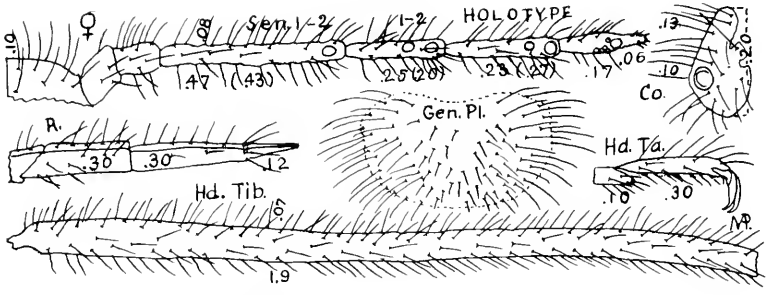


Fig. 1. *Cinara acadiana* Hottes

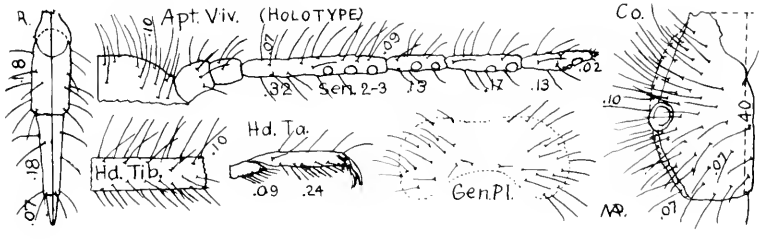


Fig. 2. *Cinara atripes* H.

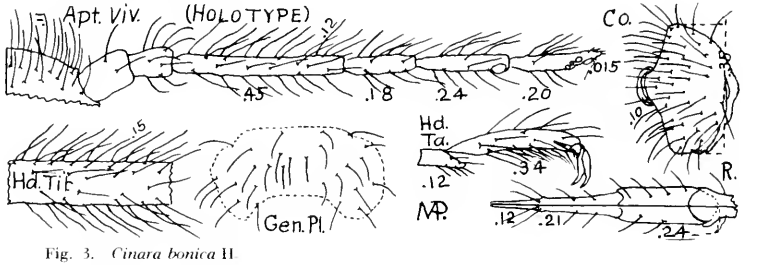


Fig. 3. *Cinara bonica* H.

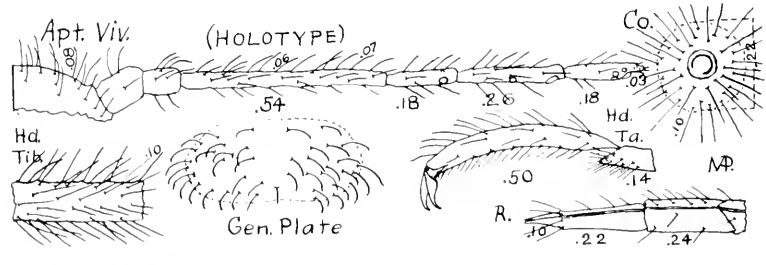


Fig. 4. *Cinara bonita* H.

PLATE NO. II

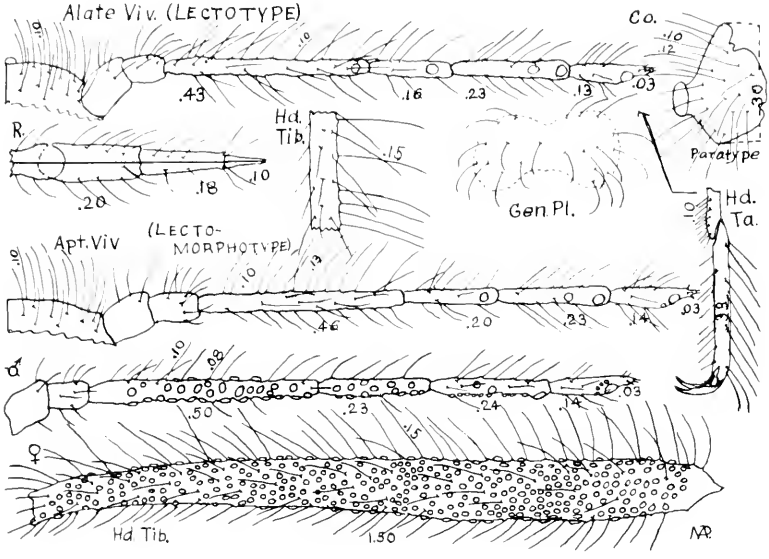


Fig. 5. *Cinara braggii* (Gillette)

Fig. 5b. *C. coloradensis*, *C. caliginosa*

Holotype apterous viviparous female in U. S. National Museum. The host is not indicated on the type slide.

Size apterous viviparous females 5.675 mm.

The host of this species is presumed to be *Picea*. The second metatarsal segment of this species is especially long.

Cinara braggii (Gillette) Fig. 5

Lachnus braggii Gillette, 1917, Ann. Ent. Soc. America 10: 138-10, figs. plate XI (original descriptions of all forms).

Type in the U. S. National Museum.

PLATE NO. III

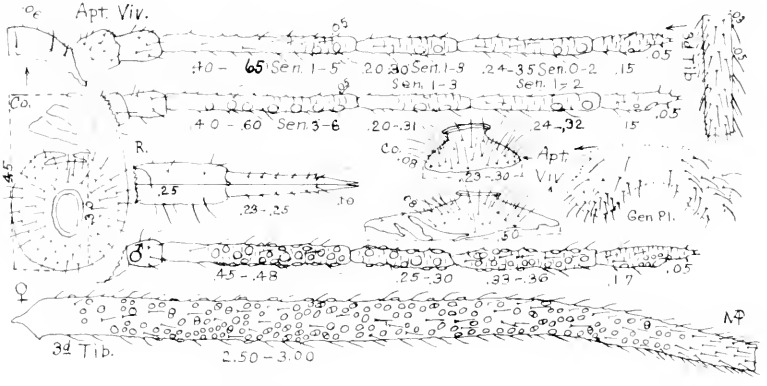


Fig. 6. *Cinara coloradensis* (Gillette)

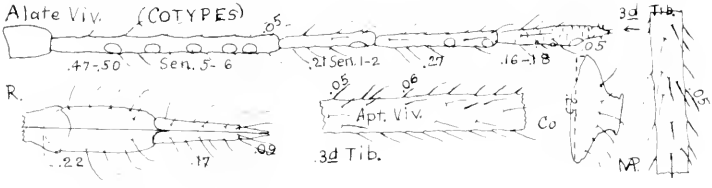


Fig. 7. *Cinara caudelli* (Wilson)

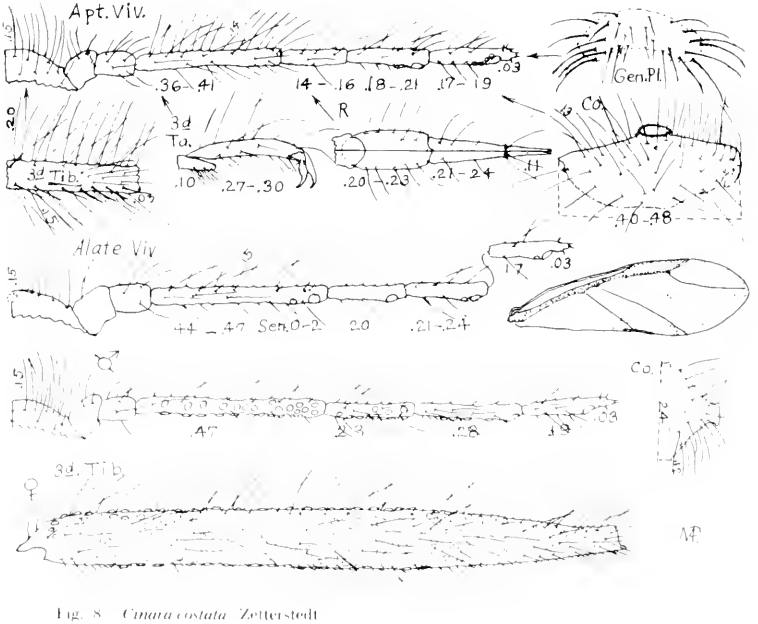


Fig. 8. *Cinara costata* Zetterstedt

PLATE NO. IV

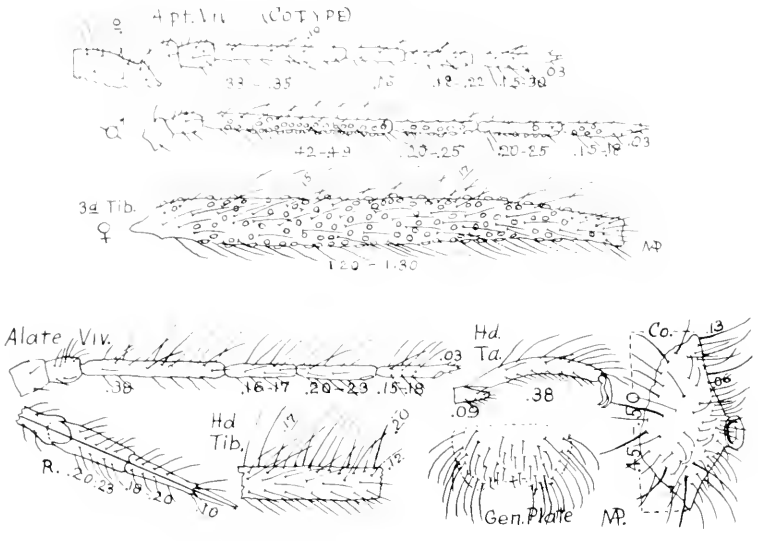


Fig. 9. *Cinara engelmanniensis* (G&P)

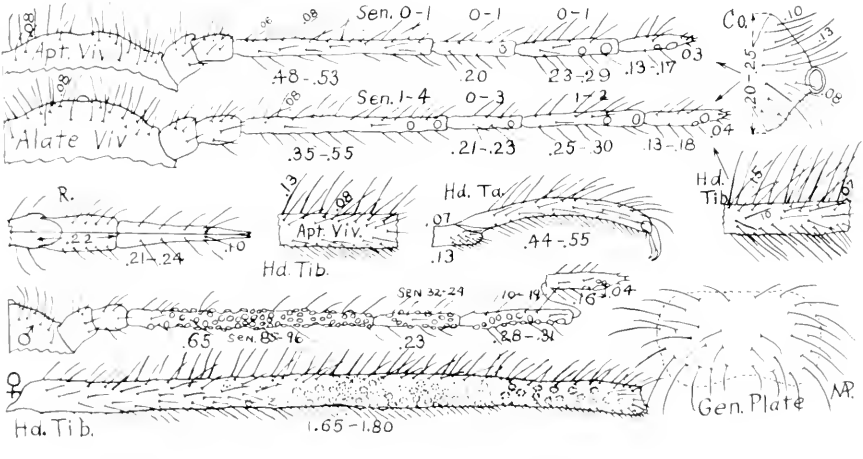


Fig. 10. *Cinara formacula* H

Host species given by Gillette in original description as *Picea parryana* which is a synonym of *Picea pungens*.

Size range apterous viviparous females 3.00 - 4.00 mm.

I have seen three slides from the type series in the U. S. National Museum and all of the type material left in the Colorado collection. As indicated by Palmer this species is very closely allied to *C. glelina* (Essig) of which I have seen three slides of the original material.

PLATE NO. V

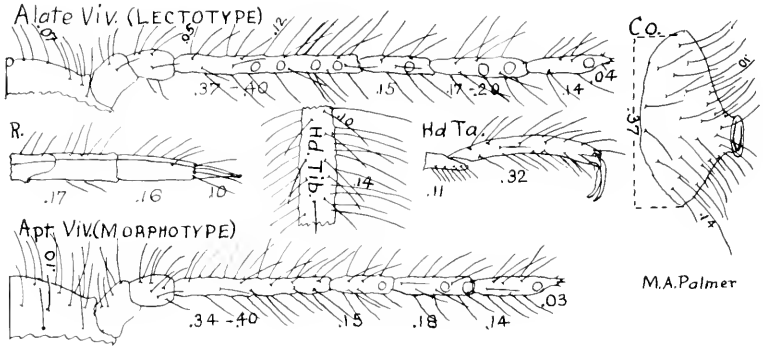


Fig. 11. *Cinara glehna* (Essig.)

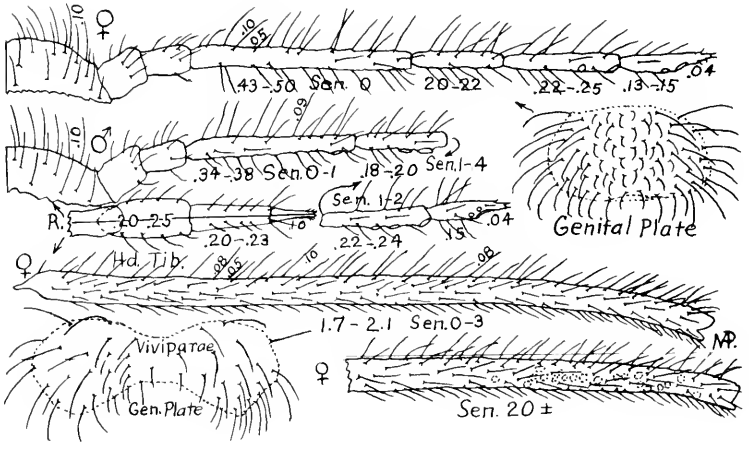


Fig. 12. *Cinara hottesi* (G&P)

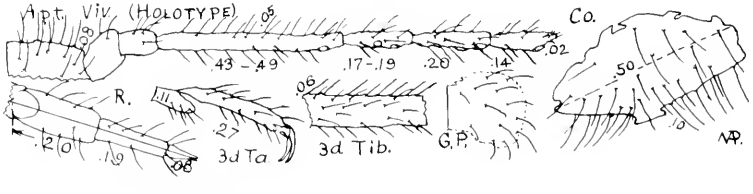


Fig. 13. *Cinara jucunda* H.

The two species seem to differ most in the color of the tibiae, the pigmentation being more extensive and darker in *glehna*, and the longer third antennal segment in *braggii*, as well as the slightly longer second metatarsal segment. I am not sure that the lengths given for the fourth rostral segment hold in all cases.

I have taken what may be this species on *Picea engelmanni;* on these specimens metatarsal II is only .28 mm. long.

Cinara caliginosa Hottes Fig. 5a

Cinara caliginosa Hottes, 1961, The Great Basin Naturalist, 21: 17-19 original descriptions apterous and alate viviparous females).

Holotype in collection of F. C. Hottes.

Host *Picea engelmanni.*

Cinara coloradensis (Gillette) Fig. 6

Lachnus coloradensis Gillette, 1917, Ann. Ent. Soc. America, 10: 133-134, pl. X (original description of all forms).

Type in U.S. National Museum. Hosts given in original description as *Picea parryana* and *Picea engelmanni.* Palmer (1961) would restrict the host to *Picea pungens.*

I have not seen the type of this species. I have seen all of the remaining slides of the original material in the Colorado collection. Not all of the specimens of this material are in good condition, but they appear to me similar. All have the antennal segments comparatively short, all have the hairs on the cornicles, where they can be seen, confined largely to a band, the hairs on the tibiae are squarely cut at the apex.

I have seen other slides determined as *coloradensis.* They are to say the least a heterogeneous lot. They differ greatly in size, in shape of body, size of cornicles and distribution of hair on the cornicles, and have longer antennal segments. They do have short squarely cut hairs on the tibiae. All specimens determined as *coloradensis* lack crisscrossing hairs along the transverse suture. I do not pretend to know this species.

Cinara caudelli (Wilson) Fig. 7

Lachniella caudelli Wilson, 1919, Canadian Ent. 51: 43-44 (original description alate and apterous viviparous females).

Cinara caudelli, Palmer, 1945, Ann. Ent. Soc. America 38: 449-450 (redescribed and illustrated from type slide).

Type in U.S. National Museum (recorded in original description as U.S. Bureau of Entomology Collection). It is recorded as having been taken on Spruce.

Size range recorded by Palmer 2.4 - 2.5 mm.

This species was keyed from the description by Palmer. I know of no record except the original one.

Cinara costata (Zetterstedt) Fig. 8

Aphis costata Zetterstedt, 1828, Insecta Lapponica, p. 599 (not seen) (original description. Re-described Insecta Lapponica 1840, p. 311. Apparently both descriptions are of an alate viviparous female taken for a male).

PLATE NO. VI

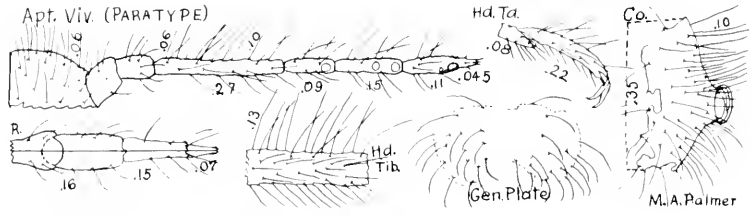


Fig. 14. *Cinara mariana* Bradley

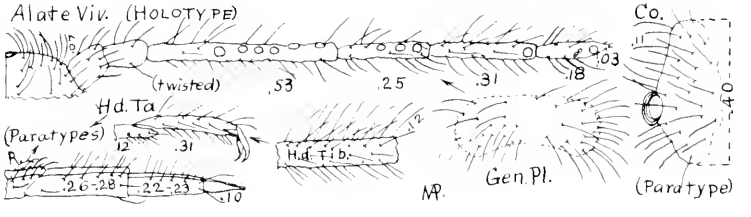


Fig. 15. *Cinara tecticula* H.

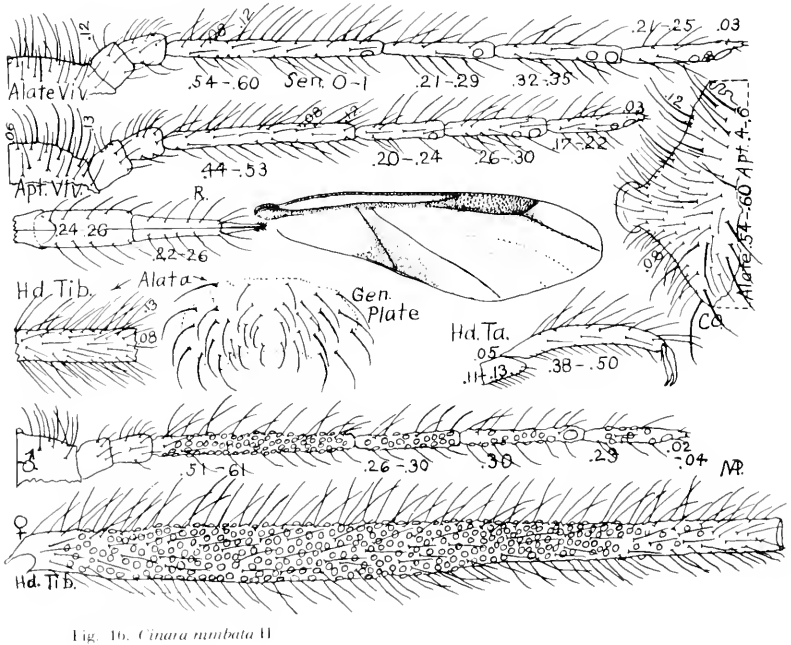


Fig. 16. *Cinara nimbata* H.

Location of type not known.

Host *Picea excelsa*, *Picea* sp.

Size of specimens taken in Europe 4.52 mm.

The only specimens I know of from the United States were taken in a city park in Tacoma, Washington. The tibiae of this species are short, they are provided with long upstanding hairs. The alate has pigmented areas on the wings. The pigmented areas anterior to the cauda are very wide.

Cinara engelmanniensis (Gillette and Palmer) Fig. 9

Lachnus engelmanniensis Gillette and Palmer, 1925 Ann. Ent. Soc. America 18: 527-530, figs. 528 plate XLIV (original description apterous viviparous female, oviparous female, alate male).

Cinara engelmanniensis, Hottes, 1954, Proc. Biol. Soc. Washington 67: 260. Description alate viviparous female. Hottes, 1955, Proc. Biol. Soc. Washington 68:74 fig. alate viviparous female.

Type and morphotype in the U. S. National Museum.

Size range apterous viviparous females 2.25 - 2.70 mm.

Host *Picea engelmanni*.

The cornicles of this species are very distinctive, often they are provided with an irregular pigmented area anteriorly, which as a rule has several clear areas. I note no mesosternal tubercle. The genital plate has the lateral margins more or less serrate, with long hairs confined largely to the lateral regions.

I have never taken this species in colonies, but Palmer records doing so. It shows a decided preference for branches of its host which are close to the ground.

Cinara fornacula Hottes Fig. 10

Cinara fornacula Hottes, 1930, Proc. Biol. Soc. Washington 43:186 (original description apterous viviparous female); Hottes, 1933, Proc. Biol. Soc. Washington 46:1-4 (description stem mother, oviparous female, alate male); Hottes, 1954, Proc. Biol. Soc. Washington 67: 258-259 (description alate viviparous female); Hottes, 1955, Proc. Biol. Soc. Washington 68:74 figs. (of all forms).

Type in collection of Prof. O. W. Oestlund, whose collection is now in the collection of the University of Minnesota. Apparently it is either lost or misplaced, a slide from the same collection is in the U. S. National Museum. Morphotypes, and allotype in U. S. National Museum.

Size apterous viviparous female 3.60 mm.

Host *Picea engelmanni*.

The mesosternal tubercle of this species is lacking.

I have never taken this species in colonies.

Palmer (1952) states that this species may be *C. piceicola* var. *viridescens* (Cholodkovsky). Börner regards *viridescens* as a species, I have material of it sent me by him. It differs from *fornacula* in the much darker cornicles, shorter hairs on the tibiae, and shorter metatarsal II. The two species may be separated at once by the shape of the sixth antennal segment.

Cinara glehna (Essig) Fig. 11

Lachnus glehnus Essig, 1915, Pomona Jour. of Ent. and Zoo. 7:180-187 (original description, figs. alate and apterous viviparous females).

PLATE NO. VII

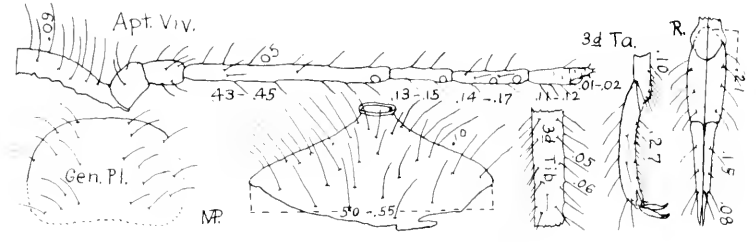


Fig. 17. *Cinara obscura* Bradley

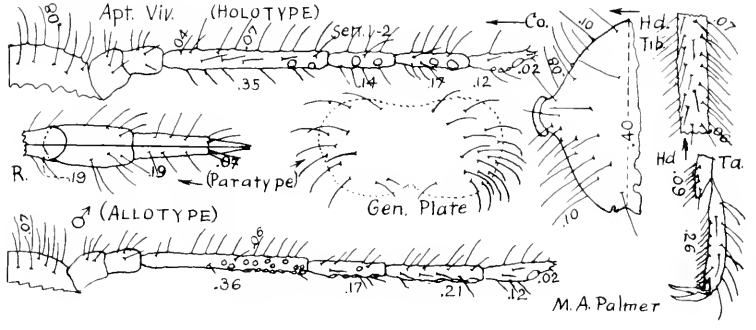


Fig. 18. *Cinara pallidipes* H.

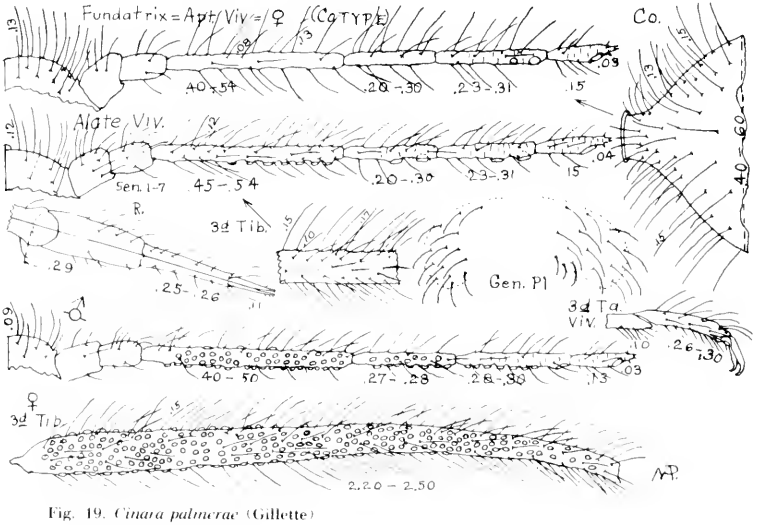


Fig. 19. *Cinara palmerae* (Gillette)

Lectotype in Collection of E. O. Essig.

Host *Picea glehni.*

Size range apterous viviparous females 2.92 - 3.45 mm.

Apparently this species is known only from the original collection. As indicated under *C. braggii* the two species are closely allied.

Cinara hottesi (Gillette and Palmer) Fig. 12

Lachnus hottesi Gillette and Palmer, 1924. Ann. Ent. Soc. America 17:22-23, pl. VI and VII (original description alate and apterous viviparous females); Hottes, 1955. Proc. Biol. Soc. Washington 68: 75-76 (description oviparous female and apterous male, figs. 70).

Type, morphotype and allotype in U. S. National Museum.

Size range apterous viviparous females 2.5 - 3.8 mm.

Host *Picea engelmanni.*

The mesosternal tubercle of this species is poorly developed. The tibiae are yellowish orange and have only the apices dusky, they are in sharp contrast to the black body which has no pulverulence. The male is characterized by having very few sensoria on the antennae.

Cinara jucunda Hottes Fig. 13

Cinara jucunda Hottes, 1958. Proc. Biol. Soc. Washington 71: 171-172 figs. (original description apterous viviparous female).

Holotype apterous viviparous female in U.S. National Museum.

The host of this species as indicated on the type slide is either Colorado or Blackhills spruce.

Size range 2.70 - 3.00 mm.

Cinara mariana Bradley Fig. 14

Cinara mariana Bradley, 1956, Canadian Ent. 88: 706-707 figs. (original description apterous and alate viviparous females).

Holotype apterous viviparous female in Canadian National Collection.

Host *Picea mariana.*

Size apterous viviparous female 2.00 mm.

Specimens of this species were not available for the construction of the key.

Cinara nepticula Hottes Fig. 15

Cinara nepticula Hottes, 1958. Proc. Biol. Soc. Washington 71: 63-64 figs. (original description alate viviparous female).

Holotype alate viviparous female in Canadian National Collection.

Host *Picea rubens.*

Size range alate viviparous females 3.45 - 3.60 mm.

This species known only from alate viviparous forms has been keyed in such a manner that it is thought that apterous females will apply.

Cinara nimbata Hottes Fig. 16

Cinara nimbata Hottes, 1954. Proc. Biol. Soc. Washington 67: 253-265 (original description of all forms); Hottes, 1955. Proc. Biol. Soc. Washington 68: 72 figs. (all forms).

Holotype and other types in U. S. National Museum.

Host *Picea engelmanni*

Size range apterous females 3.76 - 4.22 mm.

This species is one of the most easily determined species in this group. The pigmentation of the tibiae is very characteristic, the darker portions being more or less spotted. I have never taken it in colonies. I have seen specimens collected in Arizona and from western Canada.

Cinara obscura Bradley Fig. 17

Cinara obscura Bradley, 1953. Canadian Ent. 85: 431-432 figs. (original description alate viviparous female).

Cinara enigma Hottes and Knowlton, 1954. Great Basin Naturalist 14: 11-13, figs. (description apterous viviparous female).

Holotype alate viviparous female in the Canadian National Collection.

Host *Picea glauca.*

Size apterous viviparous females 2.49 mm.

Specimens of this species were not available for the construction of the key.

Cinara pallidipes Hottes Fig. 18

Cinara pallidipes Hottes, 1958. Proc. Biol. Soc. Washington 71: 8-10 (description apterous viviparous female, apterous male, figs.).

Holotype and allotype in U. S. National Museum.

Host *Picea glauca.*

Size apterous viviparous females 2.18 mm.

Cinara palmerae (Gillette) Fig. 19

Lachnus palmerae Gillette, 1917. Ann. Ent. Eoc. America 10: 135-137, figs. (original description of all forms).

Type in U. S. National Museum.

Host *Picea pungens*, Palmer records it rarely on *Picea engelmanni.*

Size range 3.5 - 4.00 mm.

This species is widely distributed in the United States and Canada. Locally I have seen it a severe pest on nursery stock in the spring and early summer, after which it migrates to the roots, as first reported by Bradley. The mesosternal tubercle is about twice as broad as long.

Cinara pilicornis (Hartig) Fig. 20

Aphis pilicornis Hartig, 1841. Zeitschr. Ent. 3: 369 (original description apterous female).

Type presumed lost.

Host *Picea excelsa, Picea* sp.

Size apterous viviparous females, 3.00 mm.

This species has a number of synonyms, and has only recently been known under the name *pilicornis* in America. It has been recorded under the names, *piceicola* (Cholodkovsky), *hyalinus* (Koch), *pinicola* (Kaltenbach) as a rule in the genus *Lachnus.* Börner spells the specific name *pillicornis.*

PLATE NO. VIII

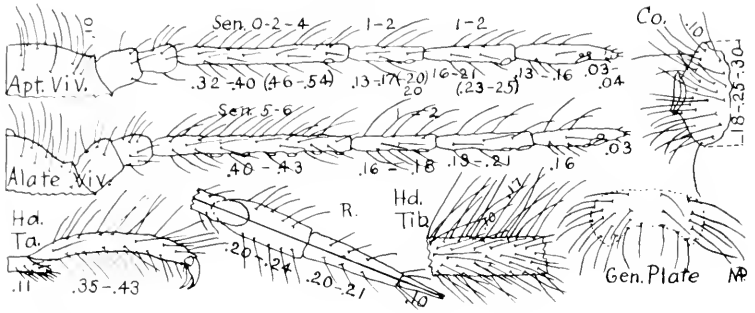


Fig. 20. *Cinara pilicornis* (H.)

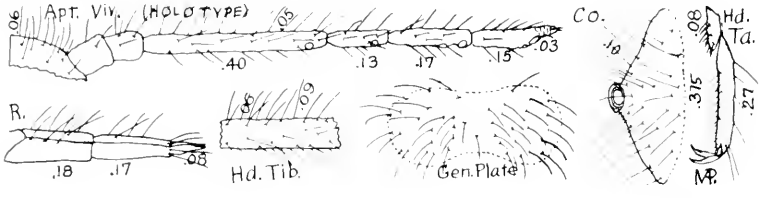


Fig. 21. *Cinara sitchensis* H.

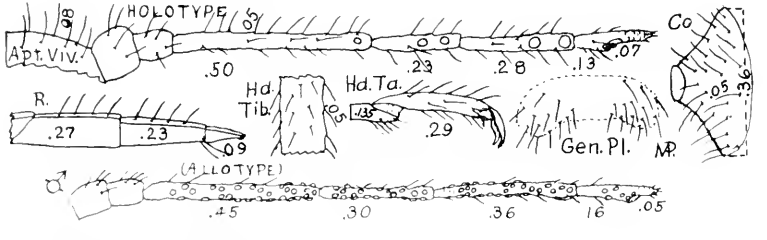


Fig. 22. *Cinara soplada* H.

Cinara rara Bradley

Cinara rara Bradley, 1956, Canadian Ent. 88: 708, figs. 707 (original description oviparous female).

Holotype oviparous female in the Canadian National Collection.

Host *Picea mariana*.

Size oviparous female 2.78 mm.

Specimens of this species were not available for the construction of the key.

Cinara sitchensis Hottes Fig. 21

Cinara sitchensis Hottes, 1958, Proc. Biol. Soc. Washington, 71:61-62, figs. (original description apterous viviparous female.

Holotype in the collection of E. O. Essig.

Host *Picea sitchensis*.

Size range apterous viviparous females 2.55 mm.

PLATE NO. IX

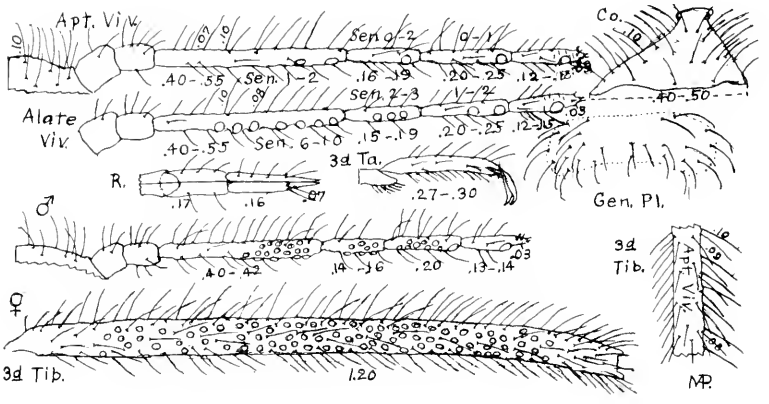


Fig. 23. *Cinara vandykei* (Wilson)

Cinara soplada Hottes Fig. 22

Cinara soplada Hottes, 1956, Proc. Biol. Soc. Washington 69:65-67, figs. (original description apterous viviparous female); Hottes, 1958, Proc. Biol. Soc. Washington, 71:10 (description alate male. fig. p. 6).

Holotype and allotype in U. S. National Museum.

Host *Picea glauca.*

Size apterous viviparous female 3.07 mm.

Cinara vandykei (Wilson) Fig. 23

Lachnus vandykei Wilson, 1919, Canadian Ent. 51: 19-20 (original description alate and apterous viviparous females); Palmer, 1926. Ann. Ent. Soc. America 19: 317-319 (description of all forms, figs. plates 27 and 28).

Type in Granovsky collection (according to Palmer, 1952.)

Host *Picea engelmanni.*

Size range apterous viviparous females 2.5 - 3.00 mm.

This species produces the sexual forms early, hence it has to be collected before the latter part of July or early August.

Key to apterous viviparous females of the genus *Cinara* (Family Aphidae) which have *Picea* sp. for host.

1. Longest hairs on outer margin of metathoracic tibiae as long as or longer than width of tibiae 2
   Longest hairs on outer margin of metathoracic tibiae shorter than width of tibiae 20
2. Dorsum of abdomen with two rows of well defined pigmented areas ..... *C. engelmanniensis* (Gillette and Palmer)
   Dorsum of abdomen without two rows of well defined pigmented areas 3

3. Hairs on tibiae coarse, almost spinelike, dark in color ..... *C. nimbata* Hottes
   Hairs on tibiae not coarse, not almost spinelike, not dark in color 4
4. Metathoracic tibiae uniformly pigmented 5
   Metathoracic tibiae with at least apices darker than middle 6
5. All tibiae uniformly dark brown ..... *C. atripes* Hottes
   Only metathoracic tibiae uniformly dark brown ..... *C. rara* Bradley
6. Cornicles concolorous with abdomen ..... *C. fornacula* Hottes
   Cornicles darker than abdomen 7
7. Metatarsal II .50 mm. ..... *C. bonita* Hottes
   Metatarsal II not over .45 mm. 8
8. Metatarsal II .31 mm. or less 11
   Metatarsal II .32 mm. or more 9
9. Antennal IV without sensoria ..... *C. bonica* Hottes
   Antennal IV with at least one sensorium 10
10. Cornicles not over .30 mm., metatarsal II .35 - .43 mm. ..... *C. pilicornis* (Hartig)
    Cornicles not under .30 mm., metatarsal II not over .33 mm. ..... *C. braggii* (Gillette)
11. Metathoracic tibiae 1.70 mm. or more 12
    Metathoracic tibiae 1.65 mm. or less 15
12. Hairs on metathoracic tibiae .12 - .17 mm. ..... *C. palmerae* (Gillette)
    Hairs on metathoracic tibiae not over .12 mm. 13
13. Base of cornicles .55 - .60 mm. .. *C. hottesi* (Gillette and Palmer)
    Base of cornicles .30 - .50 mm. 14
14. Rostral IV .16 mm. ..... *C. vandykei* (Wilson)
    Rostral IV .22 - .23 mm. ..... *C. nepticula* Hottes
15. Hairs on metathoracic tibiae .15 - .20 mm. ..... *C. costata* (Zetterstedt)
    Hairs on metathoracic tibiae .15 mm. or less 16
16. Hairs on metathoracic tibiae .10 or more 19
    Hairs on metathoracic tibiae .10 or less 17
17. Antennal V .20 - .25 mm. ..... *C. vandykei* (Wilson)
    Antennal V not over .18 mm. 18
18. Hairs on metathoracic tibiae .06 - 07, hairs on cornicles not uniformly distributed ..... *C. pallidipes* Hottes
    Hairs on metathoracic tibiae .06 - .90, hairs on cornicles uniformly distributed ..... *C. sitchensis* Hottes
19. Metatarsal II .22 - .28 mm., Antennal IV .09 - .15 mm. ..... *C. mariana* Bradley
    Metatarsal II .30 mm., Antennal IV .15 mm. .. *C. glehna* (Essig)

20. Unguis .03 mm. or less 21
Unguis more than .04 mm. 22
21. Antennal IV not over .15 mm., rostral IV not over .16 mm. ..... *C. obscura* Bradley
Antennal IV .15 - .20, rostral IV .19 mm. .... *C. jucunda* Hottes
22. Base of cornicles not over .35 mm. 23
Base of cornicles over .35 mm. 25
23. Rostral IV .28 mm or more ..... *C. acadiana* Hottes
Rostral IV not over .25 mm. 24
24. Rostral IV .23 - .25 mm. ..... *C. coloradensis* (Gillette)
Rostral IV .17 mm. ..... *C. caudelli* (Wilson)
25. Metatarsal II .29 mm. ..... *C. soplada* Hottes
Metatarsal II .33 mm. or more 26
26. Dorsum of head with few hairs, almost none along transverse suture ..... *C. coloradensis* (Gillette)
Dorsum of head with numerous hairs, hairs crisscrossing over transverse suture ..... *C. caliginosa* Hottes

ORTHOPTERA
STUDIES IN NEARCTIC DESERT SAND DUNES

Part IV. A new *Trimerotropis* from the dunes of eastern New Mexico

Ernest R. Tinkham[1]

The new species of *Trimerotropis*, herein described, was found on the Mescalero Sands during the author's investigations on the Dune Biotae of the Great Chihuahuan Desert as a Grantee of the National Science Foundation, 1957-1960. These dunes have been more fully discussed in Part I of this study and the interested student is referred to that paper. Description of the new subspecies follows:

Trimerotropis citrina neomexicana n. subsp.

Differs from typical material of *T. citrina* from the type locality (Dallas, Texas) and from areas west to the Rio Grande in New Mexico and north to Nebraska by its larger size, plain isabelline tegmina which lacks the agglomeration of fasciculi typical of *citrina* and by the definite enlargement of the dental area on the posterior angle of the lateral lobes of the pronotum (see figures). Such enlargement of the posterior lobe seems especially developed in arenicolus species of *Trimerotropis* and present as great projections in the recently described *T. agrestis gracewileyae* and *T. a. barnumi* of Utah dunes. It is also observed in *T. strenua* and especially the nymphs of *T.arenacea* Rehn of the Winnemucca dunes of northern Nevada. Additional morphological features of differentiation are: the more carinate median carina of the pronotum, more definite lateral carinae on the metazona of the pronotum, the more arcuate curving black band on the wings, which in *citrina*, especially the males, crosses the wing quite transversely giving the band a somewhat angular form. Also, the Cubitus and First Anal veins are yellow throughout, thus dividing the band into two sections in the new form. In addition, the carinae of the dorsal portions of the head seem more definite and there is usually a suggestion of a median carina of the fastigium. All these features should serve to amply distinguish this new handsome race.

Male.—Fastiguimu gently declivent, rounding into the frontal costa, with strongly defined lateral carinae commencing centrally between the compound eyes, slightly divergent forward to near the front margin of the eyes, thence convergent and gently arcuate, in almost a straight line, to the frontal costa whereas in *citrina* these carinae are somewhat irregular in the proximity of the lateral foveolae. Median foveolae gently impressed, median carina of the fastigium slightly indicated. Lateral foveolae well indicated, carinate on the two front margins, rather open behind. Frontal costa gently and evenly divergent from just above the antennal scrobes to near the clypeal margin where they evanesce. Eye typical and subprominent.

1. Indio, California

Antennae long, their apices extending to the bases of the caudal femora. Pronotum with median carina well defined especially on the prozona, less defined on the metazona; in profile rather flat or straight and notched by the principal sulcus at about the anterior 2/6th, the second sulcus almost central on the prozona thus producing bilobation, the anterior lobe of which is slightly the longest. Shoulders of the metazona with definite lateral carinae which extend posteriorly for one half the length of the metazonal shoulders and only very slightly divergent caudally. Process of the metazona slightly acute-angled and well rounded, the margins rolled and slightly concavely arcuate. Lateral lobes of the pronotum deeper than broad, the anterior and posterior margins parallel (this feature distinguishing *neomexicana*, new subspecies from the newly described *T. agrestis gracewileyae* and *T. a. barnumi* which have these margins slightly divergent ventradly), the inferior margin of the posterior angle with a large dentate projection which is an important character distinguishing *neomexicana* from *citrina*.

Coloration: whitish gray with scattered rust spots on head and pronotum reddish brown, thoracic sternites and abdomen tinged with yellow. Tegmina isabelline with principal veins brownish and network of veins whitish with dark brown cells in anterior two-thirds, posterior third (dorsal area in closed tegmina) brownish yellow. Wing disc yellow with strongly arcuate black band terminating at anal 14., the cubitus area is yellow throughout separating off the marginal area whereas in *citrina* the band is entire.

Apical portion of the wing hyaline with the veins of Anal 1 and 2 blackish while in *citrina* the blacking of veins in the apical portion is more considerable. Caudal femora whitish on the outer pagina with barely a trace of any dark fasciation which in *citrina* is quite definite and prominent; inner pagina deep coral red with three small blackish areas located as follows: the basal patch on the central two-fifths, an apical genicular area and a small intermediate spot. Lower sulcus deep coral red. Caudal tibiae deep coral red with the spines tipped with black and the external basal third with a whitish cloud area.

Male Holotype: Mescalero Sands, 44 miles east of Roswell, New Mexico on Highway #380, east margin of dunes, 12-13 September, 1959, Ernest R. Tinkham. Glogau Calliper measurements in millimeters; body length 26.9; length to apex of tegmen 36.5; pronotum 5.9 x 3.3 at shoulders; lateral lobes of pronotum 4.5 x 3.5 in breadth; tegmen 30.5; caudal femur 14.2 mm. Type deposited in the Tinkham Eremological Collection.

Female: much larger than male, fastigium relatively broader but otherwise similar. Pronotal features similar but median sulcus notching shallow. Lateral carina of metazona more defined than in male and tooth on inferior margin relatively larger. Tegmina and oviposter typical of genus.

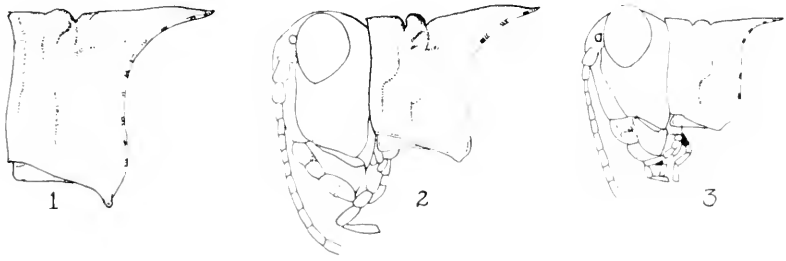
Coloration: closely similar to the male, the breadth of the black

wing band slightly more than 1/5th the length of the wing and about equal to one-half the breadth of the disc.

Female Allotype: same locality as the Holotype but collected 16-17 July, 1959. Measurements in millimeters: body length 34.6; length to apex of tegmen 48.0; pronotum 7.5 x 5.8 in breadth at the shoulders; lateral lobes of the pronotum 6.7 x 4.7 in breadth; tegmen 39.5; caudal femur 19.5. Allotype in the Tinkham Eremological Collection.

Male paratypes: 8, 6 from the same locality and date as the Holotype, 2 ♂'s from Monohans Sand Hills State Park on July 7 and Sept. 14, 1959. Range in measurements in millimeters: body length 26.8—31.2; length to apices of tegmina 33.0—39.9; Pronotum 3.9—4.9 x 4.1 to 4.5; lateral lobes of the pronotum 4.3—5.0 x 3.2 x 3.9 in breadth; tegmina 28.0—33.3; caudal femora 15.4—16.2 mm. Paratypes will be deposited in the major orthopterological collections in United States. Paratypes very closely similar to the Holotype with very slight individual variations in the straightness of the lateral carinae of the fastigium and the development of the lateral carinae on the shoulders of the metazona of the pronotum.

Female paratypes: 14, 12 from the same locality as the Allotype but collected Sept. 12-13, 1959; 1 female paratype same date and locality as the Allotype; 1 female from the red sand dunes 11 miles south of Hobbs, New Mexico. 1 female from Manahans Sand Hill State Park, Sept. 14, 1959; 2 females same location July 7, 1959. Range in measurement in millimeters: body length 35.5—39.0; length to apices of tegmina 41.4—48.5; pronotum 6.2—7.8 x 4.8—5.2; lateral lobes of the pronotum 6.5—6.2 x 3.8—4.7; tegmina 34.6—39.6; Caudal femora 16.9—19.8 mm. Female Paratypes deposited in the major orthopterological collections and the Tinkham collec-



EXPLANATION OF FIGURES

1. *Trimerotropis citrina neomexicana* n. subsp. Lateral view of pronotum of Allotype Female. Mescalero Sands, Chaves Co., New Mexico.
2. *Trimeratropis c. neomexicana* n. subsp. Lateral view of head and pronotum of Holotype Male. Mescalero Sands, Chaves, Co., New Mexico.
3. *Trimerotropis citrina* Scudder. Lateral view of head and pronotum of Male from Dallas, Texas, the Type Locality.

All drawings on the same scale and greatly enlarged. Figures 1, 2, and 3.

tion. Paratype females identical to the Allotype in every respect.

Orthopteran Associates: The orthopteran associates of *T. c. neomexicana* are many because the Mescalero Sands support the richest orthopteran fauna of all the numerous sand dune areas of the North American Deserts. The most intimate associates are *Spharagemon collare cristatum* in the blow-outs and more rarely *T. p. salina* and *Xanthippus montanus* and *X. corallipes*.

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A CHECK-LIST OF THE SPECIES OF *ELEODES* AND DESCRIPTIONS OF NEW SPECIES (COLEOPTERA-TENEBRIONIDAE)[1]

Vasco M. Tanner

Introduction

Prior to the publication of the monumental contribution, "A Monographic Revision of the Coleoptera Belonging to the Tenebrionidae Tribe Eleodiini Inhabiting the United States, Lower California and Adjacent Islands," in 1909 by Frank E. Blaisdell, Sr., approximately 90 species of this tribe had been described from America North of Mexico. It was Dr. Blaisdell's interest and critical work that has made known this important and conspicuous Coleopterous fauna of the South-Western United States. He described 125 of the 233 species and subspecies of the tribe Eleodini as included in the check-list of this study.

Dr. Blaisdell, in his monograph, instituted a nomenclatural departure that of considering specimens of a series which showed a constant variation from the typical specimens of the species as a *forma*. In explanation of this procedure the following is quoted:

> "Furthermore, in order to systematically deal with their many minor degrees of divergencies exhibited by individuals that are presumably the progeny of parents specifically or racially identical, I have deemed it conservative and scientific to recognize incipient races and incipient subraces. In accordance with this view I have used the name *forma* to make it possible to relatively define aggregations of individuals possessing some particular or salient characteristic; it is believed that these divergent characters have arisen through local or general climatic or environmental conditions acting upon the progeny of parents specifically or racially identical.
>
> "In other words, the several *formae* enumerated under *Eleodes dentipes* may arise from eggs deposited by a single *typical* female, under the influence of climatic, geographical or environmental conditions capable of producing such divergencies.
>
> "A Latin name has been used to express the salient characteristic of any given forma and these characteristics may be similar for each species or variety. A species or variety may have smooth and rough, short and elongate, small and large, caudate or ecaudate forms, consequently a repetition of Latin names is called for.
>
> "These terms are absolutely synonymous with the specific or varietal terms and must not be perpetuated as distinct grades, but simply used as an aid in recording date, and as a compromise between unscientific lumping or splitting, or the difference between 47 and 400 species.
>
> "Logically the present treatment ought not to seriously collide with the rules of the International Code governing nomenclature."[2]

In spite of Dr. Blaisdell's pronouncement, Mr. Leng, in 1920, listed in the "Catalogue of the Coleoptera of America, North of Mexico," the *formae* as contained in Blaisdell's Monograph. There has been some confusion and misunderstanding as to the status of

1. Contribution No. 177. Department of Zoology and Entomology, Brigham Young University, Provo, Utah.
2. Blaisdell, Frank E. 1909. Preface, p. v-vii.

the *formae*. This is due mainly to the fact that Dr. Blaisdell elevated several of the *formae* to higher rank. By 1925, he had published descriptions for many of the *formae*, elevating them to species or subspecies rank. In his "Studies in the Tenebrionidae No. 2, 1925b he has the following to say about his stand in this matter:

> "In the mass of heterogeneous material upon which I based my monograph, there were numerous instances in which the specimens were too few for a correct and definite understanding of the relationships; as a result, many subspecies and races were not recognized and unwittingly considered as *forma*, not wholly from ignorance in many cases, but more truly as acts of conservatism, I having believed it to be more logical and truthful to raise than to lower a grade, whenever more positive data warranted it.
>
> "The raising of certain *forms* to a definite grade does not invalidate the conception of such intra-specific groups, for even then the specific aggregates will be made up of variants, as no two individuals of any species can be exactly alike as regards to size, form, sculpturing and color, no matter how much restricted taxonomically.
>
> "In 1909 I presented the conception of *forms* as a means of directing attention to the variation within specific units so as to make them objects of research. I *advised that* forms *should not be given a place in a check-list*, for on the face of the matter they are absolute synonyms according to the author and from the standpoint of taxonomy."

The fact that Dr. Blaisdell, by 1925 had described many of the *formae* listed in his monograph, as species or subspecies is clearly brought out in his paper: "Revised Check-List of the Species of *Eleodes* Inhabiting America, North of Mexico, Including Lower California and Adjacent Islands, 1925c." In this study he points out that: "This list is intended to replace the one given by Leng in the "Catalogue of the Coleoptera of America, North of Mexico." References are given for the species and phases not given in the Leng Catalogue. This list includes 106 species, 67 subspecies, and 12 varieties.

He further comments, "In my Monograph of the Eleodiini (Bulletin 63, United States National Museum) no attempt was made to designate subspecies. In the present list this has been done, based on more recent observations."

In 1916 the writer began making a collection of Tenebrionidae. This year and 1917 *Eleodes hispilabris* subsp. *sculptilis* Blais. was abundant in the dry land Turkey Red wheat field at Indianola, Sanpete Co., Utah. Associated with this species was *E. obscura sulcipennis* Mann. Large areas, 50 to 100 yards in diameter, throughout the wheat fields were killed by the larvae of these beetles. Specimens of these same species were collected in 1916 at Zion National Park, St. George, and Parowan, Utah, and Fredonia, Arizona. In 1920 I began corresponding, submitting specimens for determination, and exchanging specimens with Dr. Blaisdell. I soon found him to be most prompt and generous with a beginning collector and student of Entomology. During the intervening years until his death July 6, 1946, we carried on an exchange of specimens, which resulted in my building up a fairly complete collection of most of the species and subspecies of the genus *Eleodes*. From 1926 until 1939 I collected in

most all parts of Utah and some contiguous states. In 1927-28, some specimens closely related to *Eleodes pilosa* were collected in South Eastern and Western Utah. Some of these specimens I submitted to Dr. Blaisdell for his identification.

He reported that these specimens represented a new species and that he intended to describe them. Unfortunately, he never published a description of this species, nor of several formae[3] which he intended to raise to subspecies.

For the past few years I have been arranging the specimen of Tenebrionidae in my collection and have decided to report on the species of the subgenera *Tricheleodes* and *Pseudeleodes*. Through the kindness of Mr. Hugh Leech of the California Academy of Sciences, I have received by loan specimens mentioned above which Dr. Blaisdell had studied.

In this study an attempt has been made to bring together in one article keys for the separation of the genera of the Eleodini and the subgenera of the genus *Eleodes*. Two new species are described and drawings of four related species are included. An up to date checklist of the species of the genus *Eleodes* forms an essential part of this study.

Acknowledgments

I wish to acknowledge the many kindnesses shown to me by past and present members of the staff of the Department of Entomology of the California Academy of Sciences: Drs. Frank E. Blaisdell, Edwin C. Van Dyke, Edward Ross, R. E. Miller and Mr. Hugh B. Leech who have cooperated in many ways with the writer while studying at various times at the Academy. Mr. Owen Bryant liberally contributed, to me, of his specimens of Tenebrionids. Dr. Ira La Rivers and Mr. Ted Spillman have been helpful in furnishing specimens. The staff and students of the Department of Zoology and Entomology at Brigham Young University have been helpful in collecting and making available Tenebrionidae from many parts of Utah. To all the above I express my thanks.

Classification of the Eleodini

The accepted classification of the Tenebrionidae under consideration here, according to Dr. Blaisdell 1939, is as follows:

The family Tenebrionidae may be recognized and separated from other Heteromera Coleoptera as follows:

Front and middle tarsi five-jointed; the hind tarsi four-jointed. Anterior coxal cavities closed behind ventral abdominal segments five, in part connate.

Tarsal claws simple, the penultimate joint of the tarsi not spongy beneath.

3. Only formae described and published since 1909, by Blaisdell or other workers, are included in this checklist. As this writer interprets the 1959 nomenclatural rules, the formae of Blaisdell's monograph, 1909, do not fulfill the requirements of the rules, and they are, therefore, not considered as valid subspecies.

SUBFAMILY ELEODINAE BLAIS. 39-49

This subfamily replaces Blaptinae which is based upon *Blaps*, a European genus. Blaisdell contends that: "The members of a subfamily should consist of those species that have descended from a common ancestral form. That being the case, the tribe *Eleodini* as now considered as (is) in no way closely related to the Blaptinae (*Blaps* of Europe, etc.), but belong to the subfamily *Eleodinae*, the members of which have had their origin in Western North America, in the Sonoran Regions of the United States and Mexico."

TRIBE ELEODINI (ELEODIINI) BLAIS. 1909

The tribe Eleodini is confined to Lower California and adjoining islands; Northern Mexico and South Western United States. In 1943, Dr. Blaisdell recorded twenty-five species and subspecies from lower California. In this study, forty-six species and subspecies are reported as occurring in Utah.

Dr. Ira La Rivers, 1948, p. 98. has proposed a Key for the Genera comprising the *Eleodini*. He considers *Neobaphion* a subgenus of *Eleodes*, and that the "subtribal segregation on the basis of morphology is further reflected in the habits of the units involved. The *Eleodina* are wanderers, *Trogloderus* semi-fossorial and *Lariversius* markedly fossorial and restricted to arenaceous areas."

KEY TO THE GENERA OF ELEODINI

1. Sides of the epistoma not dilated 2
   (a) Sides of the epistoma moderately dilated, margin arcuate ..... *Trogloderus*
   (b) Sides of the epistoma distinctly dilated; margin of lobes slightly reflexed and rather prominent, surface rather densely punctate, central part of surface, slightly convex ..... *Lariversius*
2. Epipleura attaining the humeral angles, broader at base, more or less gradually narrowing to apex 3
   Epipleura very narrow, not attaining the humeral angles ..... *Embaphion*
3. Epipleura occupying only a part of the inflexed portion of the elytra; buccal processes of the genae not produced 4
   Epipleura occupying the whole of the inflexed portion of the elytra; buccal processes of the genae acutely produced ..... *Eleodimorpha*
4. Front margin of anterior femora feebly laminate in each sex; the anterior tibial spurs dissimilar in the sexes; tarsi similar in the sexes; elytral disc flattened ..... *Neobaphion*
   Not with the above combination of characters ..... *Eleodes*

GENUS ELEODES ESCHSCHOLTZ

The family Tenebrionidae is one of the largest families of beetles in America North of Mexico. It is represented by 1440 described

species and subspecies of which 210 belong to the genus *Eleodes*.

Species of this genus are commonly met with in the Great Basin region and contiguous states. The large size of most of the species, their apterous condition, their presence as ambulators on the desert sands and open areas makes of them familiar insects to most of mankind in this South Western Country. Their food is principally dry vegetable matter and fungi, however, the larvae, false wireworms, of some species of *Eleodes* do considerable damage due to their feeding on the roots of grains and grasses. Hibernation takes place in the adult or partly grown larval stage. The females lay their eggs in the soil, which under favorable condition hatch in about four months. Pupation takes place in the soil, lasting from two to three weeks. When the adults emerge, they mate and late summer eggs are laid. The larvae hatching from these eggs hibernate in a partly grown stage.

Some of the distinguishing characteristics possessed by all species of *Eleodes* are: Mentum trilobed, middle lobe larger and convex; apical joint of labial and maxillary palpi triangular; suture between epistoma and front distinct; eyes reniform; antennae with eleven segments, the last three usually compressed. Prothorax variable in shape and sculpture, in some species prolonged into a cauda behind; epipleura distinct. Legs fairly long, femora not strongly clavate, in some species armed in one or both sexes with teeth; tarsi usually chanelled and setose beneath. Spurs of the middle and hind tibiae well developed.

A key to the species of *Eleodes* cannot be included in this paper, due to a lack of the completion of a study of the genitalia and specimens of several rare species. Dr. Blaisdell's classification and systematic conclusions as to the fine points which separate a species and subspecies of this genus were based upon his knowledge of the genitalia and morphology of these insects.

Few students of this group pay the price of becoming informed on the morphology of the genital structures. Until this is done, changes and synonymizing of taxa of this group will be hazardous.

It is hoped that the key to the subgenera of *Eleodes*, along with an up to date checklist, additional distribution data, and a listing of pertinent literature on the group will be of help to those who deal with this Tenebrionid tribe.

SYNOPSIS OF THE SUBGENERA OF THE GENUS ELEODES

(Blais. 09-35 with additions)

"The subgeneric divisions of the genus *Eleodes Esch.* constitute groups of species possessing certain characters which differentiate them from each other. The subgenus *Blapylis* Horn is based on the tarsal pubescence and correlated genital characters. The subgeneric specific units, by differential characters fall naturally into groups; these are named after the species which have priority in description and publication." Blais. 35-29.

Anterior femora at least, armed in both sexes (except in

caudifera and *longipilosa* where the teeth are abortive) ..... *Eleodes*

Anterior femora armed only in the male or mutic.

Anterior tibial spurs dissimilar in the sexes; femora mutic ..... *Melaneleodes*

Anterior tibial spurs similar in the sexes.

Tarsi similar in the sexes, or nearly so.

Middle lobe of the mentum large, lateral lobes rudimentary, invisible without dissection; anterior tarsi with first joint more or less slightly thickened at tip beneath; anterior femora armed or sinuate ..... *Discogenia*

Middle lobe of the mentum small; anterior tarsi comparatively simple beneath, groove entire.

Lateral lobes of the mentum fully exposed; sculpturing comparatively simple; femora mutic .. *Metablapylis*

Lateral lobes moderately exposed; species opaque to shining; elytra tuberculate; anterior femora not sinuate, mutic ..... *Pseudeleodes*

Anterior tarsi dissimilar in the sexes.

Species pubescent throughout.

Hairs long and flying; femora mutic; anterior tarsi with first joint scarcely produced ventro-apically, ventro-apical spinules noticeable produced in the female, not so in the male; plantar grooves distinct ..... *Trichеleodes*

Hairs short, yellowish and recumbent; form oval, opaque, subdepressed ..... *Heteropromus*

Species not usually pubescent, rarely so.

Form elongate, usually large; first joining of the anterior tarsi slightly thickened at tip beneath, bearing a small transverse tuft of yellowish or brownish modified spinules which interrupt the groove in the male; simple in the female ..... *Steneleodes*

Form elongate subfusiform to subovate facies resembling that of a small *Eleodes* (*Steneleodes*) *longicollis* Lec. Elytra somewhat depressed to moderately convex. Color black, surface more or less polished, punctation fine, not muricate. Profemora mutic, briefly sinuate beneath at apex. Protarsi and mesotarsi of male with tufts of golden or fulvous pubesence, female with protarsi less thickened beneath ..... *Holeleodes*

Form ovate or fusiform; the first one or two joints of anterior tarsi in the male more or less thickened and sometimes flattened beneath, densely clothed with fine pubescence; tarsi simple and unmodified in the female; anterior femora armed or mutic ..... *Promus*

Form short ovate, moderate in size to small, robust

(elongate and depressed in *tibialis*); anterior tarsi of the male with first two or three joints feebly thickened at tip beneath and clothed with dense silken or brownish pubescent tufts, obliterating the groove; joints simple with grooves entire in female; femora mutic ..... *Blapylis*

Form moderately elongate oblong-ovate, more or less depresssed and subalobatoid in facies. Color black to piceous; luster dull to more or less shining. Protarsi and mesotarsi with tufts or pads of yellowish pubescence on the apices of the segments beneath, varying in the species ..... *Arpeleodes*

Form ovate, moderate in size, less robust; first joint of the anterior tarsi more or less thickened and slightly more prominent ventrally than the others, pubescent tuft variable, most evident in *extricata;* in the male first joint with a minute tuft of silken pubescence at tip beneath ..... *Litheleodes*

SUBGENUS TRICHELEODES BLAIS. 09-138

As indicated above keys to the species of the subgenera except *Tricheleodes* and *Pseudeleodes* are not contained in this study. The two new species described below necessitated working with the species of the subgenera mentioned above. The genitalia of most of these species have been studied. The spermatheca is an interesting and valuable structure in making separation of genera and species.

The five species of this subgenus may be separated as follows:[4]

I. Larger species (11.0 to 16.5 mm. in length)

a. Setae of the pronotum and elytra distinctly unequal in length, slightly bristly, denser along the margins; pronotum widest at or before the middle, disc convex, punctures irregular, confluent; elytra surface with dense, irregular, small tubercles, from which issue erect black flying hairs. Length 11 to 14.5 mm. ..... *pilosa* Horn

b. Setae of the pronotum and elytra sparse, denser below the elytral declivity, on elytra, setae arise from the lee side of large spherical tubercles; pronotum rugose, due to irregular, rather deep punctures; elytra with large shiny tubercles, surrounded with smaller ones. Length 12.6 to 15.5 mm. Fig. 1 ..... *leechi, n. sp.*

c. Setae of the pronotum and elytra, not conspicuous, short; pronotum not deeply punctured, asperate like the elytra with small setigerous muricate tubercles.

4 The figures Nos. 1-9 portray many of the characters which may be useful in separating the species of the subgenera *Trichaleodes* and *Pseudeleodes*.

Length 12.8 mm. Fig. 2 ..... *spoliata* Blais.[5]

II. Smaller species (6.0 to 10 mm. in length)

a. Setae of the pronotum and elytra shorter, softer;

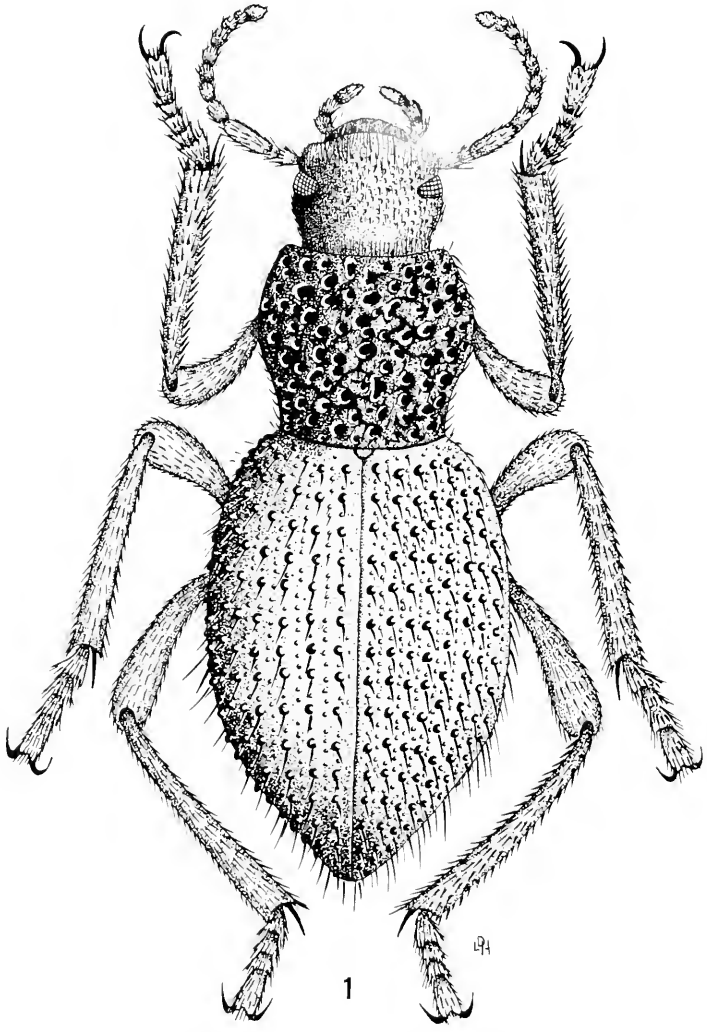


Fig. 1. *Eleodes leechi* Tanner, n. sp.

5. I am most grateful to Mr. Hugh B. Leech for the permission to study this unique type specimen. Dr. Blaisdell commented as follows on this species:

"The single specimen has been at hand for about nineteen years waiting for other specimens to be secured. It is a very distinct species and should follow *pilosa* Horn in our lists, as a member of the subgenus *Tricheleodes*. In *spoliata* the body is clothed with short setae and not long hairs as in *pilosa*; in the latter species the pronotum is sculptured with large shallow and more or less eroded punctures, while in *spoliata* the pronotum is asperate like the elytra, from small setigerous muricate tubercles." Blais. 33:197.

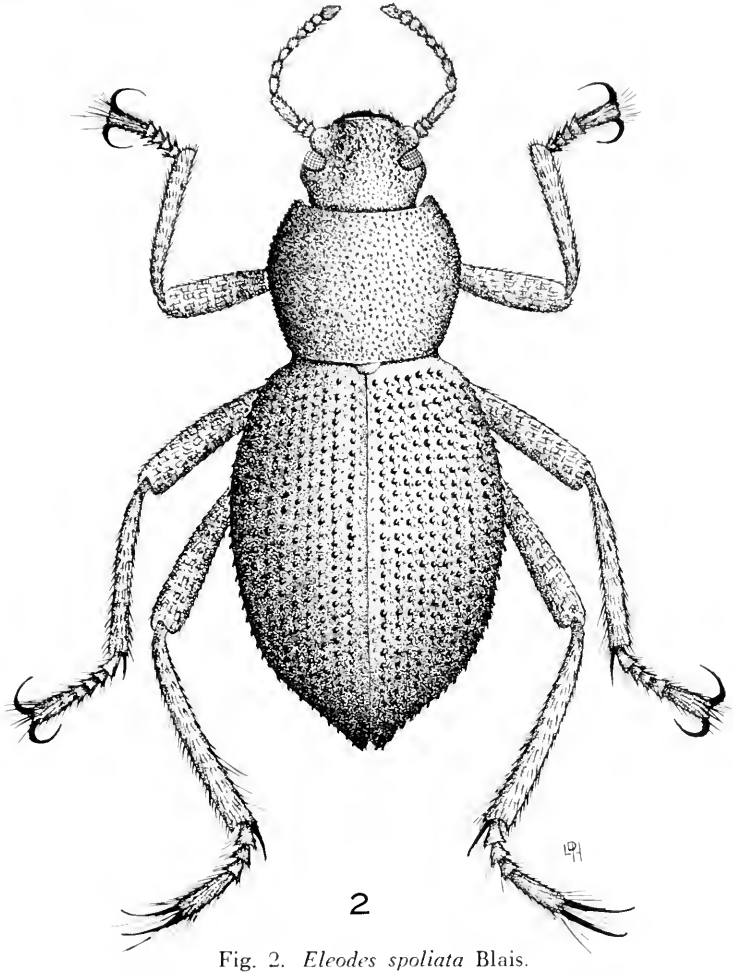


Fig. 2. *Eleodes spoliata* Blais.

pronotum subquadrate, wider than long, widest at middle, densely punctate, interstices glabrous and shining; elytra irregularly punctate, finely muricate, pubescent. Length 7.5 to 10 mm. Fig. 3 ..... *hirsuta* Lec.

b. Setae of the pronotum and elytra long, black, interspersed with golden curved ones; pronotum widest at middle, longer than wide, shining, punctures strong, deep, separated by own diameters; elytra shining, with densely, deep, serially muricate punctures. Length 6 to 7.25 mm. Fig. 4 ..... *barbata* Wickham

Eleodes leechi, n. sp. Figs. 1, 6, 7, 8

Rather robust, black, shining when clean, head and pronotum strongly punctate, elytra not punctate, but with large tubercles

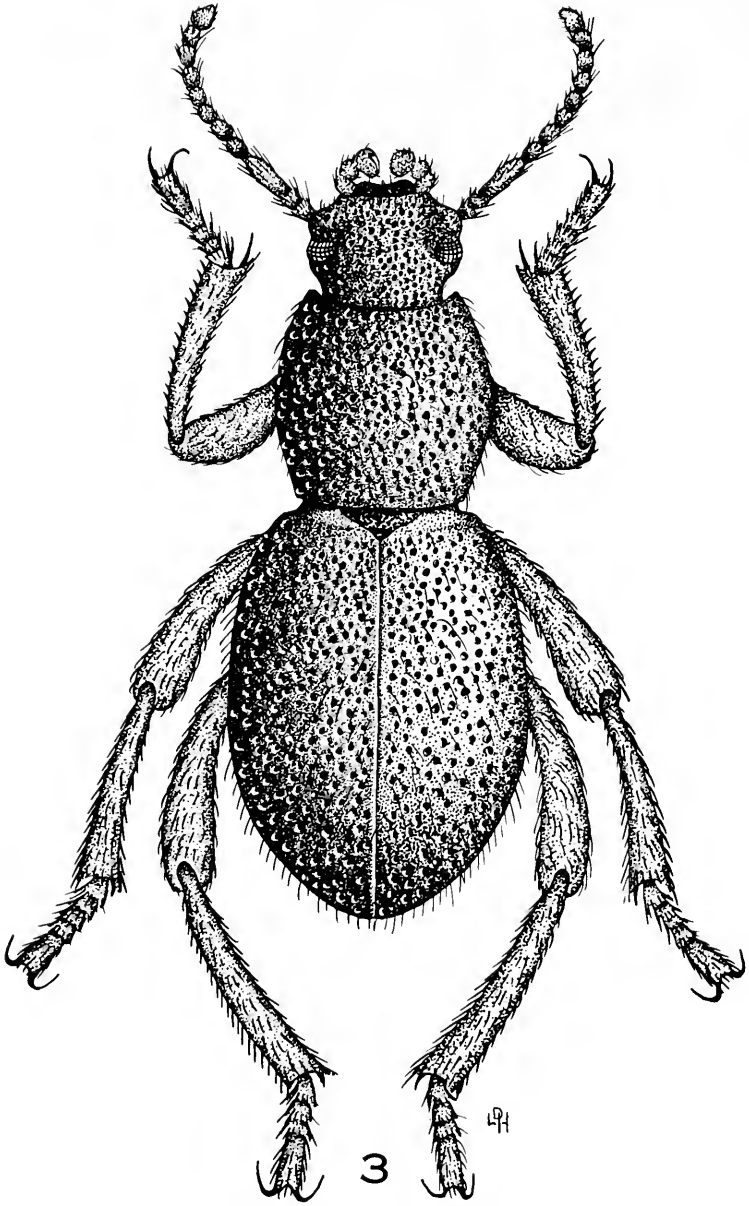


Fig. 3. *Eleodes hirsuta* Lec.

surrounded with small irregularly placed tubercles; setae sparse black, stuff. arising from lee side of tubercles.

Head convex, with shallow densely placed punctures, hairs fairly

abundant and curved. Antennae reaching humerus of elytra, third segment equal in length to segments four and five combined. Pronotum widest just in front of the middle; disc convex, coarsely punctate, intervals prominent, shining and irregular, setae on lateral margin black, long and some directed inwardly; sides evenly arcuate in apical portion, thence converging to the base, margins distinct to

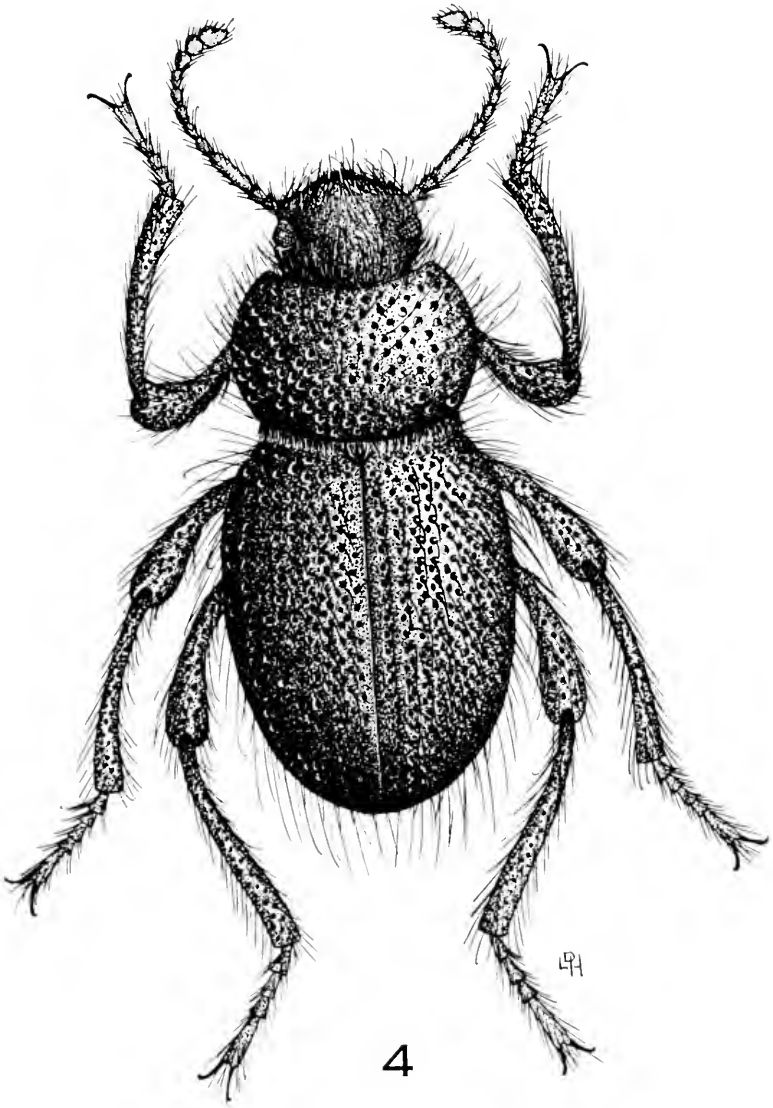


Fig. 4. *Eleodes barbata* Wickh.

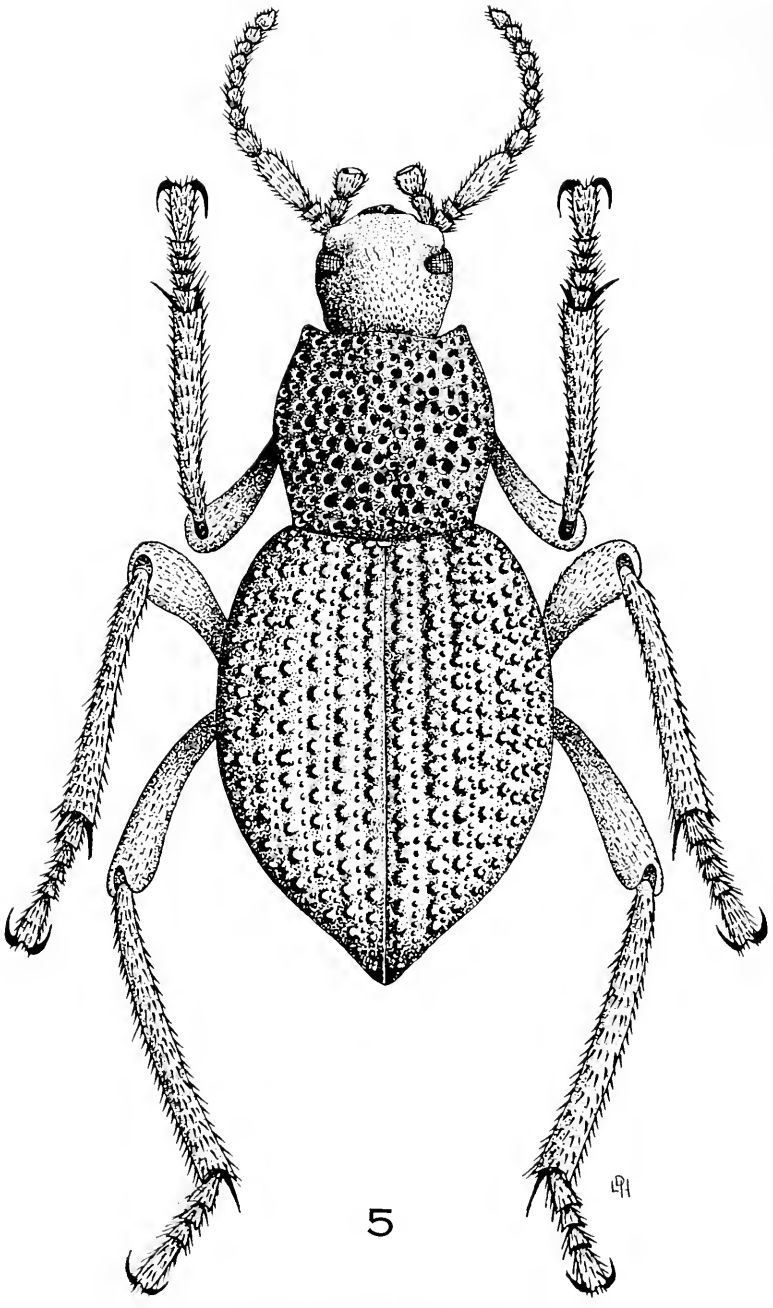
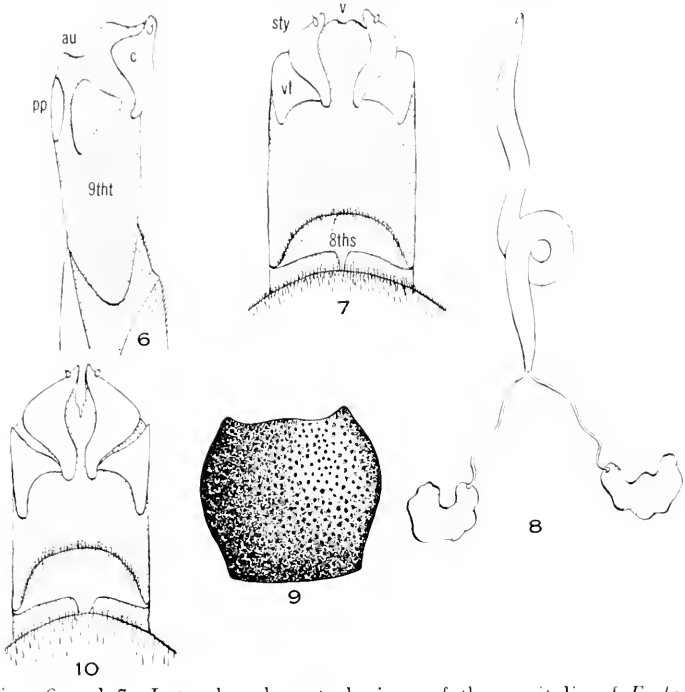


Fig. 5. *Eleodes inyoensis* Tanner, n. sp.



Figs. 6 and 7. Lateral and ventral views of the genitalia of *E. leechi*.
Fig. 8. The spermatheca of *E. leechi*.
Fig. 9. Prothorax of *E. pilosa* Horn.
Fig. 10. Ventral view of the genitalia of *E. inyoensis*.

ABBREVIATIONS

au - anus; c - coxite; pp - paraproct; sty - stylus; vf - valvifer; v - vulva 9tht - ninth tergite; 8ths - eighth sternite.

slightly reduced on apical two-thirds; base equal in length to the apex.

Propleurae granulo-muricate, with black, short curved setae.

Elytra oval, one and one half times as long as wide; base truncate and a little wider than the base of the pronotum; disc convex, arcuately declivitous posteriorly, surface with serially arranged large shining muricate tubercles with decumbent setae arising from the lee side, also with small irregularly placed tubercles, no evidence of striation, although the large tubercles are in rows, hairs sparse, straight, black, and more noticeable at the declivity.

Abdomen shining, strongly convex, impressed between the coxae, less so on the first three ventrites. Tibial spurs longer in the female; in the male moderately short, slender and acute. Genitalia of the female, figs. 6 and 7 are characteristic of the species of this subgenus; however, there are some specific differences. The spermathecae of this groups have specific characteristics.

Length 15.5 mm., width 12.6 mm.

TYPE. Female.—Ute Mountain, Utah-Colorado State Line, June

1927, Irvin Rasmussen, Coll. deposited in the Entomological collection of the California Academy of Sciences.

Paratypes: 1 Mesa Verda National Park, Colorado; 1 Gypsum Creek, San Migual Co., Colorado in the California Academy of Sciences; 1 Cottonwood Wash, 10 S.W. of Blanding, San Juan Co., Ut. in the U. S. National Museum, Entomological collection. 7 in the author's collection, Brigham Young University; 2 Cortez, Colorado, 3 Moab, Grand Co., 1 LaSal, and 1 Blanding, San Juan Co., Utah.

Leechi differs from other species of the *pilosa* group in having well developed shining round tubercles with setae arising from the lee side. In *pilosa* there are no large round tubercles. The coarseness of the pronotum and the round setigerous tubercles are unique.

I am pleased to name this species in honor of Mr. Hugh B. Leech, a good coleopterist and curator.

SUBGENUS PSEUDELEODES

The two species of this subgenus may be separated as follows:

1. Prothorax with dense shallow punctures; interstices smooth, fig. 9; elytra opaque not hairy, with rows of rounded tubercles ..... *granosa* Lec.

2. Prothorax densely, deeply and confluently punctate, interstices smooth and convex, elytra with large shiny tubercles on the intervals, small tubercles along the strial area. Tubercles devoid of setae except obscure ones along the caudal margins. Figs. 5, 10 ..... *inyoensis*, n. sp.

Eleodes inyoensis, n. sp. Figs. 5, 10

Ovate, coarsely sculptured and convex. Head wider than long, densely punctate, the punctures of the genae and epistoma coalescent and finely setigerous. Antennae reaching a little beyond the humerus the distal segments compressed, third joint as long as the next two combined.

Prothorax subquadrate, widest a little before the middle, dorsal surface deeply and irregularly punctate, some punctures confluent, interstices smooth and shining, punctures on lateral area smaller and not so deep; apical angles rectangular, not rounded. Basal angles subrectangular, not prominent, Fig. 5.

Propleurae musicato-granulate.

Elytra oval, less than twice as long as wide; base truncate rounded, wider than the prothoracic base; surface with large shining slightly ovate tubercles, arranged in rows with small tubercles along the smooth interveining strial areas; devoid of setae, however, the larger tubercles are obscurely muricate.

Abdomen horizontal, slightly opaque with small muricate tubercles; setae sparse on ventrites. Legs moderate, femora finely punctate, mutic not sinuate. Anterior tibial spurs, equal in size and length, abdomen of female more convex than the male.

LENGTH. Female 18.5 mm., Male 15 mm.

TYPE. Female, Saline Valley, Inyo Co., California, June 8, 1959,

B. H. Banta Coll., deposited in the Entomological collection of the California Academy of Sciences.

PARATYPES. 22 - Saline Valley, Inyo Co., Calif., in author's collection, Brigham Young University; 2 Saline Valley, Inyo Co.; 1 Walker Pass, Calif.; 4 Goldfield, Esmeralda Co.; 1 Tonapah, Nevada, deposited in the Entomological collection, California Academy of Sciences. 2 Saline Valley, Inyo Co., Calif., deposited in the Entomological collection of the U. S. National Museum.

Inyoensis differs from *granosa* in the surface tenture of the prothorax Fig. 9 in being more ovate in form and the tubercles are more regular in size and shape. This species does not approach *granulata* in its sculpturing. The coxites are a little larger and more pointed on the genitalia of *inyoensis* than in *leechi*, a related species.

CHECK-LIST OF THE SPECIES OF ELEODES, 1961

ELEODES ESCH. 29-8

SUBGENUS MELANELEODES BLAIS. 09-33

1. *debilis* Lec. 58-185. N. Mex., Ariz., Tex. (Davis Mts.)
2. *carbonaria* (Say) 23-260. Colo., N. Mex., Ariz. (Gila Valley, Yuma), Tex., Ut. (St. George, Santa Clara, Wash. Co.; Moab, Grand Co.; Indianola, Sanpete Co.); Wyo. (Cheyenne).
   a. subsp. *immunis* Lec. 58-186. Ariz. (Tucson, Sta. Catalina Mts., Sta. Rita Range Reserve, Miami, Willcox, Indian Hot Springs, Picacho).
   b. subsp. *interstitialis* Blais. 09-49. Ariz. (Sta. Catalina Mts.); Ut. (Paria, Kane Co.)
   c. subsp. *soror* Lec. 58-185. Tex. (Eagle Pass, San Antonio, and Brownsville).
3. *vicina* Lec. 1852-133. Calif.; Northern Mexico.
4. *nitida* Csy. 91-58. Ariz. (Hauchuca Mts.)
5. *lineata* Blais. 39-55. Ariz. (Chiricahua and Sta. Catalina Mts.)
6. *ampla* Blais. 09-40. Ariz. (Pinal, Sta. Catalina, and Sta. Rita Mts., Lowell); N. Mex. (Santa Fe Canyon); Tex. (Brownsville).
7. *obsoleta* (Say) 23-261. Ka., N. Mex., Alberta (Medicine Hat); Colo. (Mesa Verda Nat'l Pk.); Ut. (La Sal, Grand Co.; Bears Ears, Blanding, San Juan Co.; Deep Creek Mt., Juab Co.); Tex. (Davis Mts.); Neb. (Grant, Pine Ridge, Sioux City).
   a. subsp. *annectans* Blais. 09-60. Colo. (Gulnare, Las Animas Co.; Craig); N. Mex. (Luna); Ariz. (White Mts.); Ut. (Hurricane, Wash Co.)
   b. subsp. *porcata* Csy. 90-396. Ariz. (Avivaipa, White Mts., Williams); N. Mex.; Ut. (La Sal, Moab, Grand Co.; Natural Bridges Nat'l Monument, San Juan Co.; Kanab, Johnson Canyon, Kane Co.; Escalante Desert, Garfield Co.; Hurricane, Wash. Co.)
8. *mazatzalensis* Blais. 25-379. Ariz. (Mazatzal Mts.)
9. *knausi* Blais. 09-40. N. Mex. (Cloudcroft); Colo. (Mesa Verde Nat'l Pk.)
10. *omissa* Lec. 58-186. So. Calif. (San Diego, Sta. Catalina Island)
    a. subsp.*pygmaea* Blais. 09-77. So. Calif. (San Diego); L. Calif. (San Quintin).
    b. subsp.*borealis* Blais. 09-79. N. Calif. (Tulare and Kern Co.)
    c. subsp. *peninsularis* Blais. 09-79. L. Calif. (Sierra San Lazaro).
    d. subsp.*tumida* Blais. 33-194. Calif. (Bass Lake, Medera Co.)
11. *parowana* Blais. 25-374. Ut. (Iron Co.)
    a. subsp. *mimica* Blais. 29-375. Ut. (Bryce Nat'l Pk., Garfield Co.; Johnson Canyon, Kane Co., July 1953).
12. *quadricollis* Esch. 29-12. Calif., So. Calif.; Wyo. (Cheyenne).
    a. subsp. *lassenica* Blais. 25-373. Calif. (Martin's Spring, Lassen Co.)
    b. subsp. *anthracina* Blais. 09-87. Ariz. (Ft. Grant, Hot Springs, San

Simon, Galiuro Mts., Catalina Springs, Tucson, Chiricahua Mts., Graham Mts., Miami, White Mts., Nogales).

c. subsp. *lustrans* Blais. 09-89. Ariz. (Chiricahua Mts., Catalina Springs).

13. *cuneaticollis* Csy. 90-397. Calif. (San Francisco, Marin, San Mateo and Alameda Cos.)
14. *humeralis* Lec. 57-50. Ida., Wash., Ore., N. Calif., Ut. (Central, Wash. Co.)
latiuscula Walk. 66-329.
15. *reducta* Blais. 25-377. Ut. (Cove Fort, Beaver Co.)
16. *concinna* Blais. 25-381. Nev. (Verdi, Carson City, Reno); Calif. (Lassen Co.); Ut. (Aquarius Plateau, Garfield Co.; Pine Valley Mts., Wash. Co.; Lynndyl, Millard Co.; Sheep Creek, Daggett Co.); Ariz. (Kaibab Forest).
17. *coloradensis* Blais. 25-380. Colo. (Leadville); Ariz. (Jacobs Lake, Kaibab Forrest); Ut. (Torrey, Wayne Co.)
18. *fuscipilosa* Blais. 25-376. Ut. (Parowan, Iron Co.)
19. *tanneri* Blais. 31-74. Ut. (LaSal Mts., Elk Ridge, Bears Ears, San Juan Co.; Moab, Grand Co.)
20. *rileyi* Csy. 92-57. Ariz.; Ida. (Tetonia); Ut. (Aspen Grove, Mt. Timpanogos, Utah Co.; Bears Ears, Elk Ridge, San Juan Co.); Posey Lake, Aquarius Plateau, Garfield Co.)
21. *tricostata* (Say) 23-262. Mex.; Br. Am. Ariz. (Tuba City); Tex. (Quanah, Hardman Co.)
planata Sol., 48-366.
alternata Kby. 37-232.
robusta Lec. 58-183.
22. *pedinoides* Lec. 58-183. Tex. (Dameron and Bosque Cos.)
a. subsp. *asperata* Lec. 58-183. Ariz.
23. *neomexicana* Blais. 09-41. N. Mex. (Cloudcroft).
24. *speculicollis* Blais. 25-382. Tex. (Davis Mts.)
25. *wenzeli* Blais. 25-381. Tex. (Alpine, Chisos Mts.)
26. *halli* Blais. 41-37. Ariz. (Kayenta, Navajo Co.)

SUBGENUS LITHELEODES BLAIS. 09-34

27. *arcuata* Csy. 84-47. Ariz. (Sta. Rita and Chiricahua Mts.)
28. *extricata* (Say) 23-261. Tex.; Br. Am.; Colo. (Buena Vista, Golden); Ariz. (Graham Mts.; White Mts.; Genease Mts.); Ut. (Cove Fort, Beaver Co.; La Sal Mts., Grand Co.); Alberta (Medicine Hat).
a. subsp. *convexicollis* Blais. 09-123; 21-132. Wyo. (Laramie, Cody, Park Co.); Mont. (Blackfoot Indian Reservation).
b. subsp. *cognata* Hald. 52-376. Blais, 42-140. Ut. (Great Salt Lake Desert, Arches Nat'l Monument, Grand Co.; Fruita, Wayne Co.; Johnson Canyon, Kane Co.; Buckhorn, Emery Co.; Bryce Nat'l Pk., Garfield Co.; Provo, Utah Co.; Mt. Pleasant, Sanpete Co.; Zion Nat'l Pk., Mountain Meadows, Wash. Co.); Wyo. (Cody, Park Co.); Ariz. (Sta. Catalina Mts., Chiricahua Mts., Lake Mary, Show Low); Tex. (Davis Mts.)
c. subsp. *arizonensis* Blais. 09-116. Ariz. (Fort Huachuca).
d. subsp. *utahensis* Blais. 21-131. Ut. (Stockton, Milford, Eureka; Notum, Wayne Co.; Aquarius Plateau, Garfield Co.; Lynndyl, Millard Co.); Ariz. (Pinal Mts.); Colo. (Gulnare); N. Mex. (Cloudcroft).
e. subsp. *frigida* La Riv. 43-54. Nev. (Kyle Gorge, Charleston Mt., 10,000 ft., Clark Co.)
29. *granulata* Lec. 57-50. Ore.; Calif. (Siskiyou Co.; Carrville, Trinity Co.)
subaspera Sol. 48-237.
subtuberculata Walk. 66-328.
a. subsp. *obtusa* Lec. 61-352. Blais. 42-140. (eastern desert region)
b. subsp. *aspera* Lec. 66-115. Blais. 42-140. Colo. (Gateway).
30. *papillosa* Blais. 17-226. N. Calif. (Siskiyou Co.; Carrville, Trinity Co.)
31. *letcheri* Blais. 09-133, 42-143. Nev. (Verdi); Ida. (Tetonia).
32. *vandykei* Blais. 09-136. 18-384. Calif. (Medicine Lake; Siskiyou and Modoc Cos.); Wash. (McElroy).

a. subsp. *modificata* Blais. 21-131. 42-141. B.C. (Vernon, Kamloops).
b. subsp. *parvula* Blais. 09-137. 42-141. Ariz. (Dallas); Ida.(Blackfoot).
c. subsp. *similis* Blais. 42-142. Ore. (Haines).

33. *carvina* Blais. 21-224. Calif. (Walker, Siskiyou Co.)

SUBGENUS TRICHELEODES BLAIS. 09-34

34. *hirsuta* Lec. 61-352. So. Calif.; Nev.; Ut. (Ibapah, Tooele Co.; Topaz Mt., Juab Co.; Hamblin Valley, Iron Co.; Copper Mts., Box Elder Co.)
35. *pilosa* Horn. 70-302. So. Calif.; Nev.; Ore.; Ut. (Zion Nat'l Pk., Wash. Co.; Dinosaur Nat'l Monument, Uinta Co.; Flaming Gorge, Daggett Co.; Johnson Canyon, Kane Co.; Boulder, Garfield Co.; Callas, Juab Co.); Ida. (Ouyhee Co.)
a *pilifera* Boddy.[6] 57-193. Or.
36. *leechi* Tanner, n. sp. Colo. (Gypsum Creek, San Miguel Co.; Mesa Verde Nat'l Pk.; Cortez); Ut. (Ute Mt., Ut.-Colo. State Line; Blanding; Cottonwood Wash; La Sal, San Juan Co.; Moab, Grand Co.)
37. *spoliata* Blais. 33-196. Ore. (Klamath Co.)
38. *barbata* Wickh. 18-256. N. Mex. (Willard).

SUBGENUS PSEUDELEODES BLAIS. 09-34

39. *granosa* Lec. 66-116. Calif. (Lyon Pass, Colorado Desert, San Bernardino Co.); Nev.
40. *inyoensis* Tanner, n. sp. Calif. (Saline Valley, Inyo Co., Walker Pass); Nev. (Goldfield, Esmeralda Co., Tonapah).

SUBGENUS PROMUS LEC. 62-226

41. *insularis* Linell. 01-181. L. Calif. (Grand Canyon; Cedros Island).
a. subsp.*terricola* Blais. 23-365. L. Calif. (El Taste; San Pedro; Sierra Lazaro.)
42. *subnitens* Lec. 41-134 Ariz. (White Mts., Sta. Catalina Mts., Sta. Rita Mts., Tucson); So. Calif.
43. *goryi* Sol. 48-237. Mex.; N. Mex.; Tex.
a. subsp. *seriata* Lec. 58-185. Blais 25-79. Tex.
44. *striolata* Lec. 58-185. Tex.; Mex.
45. *fusiformis* Lec. 58-184. Neb.; Kan.; Tex. (Marathon, Alpine).
46. *opaca* (Say) 23-262. Tex.; Neb.; Kan. (Ellsworth); Colo.; S. D. (Edgemont).

SUBGENUS HETEROPROMUS BLAIS. 09-33

47. *veterator* Horn. 74-33. Tex.

SUBGENUS ELEODES ESCH. 29-9

48. *obscura* (Say) 23-359. N. Mex.; Wash.
a. subsp. *dispersa* Lec. 58-182. Ariz. (White Mts.); Colo.; Ut. (Bluff, La Sal, Red Mesa, San Juan Co.)
deleta Lec. 58-182.
b. subsp. *sulcipennis* Mann. 43-226. Ore.; N. Calif.; Ida.; Ariz. (Pinal Mts., Arivaipa); Ut. (Topaz Mt., Juab Co.; Johnson Canyon, Kane Co.; Magatsu; Zion Nat'l Pk.; St. George, Wash. Co.; Indianola, Sanpete Co.); Nev. (Alamo).
conjuncta Walk. 66-329.
convexicollis Walk. 66-328.
arata Lec. 58-182.
c.subsp. *glabriuscula* Blais. 25-383. Tex. (Alpine, Livermore Peak, Davis Mts.)
49. *acuta* (Say) 23-258. Kan.; Tex.; Ariz. (Globe).
a. subsp. *pernigra* Blais. 37-128. Tex. (Katherine Sarita).
50. *suturalis* (Say) 23-257. Tex.; Neb. (Crawford); Kan. (Ellsworth); Colo. (Boulder).

[6] I have not seen a specimen of *pilifera* but from the description, I think it is not a *granosa*, but belongs to the *pilosa* group.

a. var. *texana* Lec. 58-182. Kan.; Tex.; Colo.

51. *grandicollis* Mann. 43-266. Calif., So. Calif.
    a. subsp.*valida* Boh. 58-90. So. Calif. (San Diego, Los Angeles, Monterey, San Bernardino, and Kern Cos.); Ariz. (Yuma Desert, Sta. Marie River); Nev. (Alamo, Mercury).
52. *sanmartinensis* Blais. 21-220. So. Calif. Is. (San Martin Island).
    binotata Walk. 66-329.
54. *hispilabris* (Say) 23-259. Colo.; Mex.; Ut. (Monticello, San Juan Co.; Henrieville, Garfield Co.); Alberta (Medicine Hat).
    lecontei Gemm. 70-122.
    sulcata Lec. 52-67.
    a. subsp. *nupta* Lec. 59-183. Blais. 25-384. Tex. (Laredo to Ringhold Barracks); Okla. (Fort Supply); Kan. (Medora); Colo. (Boulder).
    b. subsp. *attenuata* Blais. 18-168. Ariz. (Nogales, Sta. Cruz Co.)
    c. subsp. *convexa* Lec. 57-49. Blais. 25-384. (Prairie Pasco); N. Mex. (Columbus).
    d. subsp. *sculptilis* Blais. 09-220. Ariz. (Oracle, Williams, Ft. Grant, Ash Fork, and Yuma); N. Mex. (Las Vegas); Colo. (Denver); Ut. (Salt Lake City; St. George, Wash. Co.; Parowan, Iron Co.; Indianola, Sanpete Co.; Topaz Mt., Juab Co.; Lehi, Utah Co.)
    e. subsp. *imitabilis* Blais. 18-167. Ut. (Salt Lake Co.; Desert Range Exp. Station, Millard Co.; Escalante Desert, Garfield Co.); Ore. (The Dalles); Wash. (Walla Walla); Calif. (Saline Valley, Inyo Co.)
    f. subsp. *immunda* Blais. 25-79. Ariz.; B. C. (Oliver).
    g. subsp. *composita* Csy. 91-58. Tex.
55. *subpinguis* Blais. 09-247. Tex. (Cameron Co.)
56. *gracilis* Lec. 58-184. So. Calif.; N. Mex.; Ariz. (Sta. Rita Mts.)
    a. subsp. *distans* Blais. 09-242. Calif. (Ft. Tejon; Los Angeles Co.; Fairmont; Norwalk and Antelope Valley; Oak Creek, Kern Co.; Tehachapi Valley; Victorville).
57. *caudifera* Lec. 58-184. Colo.; Ariz. (Snowflake); Tex. (El Paso); Ut. (Bluff, San Juan Co.; La Sal. Grand Co.); N. Mex.
    longipilosa Horn 91-42. Nev.; Calif.
58. *dentipes* Esch. 29-19. Calif. (San Fernando; Stanford Univ.; Pacific Grove; Harbor City; San Pedro; Murphy).
    a. var. *perpunctata* Blais. 18-386. Calif. (Eldorado; Tehama, Trinity, Contra Costa and San Mateo Cos.)
    b. subsp. *elongata* Blais. 09-254. Calif. (Mokelumne Hills, Calaveras Co.; Fresno Co.; Oakland).
    c. subsp. *tularensis* Blais. 25-386. Calif. (Northfork, Fresno Co.; Yosemite Nat'l Pk.)
    d. subsp. *paradoxa* Blais. 31-78.=*montana* Blais. preoccupied. Calif. (Sta. Cruz Mts., Sta. Cruz Co.)
    e. subsp. *sordida* Blais. 35-30. Calif. (Tulare Co.)
    f. subsp. *marinae* Blais. 21-218. Calif. (Fairfax, Marin Co.)
    g. subsp. *confinis* Blais. 95-237. Calif. (Mokelumne Hill, Calaveras Co.; Napa Co.; Sta. Clara Co.; Tulare Co.; Sonoma Co.)
    h. subsp. *elegans* Csy. 90-401. N. Calif. (Hoopa Valley, Humboldt Co.)
    i. subsp. *prominens* Csy. 90-401. Calif. (Port Harford, San Luis Obispo Co.)
    j. subsp. *pertenuis* Blais. 09-253. Calif. (Kaweah, Tulare Co.; Watson Springs; Martinez, Contra Costa Co.)
59. *rossi* Blais. 43-241. L. Calif. (Comonder).
60. *subcylindrica* Csy. 90-400. Ariz.
61. *amedeensis* Blais. 33-199. Calif. (Palm Springs; La Puerta, Imperial Co.; Ahwalmee; Yosemite Valley, Maripose Co.); Nev. (Goldfield, Esmeralda Co.)
62. *striatipennis* Blais. 42-134. Nev. (Walker Lake; Paradise Valley; and Tonopah).
63. *armata* Lec. 51-134. Colo.; Ariz. (Picacho, Tucson, Superior); Calif. (Am-

boy); So. Calif.; Nev. (Alamo, Mercury); Ut. Sta. Clara, Wash. Co.)

a. var. *pumila* Blais. 33-197. Calif. (El Centra, Imperial Co.)

b. subsp. *impotens* Blais. 95-236. Calif. (Merced Co; David).

64. *inepta* Blais. 25-334. L. Calif. (Angulo Rock; Asuncion Island—Pacific Coastal Group).

65. *marthae* Blais. 43-243. L. Calif. (Mesquital).

66. *simondsi* Blais. 43-247. L. Calif. (Mesquital).

67. *militaris* Horn 70-303. L. Calif. (San Quintin, San Vicente, Cedrso Island); Ariz.

a. subsp. *femorata* Lec. 51-134. Calif., So. Calif.

68. *mexicana* Blais. 43-246[7]. L. Calif. (near Sta. Rosalia; El Refugia and Mesquital).

blaisdelli Blkwr. 45-521.

69. *loretensis* Blais. 23-262. L. Calif. (Loreto; Las Animas Bay and Angeles Bay).

70. *vanduzeei* Blais. 23-264. L. Calif. (Mulege; Sta. Rosalia).

71. *morbosa* Blais. 25-335. L. Calif. (Angulo Rock; Asuncion Island; Pacific Coastal Group; San Quintin and Ensenada).

72. *moesta* Blais. 21-221. 43-246. L. Calif. (San Martin Island; San Vicente).

73. *acuticauda* Lec. 51-135. Calif., So. Calif. (San Diego); L. Calif. (San Pedro Martir, near Ensenada and Santo Tomas).

a. subsp. *punctata* Blais. 09-278. Calif. (San Diego).

74. *laticollis* Lec. 51-135. Calif. (San Diego Co.; Fort Tejon).

a. subsp. *minor* Blais. 09-283. Calif. (San Diego).

b. subsp.*apprima* Blais. 21-219. So. Calif. (San Nicolas Island).

75. *eschscholtzi* Sol. 48-238. Mex.; Tex.

a. subsp. *lucae* Lec. 66-114. Blais. 43-249. L. Calif. (Cape San Lucas; Sta. Rosa; San Jose del Cabo; San Pedro; LaPaz and Santiago; Miraglores; near San Bartolo; Trunfo; Mesquital).

b. subsp. *inflata* Blais. 43-249. L. Calif. (Cape San Lucus; Venancia).

76. *mutilata* Blais. 21-222. L. Calif. (Sierra Laguna).

77. *adumbrata* Blais. 25-332. L. Calif. (Middle San Senito Island; Pacific Coastal group; Arroys del Rosarito, Rosario; San Vicente, near Punta Prieta).

78. *discincta* Blais. 25-333. L. Calif. (Natividad Island; Pacific Coastal Group; Arroyo del Rosarito; Rosario; San Vicente, near Punta Prieta).

79. *tenuipes* Csy. 90-339. Tex.

80. *wickhami* Horn. 91-41. Ariz.

81. *ventricosa* Lec. 58-186. Tex.; Mex.

a. subsp. *falli* Blais. 09-235. Tex. (El Paso, Fort Bliss).

SUBGENUS BLAPYLIS HORN. 70-301

82. *snowi* Blais. 09-311. Colo. (Ouray); Ariz. (Williams, Flagstaff, Oak Creek, Colorado River); N. Mex. (Santa Fe Canyon, Cloudcroft).

83. *lecontei* Horn. 70-304. Colo.

subaspera Lec. 66-115. preoccupied.

84. *tenebrosa* Horn. 70-304. S. Calif.; Nev.; Ut. (Pine Valley, Wash. Co.; Raft River Mts., Box Elder Co.; Bryce Nat'l Pk.; Duchesne; Widtsoe); Ida. (Rexburg).

a. var.*nana* Blais. 09-328. So. Calif.; Nev. (Carson City, Verdi).

85. *robinetti* Boddy. 57-194. Ore. (Robinette; Bear Springs, Wasco Co.; Bend, Manns Lake, Maupis and Quinton); Wash. (Cooks Lake, White Salmon, Walla Walla, and Wawawai).

86. *inculta* Lec. 51-135. Calif. (San Miguel Island).

a. subsp. *affinis* Blais. 18-384. Calif. (Sta. Cruz Island).

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7. *Mexicana* Blais 43-249 L. Calif. is a valid species. Blackwelder evidently confused *Embaphion mexicana*, described by Blaisdell p. 160 in his paper entitled, "New Species of *Eleodes* from Mexico in the British Museum (Col. Tenebrionidae," Stylops, Vol. IV. Part 7, pp. 156-160, 1934, with Dr Blaisdell's *Eleodes mexicana* of 1943. This oversight is further evident since Blackwelder failed to record *Embaphion mexicana* Blais in his catalogue, "Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America," part 3, page 522, 1945.

87. *consobrina* Lec. 51-135. Calif. (So. Calif.; Mt. Pass); Ut. (Glacier Lake, Mt. Timpanogos, Elev. 10,500 ft., Utah Co.)
88. *kaweana* Blais. 33-203. Calif. (Kaweah, Tulare Co.)
89. *scabripennis* Lec. 59-77. Blais. 33-201. Calif., So. Calif. (Hot Springs, Tulare Co.; Tejon).
90. *blanchardi* Blais. 09-347. Calif. (San Diego Co.; Port Harford, San Luis Obispo Co.)
91. *fuchsi* Blais. 09-343. Calif. (Tulare Co.; Marbel Fork; Kaweah River; Yosemite).
92. *neotomae* Blais. 09-312. Calif. (San Diego Co.; Port Harford, San Luis Obispo Co.)
93. *horni* Blais. 09-350. 18-385. Calif. (Plumas and Eldorado Cos.)
    a. subsp. *fenyesi* Blais. 25-77. Calif. (Bishop, Inyo Co.)
    b. subsp. *monticola* Blais. 18-385. Calif. (Calaveras, Shasta and Tulare Cos.)
94. *manni* Blais. 17-221. Wash. (Wawawai, Ellensburg, Almota).
    a. subsp. *sierra* Blais. 25-78. Calif. (Kings Canyon, Fresno, Co.)
    b. subsp. *patulicollis* Blais. 31-78. new name for *dilaticollis* Blais. 25-388. Wash. (Ritzville Lake, McElroy, Paha); Ut. (The Pass, Table Cliff Mt., Garfield Co.)
    c. subsp. *variolosa* Blais. 17-223. Wash. (Wenatchee, Ellensburg).
95. *parvicollis* Esch. 29-11. Calif. (So. Calif.; Pacific Grove).
    a. subsp. *farallonica* Blais. new name 25-80. see Blais. 09-356. Calif. (San Francisco Bay Area; San Joaquin and Sacramento Valleys; Farallone Islands).
    b. subsp.*planata* Esch. 29-12. Calif.
    c. subsp. *squalida* Blais. 18-380. Calif. (Dabis's Meadow near Railroad Flat, Calaveras Co.)
96. *producta* Mann. 43-271. Calif. (Maraposa, Big Trees, Yosemite Nat'l Pk.)
    a. subsp. *alticola* Blais. 25-387. Calif. (Piute Mt., Kern Co.; Fallen Leaf Lake, Big Trees).
    b. subsp. *trita* Blais. 17-225. Ore. (Josephine Co.); N. Calif. (Humboldt and Del Norte Cos.; Piute Mt., Kern Co.)
    c. subsp. *constricta* Lec. 58-187. Calif. (Yosemite Nat'l Pk.)
97. *scabriventris* Blais. 33-202. Calif. (Camp Potwisha, Sequoia Nat'l Pk., Tulare Co.)
98. *oblonga* Blais. 33-206. Calif.
99. *hoppingi* Blais. 09-312. Calif. (Eldorado Co.; Mt. Tallac, Tahoe); Nev. Mt. Rose); Ut. (Navajo Mt.)
100. *clavicornis* Esch. 29-11. Calif. (San Francisco; Ocean Beach).
    impressicollis Boh. 58-90.
101. *scabrosa* Esch. 29-11. Calif.; Ore. (Gold Beach).
102. *rotundipennis* Lec. 57-50. Ore.; Wash. (Friday Harbor); B.C. (Pender Harbor, Kamloops).
    a. var. *versatilis* Blais. 21-217. Ore. (Colestin, Jackson Co.)
103. *oregona* Blais. 41-157. Ore. (Bear Springs, Eugene).
104. *cordata* Esch. 29-11. Calif. (Stanford Univ.; Jasper Ridge, San Mateo Co.; San Francisco; Pacific Grove; Berkeley; Mt. Diablo).
105. *tuberculata* Esch. 29-12. Calif.[8]
    intricata Mann. 43-273.
    stricta Lec. 57-50.
    a. subsp. *horrida* Blais. 18-383. Calif. (Davis Meadow near Railroad Flat, Calaveras Co.)

8. "*Indentata* described above, (Blais. 35-28) belongs to the *Cordata Group* (1833). The phases referable to the latter group, show farther differential group characters: those having greater affinity with *cordata* Esch. and those with *tuberculata* Esch. These ultimate affinities indicate the genealogical relationships.

Cordata Esch. is somewhat a larger species with a varying dull luster and the sculpturing is not as coarse as in *tuberculata* Esch. and its related forms. The views expressed from time to time may differ from those given in my Monograph (Bull. 63, U. S. Nat. Mus.). Twenty-five years have passed since that work was given forth and much new material has come to hand since then which has necessarily resulted in changes in my knowledge regarding species and their relationships." Blais. 35-29

b. subsp.*patruelis* Blais. 18-382. Ut. (Provo Canyon, Zion Nat'l Pk., Bryce Nat'l Pk., Spanish Fork, Utah Lake, La Sal Mts., Indianola, Fruita); Nev. (Lehman Cave Nat'l Mon.; Mt. Wheeler); Ariz. (Jacob Lake, Kaibab Forest).
c. var.*adulterina* Blais. 17-244. Calif. (Eldorado, Plumas, Del Norte, Humboldt, Placer, Monterey, Shasta and Lake Cos.)
d. var. *hybrida* Blais. 17-225. N. Calif. (Plumas and Lake Cos., Yosemite Yosemite Nat'l Pk.)
e. var. *sublaevis* Blais. 09-381. N. N. Blais. 24-80. Calif. (Near San Francisco Bay).

106. *indentata* Blais. 35-28. Wash. (Mt. Ranier, Pierce Co.)
107. *primeliodes* Mann. 43-274. Wash.; Nev.; Mont.
108. *nunenmacheri* Blais. 18-163. Ore. (Klamath and Lake Cos.); Calif. (Lassen and Modoc Cos.); Wash. (Granger); B. C. (Kamloops).
a. subsp. *verrucula* Blais. 18-164. Calif. (Lassen and Modoc Cos.); Ore. (Klamath and Lake Cos.)
109. *novoverrucula* Boddy 57-195. Wash. (Grand Coulee, Park Lake); B. C.; Ida.; Mont.
110. *brunnipes* Csy. 90-402. Ida.; Wyo.; Colo. (Salida).
a. subsp. *brevisetosa* Blais. 18-162. Calif. (Lassen Co.); Nev. (Verdi)
111. *propinqua* Blais. 18-165. Calif. (Modoc Co.); Ore. (Grants Pass).
112. *strumosa* Blais. 31-76. Ut. (Deep Creek Mts., Tooele Co.); Nev. (Lehman Cave, Mt. Wheeler, White Pine Co.)
113. *caseyi* Blais. 09-313. Nev. (Verdi); Calif. (Bodie).

SUBGENUS ARPELEODES BLAIS. 1937-128[9]

114. *tibialis* Blais. 09-313. L. Calif. (Sierra Laguna and La Chuparosa).

SUBGENUS METABLAPYLIS BLAIS. 09-34

115. *nigrina* Lec. 58-186. Ore.; Colo.; Ariz.; Ut. (Pine Valley Mts., Wash. Co.; Bryce Nat'l Pk.; Blanding, San Juan Co.; Steep Creek, Boulder Mt., Garfield Co.); Wash. (Prosser); Nev. (Central and Northern Part of the state).
a. subsp. *perlonga* Blais. 09-393. Wyo. (Rock Springs, Sweet Water Co.)
b. subsp. *difformis* Blais. 25-389. Wash. (Ritzville); Ut. (Indianola, Fairview, Mt. Pleasant, Sanpete Co.)
c. subsp.*maclayi* Boddy 57-197. Ore. (Talent; Lake Creek, Jackson Co.; Medford).
116. *dissimilis* Blais. 09-398. Ariz. (Fort Grant, Sta. Rita Mts.; Chiricahua Mts.; Graham Mts.; Oracle, and Williams).
a. subsp. *nevadensis* Blais. 09-402. Nev. (Pioche); Calif. (Palm Springs); Ariz. (Tucson and Pinal Mts.); Ut. (Zion Nat'l Pk.; Escalanta Desert, Kane Co.; St. George, Hurricane, Wash. Co.)
117. *schwarzi* Blais. 09-393. Wash. (Pullman, Toppenish).
118. *delicata* Blais. 29-164. Ariz. (Douglas); Ut. (Hurricane, Wash. Co.)
119. *californica* Blais. 29-165. Calif. (Palm Springs, Riverside Co.; Saline Valley, Inyo Co.)

SUBGENUS STENELEODES BLAIS. 09-33

120. *gigantea* Mann. 43-276. N. Calif. (Tehama Co.; Redondo; San Diego).
a. subsp. *meridionalis* Blais. 18-387. So. Calif. (San Diego; Kern and Sta. Cruz Cos.); L. Calif. (San Pedro Martir).
b. subsp. *gentilis* Lec. 58-187. Calif., So. Calif., L. Calif. (San Pedro, Martiz and San Francisquito)
c. subsp. *estriata* Csy. 90-398. Calif. (San Francisco).
121. *longicollis* Lec. 51-143. Ariz. (Sta. Rita Mts.); N. Mex.; Tex.; Ut. (Hurricane, Wash. Co.; Bluff, San Juan Co.; Utah Lake Area; Lehi, Utah Co.)
haydeni Lec. 58-186.

[9] The subgenus *Arpeleodes* in Dr Blaisdell's paper, 1937, pp. 128, is spelled differently on pp 129 of this same paper.

122. *ornatipennis* Blais. 37-129. N. Mex.
123. *innocens* Lec. 66-114. L. Calif. (Cape San Lucas, Eltaste, Sierra El Chinche, Miraflores).

SUBGENUS HOLELEODES BLAIS. 37-132

124. *beameri* Blais. 37-132. Ariz. (Huachuca and Chiricahua Mts.)
125. *bryanti* Blais. 37-134. Ariz. (Graham Mts.)
126. *palmerleensis* Blais. 37-136. Ariz. (Near Palmerlee).

SUBGENUS DISCOGENIS LE CONTE. 66-114

127. *marginata* Esch. 29-10. Calif. (Ft. Bragg, San Francisco, Pacific Grove); So. Calif.
fischeri Mann. 43-137.
128. *scabricula* Lec. 58-187. Calif. (Yosemite Nat'l Pk.; Marapose Big Trees); Nev. (Lake Tahoe Area).
subsp. *acutangula* Blais. 21-225. Calif. (Channel Meadows and Breckerridge Mt., Kern Co.; West Point, Yosemite Nat'l Pk.)

GENUS TROGLODERUS LEC. 79-2[10]

129. *costatus* Lec. 79-3. Nev.; Ida.; Ariz.
subsp. *tuberculatus* Blais. 09-486. Calif. (So. Calif.); Ut. (Willow Tank, Escalante Desert, Kane Co.; Delta, Millard Co.; Woodside, Emery Co.; Hanksville, Wayne Co.; La Sal, San Juan Co.; Duchesne, Duchesne Co.; Grafton, Wash. Co.); Ariz. (Tuba City).
b. subsp. *nevadus* La Riv. 42-437. Nev.; Calif.
c. subsp. *vandykei* La Riv. 46-41. So. Calif.

GENUS EMBAPHION SAY. 23-254

130. *depressum* Lec. 51-136. Calif. (So. Calif.)
131. *elongatum* Horn. 70-321. Nev.; Calif.; Ut. (Red Mesa, San Juan Co.)
132. *glabrum* Blais. 09-453. Ariz.; N. Mex.; Ut. (Zion Nat'l Park, Wash, Co.; Henrieville, Garfield Co.; Indianola, Sanpete Co.; Moab, Grand Co.)
133. *contractum* Blais. 09-453. N. Mex.
134. *planum* Horn 70-321. Kan.; Colo.; N. Mex.; Ut. (Bluff, San Juan Co.)
135. *blaisdelli* Benedict 27-46. N. Mex. (Bat Cave, Carlsbad Cavern).
136. *contusum* Lec. 58-20. Wyo.; Colo.; Ariz.; Texas.
a. subsp. *laminatum* Csy. 90-403. Tex.
137. *muricatium* Say. Tex.; Colo.; Kan.; Neb.; S. Dak.; Alberta (Medicine Hat).

GENUS ELEODIMORPHA BLAIS. 09-477

138. *bolcan* Blais. 09-479. So. Calif.

GENUS NEOBAPHION BLAIS. 25-390

139. *planipennis* (Lec.) N. Mex.; Ariz. (Graham Mts., Chiricahua Mts., Sta. Catalina Mts.); Colo. (Mesa Verda Nat'l Pk.); Ut. (La Sal Mts.)
140. *elongatum* Blais. 33-208. Nev. (Yerrington).

GENUS LARIVERIUS BLAIS. 47-61

141. *tibialis* Blais. 47-61. Nev. (Pyramid Lake; Mineral Co.; San Dunes).

10. I have before me specimens of the species now assigned to this genus, with the exception of *vandyki*. I agree with the thinking of La Rivers as presented in the Ento. News, Vol. LVII, pp. 35-41, 1946.

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UNDESCRIBED SPECIES OF NEARCTIC TIPULIDAE (DIPTERA). I.

Charles P. Alexander[1]

In the present report I am discussing various novelties from Maine, Florida, Arizona and California, collected by Dr. A. E. Brower, Dr. S. W. Frost, Mr. Carl W. Kirkwood, Professor George F. Knowlton and Dr. L. W. Saylor, respectively. The types of the species are retained in my personal collection through the generosity of the collectors.

Prionocera broweriana n. sp.

Belongs to the *turcica* group; general coloration brownish gray; frontal prolongation of head brownish gray, yellowed ventrally; mesonotal praescutum with four entire dark brown stripes; antenna with proximal segments yellow, flagellar segments moderately serrate, the terminal one very slender; femora obscure yellow, tips narrowly infuscated; wings light brown, prearcular and costal fields more brownish yellow, vein R_3 long and straight; abdominal tergites light brown with a broad nearly continuous middorsal stripe; male hypopygium with dorsal tergal lobes broad, tips obtuse, lateral angles not developed; outer dististyle narrowed outwardly, inner style with apex obtuse, without setae.

Male.— Length about 11 mm.; wing 11 mm.; antenna about 3.6 mm.

Frontal prolongation of head short, brownish gray above, the apex and ventral third obscure yellow; nasus short and stout; palpi brownish black, outer two segments more intensely so. Antennae with scape obscure yellow, pedicel and proximal two-thirds of first flagellar segments only moderately serrate, as in the group; terminal segment very slender, about one-fourth as long as the penultimate. Head brownish gray, above with a central darker line, more expanded and evident on the low vertical tubercle, narrowed behind; orbits and antennal fossae obscure yellow.

Pronotal scutum brownish gray, posterior border on either side narrowly yellowed; scutellum light yellow. Mesonotal praescutum brownish gray, with four entire dark brown stripes, the intermediate

1 Amherst, Massachusetts

pair broad in front, narrowed posteriorly, separated by a more brownish gray central stripe, sublateral stripes obtuse in front; lateral borders darkened, humeral region light yellow; scutum gray, each lobe with two brown areas, the posterior one large, median area with a narrow blackened line; scutellum brownish gray with a blackened central line that is obsolete behind, parascutella light yellow; mediotergite gray, lateral border light yellow, pleurotergite gray, the elevated dorsal part of the katapleurotergite light yellow, silvery pruinose. Pleura gray, restrictedly variegated with yellow on propleura, dorsal sternopleurite, pteropleurite and metapleura. Body only moderately hairy, as compared with *setosa* and other species. Halteres with stem light brown, base of knob a little darker, apex yellowish brown, glabrous. Legs with coxae brownish gray; trochanters yellow; femora obscure yellow, tips narrowly infuscated, least evident on fore legs; tibiae brownish yellow, tips darkened; proximal end of basitarsus light brown, remainder of tarsi black; claws simple. Wings light brown, prearcular and costal fields, with the stigma, more brownish yellow; obliterative area before stigma and cord whitened, relatively conspicuous; veins brown, more brownish yellow in the brightened fields; veins behind *R* without macrotrichia. Venation: *Rs* slightly less than three times *m-cu; R_4* long and straight, not arcuated as in *dimidiata*, *electa* and others; petiole of cell *M* longer than *m*.

Abdominal tergites sublaterally light brown, the middorsal region with a broad nearly continuous blackened stripe, lateral borders gray pruinose; basal sternites light gray, intermediate ones obscure yellow. Male hypopygium with dorsal tergal lobes broad, narrowed to obtuse tips, the intervening area broader than either lobe; ventral lobes very small, widely separated; lateral tergal angles not produced, as is the case in most species. Outer dististyle dilated at base, conspicuously narrowed to the obtuse tip; inner dististyle relatively narrow, the basal lobe inconspicuous; outer half narrowed, beak obtuse, glabrous; setae of dorsal crest pale, inconspicuous; no tubercles or spines on outer half of style as in *rostellata* and others. The shape of the inner style is more as in *turcica* than in other European members of the group, the broad apex of the beak with abundant pale punctures that do not bear setae.

Habitat.— Maine (Penobscot County).

Holotype, ♂, Passadumkeag, in bog, May 26, 1944 (A. E. Brower).

I am pleased to dedicate this species to Dr. Auburn Edmond Brower, outstanding student of the Lepidoptera, especially the genus *Catocala*. I am very deeply indebted to Dr. Brower for great series of crane-flies from Maine that have added vastly to the state list. The fly is quite distinct from other regional species, such as *Prionocera dimidiata* (Loew), *P. electa* Alexander, and *P. sordida* (Loew), in the structure of the male hypopygium, particularly the tergite, which likewise differs from that of all other Holarctic species. An outstand-

ing paper by Tjeder[2] records ten species of *Prionocera* from Sweden, including four in the *turcica* group, all quite distinct from the present fly. The only other record for the genus in New England is an imperfectly known specimen from Massachusetts that tentatively was referred to *Prionocera sordida* but which may prove to be conspecific with the present fly. Until further material can be examined the strict identity of this specimen must be held in question. The widespread *illustris* Doane (*fuscipennis* Loew, preoccupied), formerly assigned to *Prionocera*, actually is a species of *Tipula* of the subgenus *Arcotipula* Alexander.

Tipula (*Lunatipula*) *saylori* n. sp.

Allied to *mariposa;* mesonotum gray, the praescutum with four stripes, the intermediate pair reddish brown; femora and tibiae obscure yellow, the tips narrowly dark brown; wings strongly infuscated, the obliterative band small but very conspicuous, no post-stigmal brightening; male hypopygium with tergal horns long, cylindrical, simple; apex of basistyle produced into an unequally bispinous appendage, the upper spine smaller, both spines slender and unmodified; inner dististyle with apical head enlarged and produced ventrally, lower beak lacking; lateral arms of gonapophyses more produced.

Male.— Length about 15-16 mm.; wing 16-17 mm.; antenna about 5 mm.

Female.— Length about 19-21 mm.; wing 18 mm.

Frontal prolongation of head relatively long, light chestnut, restrictedly pruinose at base; nasus long and slender; palpi brownish black. Antennae with scape and pedicel yellow, flagellum brownish black; male with flagellar segments only feebly incised, about equal in length to the longest verticils. Head above grayish brown, clear gray on front and orbits; a capillary dark brown median vitta and scattered dark setigerous punctures on vertex.

Pronotum gray. Mesonotal praescutum gray with four stripes, the intermediate pair reddish brown, their mesal edges on cephalic third more darkened, lateral stripes brown; median ground vitta without punctures, at anterior end about one-half as wide as the intermediate stripes; scutum gray, each lobe with two reddish brown areas; scutellum light brownish gray; mediotergite brownish gray, posterior third yellow, with vague brownish clouds on either side immediately before this. Pleura and pleurotergite brown, heavily gray pruinose; dorsopleural membrane yellow; a conspicuous yellow spot surrounding and beneath the root of halteres. Halteres elongate, stem brown, narrowly yellow at base, knob dark brown. Legs with coxae pale, gray pruinose; trochanters brownish yellow; femora and tibiae obscure yellow, tips narrowly dark brown; tarsi brownish yellow, outwardly passing into black; claws of male toothed. Wings with a strong brown tinge, the prearcular cells more yellowed; cells

2. Tjeder, Bo. The Swedish Prionocera (Dipt. Tipulidae). Opuscula Entomologica, 1948: 75-99, 14 figs.; 1948

C and *Sc* more brownish yellow; stigma pale brown; small brown spots at origin of *Rs* and over *r-m;* obliterative band beofre cord whitish subhyaline, small but very conspicuous, extending into base of cell M_3; no post-stigmal brightening; veins brown, more brownish yellow in the paler portions. Venation: *Rs* about two and one-half times *m-cu; m* about one-half to two-thirds the petiole of cell M_1.

Abdominal tergites yellowish brown or obscure yellow, with a conspicuous more brownish gray median stripe and inconspicuous brown sublateral spots on tergites two to six, lateral tergal borders broadly obscure yellow; setigerous punctures dark, conspicuous, especially in female; sternites obscure yellow, caudal margins restrictedly darker; hypopygium large, chestnut brown. Ovipositor long and slender, cerci tapering gradually to the acute tips; hypovalvae much shorter, compressed, bases blackened. Male hypopygium with ninth tergite produced into long cylindrical horns that narrow gradually to subacute tips, the latter incurved; on ventral surface at base of lobes with a flattened weakly bilobed darkened plate and a small spinous point closer to midline. Ninth sternite with the appendage a low suboval lobe that is clothed with erect long yellow setae. Basistyle at apex produced into a long unequally bispinous appendage; upper spine smaller, directed dorsad, the second spine directed caudad, both spines slender and unmodified; basistyle cut off from sternite by a suture, the ventral half deep, dorsal portion less complete. Outer dististyle greatly reduced, placed on margin of the larger style. Inner dististyle somewhat as in *mariposa* but differing in details; apical head or beak enlarged and much produced ventrally, lower beak lacking; in *mariposa* the lower beak represented by a acute spine. Gonapophysis with lateral arms more produced than in *mariposa*. Eighth sternite almost as in *mariposa*, the setae arranged in three distinct groups, the enlarged lateral groups decussate.

Habitat.— California (San Diego County); Baja California.

Holotype, ♂, Campo, San Diego County, California, May 18, 1945 (L. W. Saylor). *Allotopotype*, ♀, pinned with type. *Paratopotypes*, ♂ ♂ ♀ ♀, with types; *paratypes*, ♂ ♀, Baja California, Mexico, one-half mile south of border, near Campo, May 18, 1945 (L. W. Saylor).

The species is named for the collector, Mr. Larry W. Saylor. It is allied to *Tipula* (*Lunatipula*) *mariposa* Alexander and *T.* (*L.*) *yosemite* Alexander, especially the former, differing especially in important hypopygial characters, as discussed above. The long slender tergal arms are noteworthy.

Tipula (*Lunatipula*) *kirkwoodi* n. sp.

Size large (wing of male 20 mm.); mesonotum buffy gray, the praescutum with a broad light gray central stripe that is bordered laterally by dark brown; legs obscure yellow, tips of femora not darkened, claws toothed; wings brown, conspicuously striped longitudinally with white, including a central line from arculus to wing apex in cell R_5; abdomen light brown, scarcely patterned; male

hypopygium with basistyle produced at apex into a pale triangular blade; outer dististyle generally similar in outline to the blade of basistyle; inner dististyle profoundly bifid, the yellow outer basal lobe slightly larger than the body of style; eighth sternite with dense fringes of yellow setae.

Male.— Length about 20 mm.; wing 20 mm.; antenna about 5.5 mm.

Frontal prolongation of head relatively long, obscure yellow, dorsal surface light gray pruinose; nasus long; palpi brown. Antennae with proximal three segments yellow, succeeding segments brown, basal enlargements brownish black, outer segments blackened; segments subequal to the longest verticils, the basal enlargements moderately developed. Head light buffy gray; a capillary brown central line extending from the very low vertical tubercle backward, most evident in front.

Pronotum light buffy gray; setigerous punctures conspicuous. Mesonotal praescutum with a broad light gray central stripe with narrower dark brown margins, lateral praescutal stripes narrow, pale brownish gray; all interspaces with conspicuous brown setigerous punctures, these continued across the suture onto the lateral parts of scutal lobes; posterior sclerites of notum buffy gray, each scutal lobe with two pale brown areas, the inner margin of each slightly darker. Pleura light gray, dorsopleural membrane more yellowed. Halteres with stem brownish yellow, base clear yellow, knob dark brown. Legs with coxae light gray; trochanters yellow; femora and tibiae obscure yellow, tips not darkened, tarsi passing into black; claws of male with a single elongate tooth. Wings brown, striped longitudinally with whitish, including a central line from arculus virtually to apex in cell R_5, the stripe widest in cells *R* and M; bases of anal cells and outer third of *Cu* similarly whitened; less evident brightenings in cells M_1 and M_2; an elongate triangular grayish area in cell R_5, widened outwardly; prearcular and costal fields more fulvous brown, especially cell *Sc*; veins brown. All outer radial veins with trichia, more sparse on outer medial veins, especially M_2 and M_3; vein *1st A* with very few trichia scattered over most of the length. *2nd A* with abundant trichia on outer two-thirds; conspicuous prearcular trichia on *R* and M and the Anals; squama with setae. Venation: *Rs* nearly twice *m-cu*; petiole of cell M_1 about one-half longer than *m*; *m-cu* shortly before outer end of M_{3+3}.

Abdomen light brown, slightly pruinose; posterior borders of tergites narrowly gray; setae short; hypopygium large, yellow. Male hypopygium with tergite transverse, constricted medially, posterior border broadly emarginated; lower surface with a darkened depressed-flattened median lobe, its tip obtuse, and subequal lateral blades with truncated tips. Basistyle extended caudad into a flattened glabrous blade, tip obtusely rounded. Outer dististyle having somewhat the same outline as the blade of basistyle, triangular, narrowed to the blunt tip, surface with long setae, those at apex short. Inner dististyle profoundly divided into the main body and a slightly larg-

er outer basal lobe; body of style narrow, both the beak and lower beak blackened, obtusely rounded; outer basal lobe yellow, vestiture inconspicuous, on inner margin longer and abundant; appendage broadest at near two-thirds the length, lower apical margin shallowly bilobed, apex obtuse. Aedeagus narrow; apophyses not developed. Eighth sternite sheathing, narrowed outwardly, apex truncate, with a broad terminal cushion that is densely fringed with long yellow setae, the lateral ones longest.

Habitat.— Arizona (Pima County).

Holotype, ♂, Madera Canyon, Santa Rita Mountains, 4800 feet, April 23, 1961 (C. W. Kirkwood). Associated with *Tipula* (*Lunatipula*) *mahavensis* Alexander.

This interesting crane-fly is named in honor of the collector, Mr. Carl W. Kirkwood, student of the Geometridae, who has collected many crane-flies in Arizona and California. In its striped wing pattern the fly is quite distinct from other regional members of the subgenus, superficially resembling *Tipula* (*Bellardina*) *praelauta* Alexander and various species of the subgenus *Yamatotipula* Matsumura.

Tipula (*Lunatipula*) *incisa picturata* n. subsp.

Male.— Length about 12 mm.; wing 15 mm.; antenna about 3.8 mm.

In its wing pattern most like *Tipula* (*Lunatipula*) *incisa kansensis* Alexander, of eastern Kansas, differing in details, especially the darker, more contrasting markings. Cell *C* more nearly hyaline; more than the proximal half of both cells *R* and *M* more whitened, the darkened areas in outer ends of the cells clearly defined; both the prestigmal and postigmal whitenings much more distinct. There appear to be some slight differences in the venation, especially in the medial field, but due to the scanty materials of both races still available it seems inadvisable to do more than call attention to this point for future investigations.

Habitat.— Arizona (Yavapai County).

Holotype, ♂, Peeple's Valley, May 11, 1945 (G. F. Knowlton). *Paratopotypes*, 2 ♂♂. The collector writes, "I could have secured 300 or more in the shade of two trees not far from the cafe Peeples Valley. They were very abundant among blue grass and squirreltail grass, in the shade."

Limnophila (*Phylidorea*) *frosti* n. sp.

Size medium (wing of female 8 mm.); mesonotal praescutum ferruginous, polished, posterior sclerites of notum pruinose; antennae light brown; front and anterior vertex silvery; legs brownish yellow, outer tarsal segments dark brown; wings strongly tinged with brown, especially cells *C* and *Sc*; longitudinal whitened lines in cells *R*, *M* and *1st A*; *no* macrotrichia on vein *Sc*; cell *1st* M_2 subrectangular, with *m-cu* before midlength.

Female.— Length about 10 mm.; wing 8 mm.

Rostrum chestnut brown; palpi black. Antennae light brown, scape pruinose; flagellar segments oval, becoming smaller and more elongate outwardly, shorter than the verticils. Head in front light silvery; posterior vertex darkened on sides, narrowly gray on central part.

Pronotum highly polished, scutum black, scutellum yellowed. Mesonotal praescutum ferruginous, polished; scutum brown, posterior sclerites obscure yellow, darker medially, conspicuously pruinose. Pleura yellow, slightly pruinose, weakly darkened on anepisternum. Halteres yellow, apex of knob infuscated. Legs with coxae and trochanters yellow; femora, tibiae and basitarsi brownish yellow, outer tarsal segments dark brown. Wings with a strong brownish tinge, especially cells *C* and *Sc;* stigma long-oval, pale brown; a conspicuous longitudinal white line in cell *R* near vein *M*, passing through cell *1st* M_2 to midlength of cell M_3; comparable whitened lines in outer third of cell *M* and two in cell *1st A;* veins brown, more yellowed in the prearcular and costal fields. Macrotrichia on most longitudinal veins beyond cord, lacking on R_{2+3+4}; basad of cord lacking on *Sc* and *M;* basal section of Cu_1 and the Anal veins with apical trichia, very sparse on *1st A*, more numerous on *2nd A*. Venation: Sc_2 longer than Sc_1, ending opposite fork of *Rs;* cell M_1 approximately one-half as long as its petiole; cell *1st* M_2 subrectangular, with *m-cu* before midlength.

Abdominal tergites yellowish brown, with abundant yellow setae, sternites clearer yellow.

Habitat.— Florida (Highlands County).

Holotype, ♀, Archbold Biological Station, at light, November 11, 1959 (S. W. Frost).

I name this fly in honor of Dr. Stuart W. Frost who discovered it while engaged in insect-light studies at the Archbold Biological Station. The most similar species is *Limnophila* (*Phylidorea*) *osceola* Alexander, of northern Florida, which differs in size, general coloration of the wings, and in the trichiation of the wing veins.

Limnophila (*Phylidorea*) *paeneadusta* n. sp.

Belongs to the *adusta* group; general coloration of thorax brown, pruinose; flagellum yellow; knobs of halteres dark brown; femora yellow, tips narrowly dark brown; wings whitened, conspicuously patterned with brown; veins beyond cord with macrotrichia; *Rs* relatively long, about twice *m-cu;* abdomen brownish yellow, subterminal segments brownish black; hypopygium with the tergite emarginate, forming oval cushions; basal sternal lobe a narrow blade, the extended tip recurved; both dististyles yellow, terminating in slender fingerlike lobes; aedeagus with three long slender filaments; gonapophyses simple, tips acute.

Male.— Length about 9.5 mm.; wing 9.5 mm.; antenna about 1.9 mm.

Rostrum stout, dark brown, gray pruinose; palpi light brown. Antennae with scape brownish yellow, remainder of organ light yellow, the two outer segments slightly darker; basal flagellar segments long-oval, the outer ones elongate, with long verticils. Head gray; anterior vertex broad, about four times the diameter of scape.

Pronotal scutum medium brown, sides yellowed, scutellum chiefly yellow. Mesonotal praescutum opaque brown, gray pruinose; a central darker brown stripe, darkest in front, paling to yellow behind; scutal lobes brown, sparsely pruinose; scutellum obscure yellow; mediotergite yellow, central part weekly brownish gray. Pleura brown, gray pruinose, propleura, metapleura and dorsopleural membrane yellowed. Halteres with stem yellow, knob dark brown. Legs with all coxae and trochanters light yellow; femora yellow, tips narrowly dark brown; tibiae brownish yellow, tips more narrowly darkened; tarsi brown. Wings whitened, conspicuously patterned with brown, including cell *C*, stigma, wing tip and a seam over cord, widest on the anterior cord; narrower brown seams at outer end of cell *1st* M_2; a narrow darkened seam over vein *Cu* to margin; veins brownish yellow, darker where seamed with brown. Longitudinal veins beyond cord with macrotrichia, basad of this lacking on *Sc*, *Rs* and *1st A*, present at tips of *M* and more extensively on *Cu* and *2nd A*. Venation: *Rs* relatively long, about twice *m-cu*; cell M_1 longer than its petiole; *m-cu* at near one-third M_{3+4}.

Abdomen brownish yellow, subterminal segments brownish black to form a ring; styli yellowed. Male hypopygium with the tergite emarginate, appearing as two darkened lobes that are separated by pale membrane. Basistyle stout, with long yellow setae. Dististyles yellow; outer style moderately flattened, the tip suddenly narrowed into a fingerlike extension; inner style on more than basal half stout, bent at a right angle into a straight slender rod. Sternal region at base of phallosome with a narrow blade on either side, its outer end prolonged and narrowed, finally strongly recurved. The comparable structure in *adusta* is a small subtriangular blade. Phallosome with base of aedeagus unusually long, divided into three long slender filaments, as in the group, these filaments nearly twice as long as the outer dististyle; gonapaphysis appearing as a long slender simple rod, narrowed to an acute point.

Habitat.— Maine (Penobscot County).

Holotype, ♂, Chester, May 29, 1936 (A. E. Brower).

In the pattern of the wings, *Limnophila* (*Phylidorea*) *paeneadusta* resembles *L.* (*P.*) *adusta* Osten Sacken, differing in the darkened costal cell, the darkened thorax and in details of hypopygial structure, as the basal lobes of the sternum, as described above.

NEW SPECIES OF BARK BEETLES (COLEOPTERA: SCOLYTIDAE), MOSTLY MEXICAN PART VI.

Stephen L. Wood[1]

On the following pages nineteen neotropical species of scolytid beetles belonging to the genera *Scolytopsis* (1), *Loganius* (10), *Hexacolus* (4), *Prionosceles* (2), *Microborus* (1), *Eupagiocerus* (1), and *Hoplitophthorus* (2) are described as new to science. Ten of these species were taken in Mexico, three in the Panama Canal Zone, two in Cuba, and one each in Puerto Rico, Honduras and Bolivia; one species was taken in Florida, Puerto Rico and the Panama Canal Zone. Seven of the species were collected by the writer while with the 1953 expedition of the Francis Huntington Snow Entomological Museum (University of Kansas, Lawrence); of the remaining species nine were received from the United States National Museum and one from the California Academy of Sciences.

Scolytopsis cubensis, n. sp.

This species is very closely allied to *puncticollis* Blandford, but may be distinguished by the more strongly impressed striae in the posterior areas, by the larger strial punctures with interstrial punctures subequal in size, and by the slightly larger, more shallow punctures of the pronotum.

Female.— Length 2.4 mm. (paratypes 2.1-2.4), 2.3 times as long as wide; color dark brown.

Frons broadly convex above, transversely impressed immediately above epistoma, with a broad median elevation extending from convex area above partly bisecting the impression below; surface finely, deeply, closely punctured, convergently strigose toward the weak median elevation below; vestiture scanty, consisting of a few short, coarse setae and a rather poorly developed epistomal brush. Eye and antenna as in other species of the genus.

Pronotum equal in length and width; widest on posterior third, sides arcuately converging toward the broadly rounded anterior margin; surface smooth, shining, except reticulate in lateral areas, with numerous minute points between the punctures; punctures rather large, deep, oval, narrowest diameter at least five times greater than that of minute points, those in lateral areas round and at least three times larger than those on disc; glabrous.

Elytra 1.4 times as long as wide, 1.4 times as long as pronotum; sides constricted on basal third, rather broadly rounded behind; surface smooth near bases, minutely granulose over posterior three-fourths; striae not impressed on basal half, distinctly impressed on posterior half, the punctures as large and deep and somewhat closer

1. Contribution no. 179, Zoology and Entomology Department, Provo, Utah. Scolytoidea contribution no. 23.

than in *puncticollis;* interstriae appearing very feebly sulcate, the punctures deep, close, regular, almost as large as those of striae. Declivity gradual, not steep. Vestiture consisting of rows of erect interstrial scales as in *puncticollis.*

Male.— Similar to female except frons smooth and polished in central area with a fringe of long yellowish hair arising on sides and on vertex, largely concealing surface.

Type locality.— Cayamas, Cuba.

Type material.— The female holotype, male allotype and six paratypes were taken at the type locality on May 9, by E. A. Schwarz; two paratypes bear the same data, taken Jan. 20. One paratype was taken at Baragua, Cuba, on Aug. 29, 1927, from a sticky shield, by L. A. Searamuzza.

The holotype, allotype and six paratypes are in the U. S. National Museum; three paratypes are in the collection of the writer.

Loganius splendens, n. sp.

This species is allied to *ficus* Schwarz, but is readily distinguished by the less strongly impressed frons which is pilose in the female, and by the more coarsely sculptured elytral declivity.

Male.— Length 2.0 mm. (paratypes 1.7-2.1), 2.3 times as long as wide; color reddish brown.

Frons convex above, transversely impressed above epistoma, epistomal submargin with an impressed line on median two-thirds; surface reticulate above, rather coarsely, closely, deeply sculptured, the punctures moderately close above, very close below; vestiture short, inconspicuous. Eye elongate, weakly sinuate on anterior margin; coarsely granulate. Antenna as in *ficus.*

Pronotum as long as wide, widest on basal third; sides weakly arcuate and converging toward the narrowly rounded anterior margin; surface subshining, the punctures rather large, deep, close, oval, somewhat larger in lateral areas; glabrous.

Elytra 1.5 times as long as wide; sides straight and subparallel on basal two-thirds, rather broadly rounded behind; elytral bases weakly raised along a continuous, irregular line; scutellum small, rounded; striae weakly impressed, the punctures moderately large, close deep; interstriae as wide as striae, moderately convex, smooth, subshining, the punctures small, distinct, close. Declivity steep, convex; all striae more strongly, narrowly impressed and all interstriae more strongly convex than on disc; all interspaces finely tuberculate, the tubercles becoming progressively larger laterally, largest on nine; interspaces one, two, three and five meet ten, four joins five, six and eight end short, seven and nine fuse apically; ten very narrow, largely reduced but bearing a few tubercles. Vestiture consisting of rows of short narrow scalelike setae, each seta arising from posterior margin of a tubercle.

Female.— Similar to male except frons flattened on a broad area to well above eyes and bearing a subcircular brush of moderately

long hair, shorter toward center, extending from epistomal margin to upper level of eyes.

Type locality.— Mexico.

Host.—Tabebuia (=Cybistax) donnell-smithii.

Type material.— The male holotype, female allotype and five paratypes were intercepted at San Pedro, California, on Sept. 22, 1947, in "*Cybistax donnell-smithii*" bark that came from Mexico.

The holotype, allotype and three paratypes are in the U. S. National Museum; two paratypes are in the collection of the writer.

Loganius vagabundus, n. sp.

This species is rather closely allied to *impressus*, but is distinguished by the less broadly impressed frons, by the more coarsely punctured pronotum, by the more sparsely, more deeply punctured elytral interstriae, and by the less abundant elytral setae.

Male.— Length 1.7 mm. (paratypes 1.2-1.7), 2.5 times as long as wide; body color light reddish brown.

Frons convex on upper half, flattened on a subtriangular area on lower half, more strongly impressed on a transverse line just above epistoma, narrow epistomal margin smooth and shining; surface retucilate, rather closely, deeply punctured above, punctures setose on flattened area; setae moderately abundant except at center, rather coarse, moderately long. Eye coarsely faceted; outline sinuate on both anterior and posterior margins. Segments two to seven of antennal funicle as broad as pedicle and each bearing a tuft of long setae on inner margin; club broad, not septate, conspicuously marked by three strongly procurved rows of setae.

Pronotum very slightly wider than long (1.02 times); widest on basal fourth, sides convergently arcuate toward the rather narrowly rounded anterior margin, very slightly constricted just behind anterior margin; surface shining, with very feeble indication of minute longitudinal lines, and a few very minute points between the moderately coarse, deep, broadly oval punctures; glabrous.

Elytra 1.5 times as long as wide; sides straight and subparallel on basal two-thirds, narrowly rounded behind; elytral bases not raised along a continuous costa, but with a few finely subcrenulate punctures suggesting a partial raised line; striae feebly if at all impressed, the punctures moderately large, very close, deep; interstriae subconvex, smooth, subshining, about one and one-half times as wide as striae, the punctures almost as large as those of striae, rather shallow, sparse, spaced at distances about equal to width of interstriae. Declivity moderately steep, convex; striae one and two more strongly impressed, interstriae one, two, three and nine more strongly convex than others, their punctures closer than on disc and subserrate on anterior margins; interspaces five and seven also minutely granulate; interspaces one and two reaching margin, three, five and seven join nine. Vestiture limited to declivity, consisting of sparse, short, narrowly flattened setae.

Female.— Similar to male except frons more strongly, broadly impressed, the impression ending well below upper level of eyes; and declivital sculpture finer.

Type locality.— Key West, Florida.
Host.— *Ichthyomethia piscipula.*

Type material.— The male holotype, female allotype and 27 paratypes were reared from the host at the type locality from May 22 to 30, 1912, by E. A. Schwarz, lot no. 9170. Nineteen other paratypes were taken at the same locality and time but do not bear a lot number, except one specimen numbered 5952. Five paratypes are labelled "Mona Island, Puerto Rico, April 6-8, 1927, W. A. Hoffman;" two paratypes are from Barro Colorado Island, Panama Canal Zone, Sept. 1941, taken by J. Zetek, lot no. 41-20624, and seven others are from the same locality and were taken on June 20, 1941, at light, lot no. Z-4816. Two additional specimens evidently belong to this species, but not designated as paratypes are lebelled "Jost Van Eyke, Little Harbor, B. V. I., 1-IV-1958, J. F. G. Clarke."

The holotype, allotype and most of the paratypes are in the U. S. National Museum; some paratypes are in the collection of the writer.

Loganius impressus, n. sp.

This species is allied to *ficus* Schwarz but is distinguished by the much smaller size, by the dull more coarsely sculptured elytral surface, by the more finely punctured pronotum, and by the much more shallowly impressed, more strongly pubescent frons.

Male.— Length 1.5 mm. (paratypes 1.3 and 1.4), 2.3 times as long as wide; body color reddish brown.

Frons very shallowly, broadly concave almost to upper level of eyes; a rather wide, subtriangular, smooth shining epistomal area immediately above epistomal brush; surface of impressed area finely granulate-punctate, largely obscured by abundant, subplumose yellow setae of moderate length. Eye large, coarsely faceted; anterior margin sinuate. Antennal scape short, stout; funicle as long as scape, with segments two to seven each as wide as pedicle and bearing on ventral margin long setae none of which extend beyond tip of club; club large, broadly obovate, about as long as scape and funicle combined, 1.3 times as long as wide, with three strongly procurved stures indicated by rows of setae, the first not quite reaching middle.

Pronotum very slightly wider than long (1.04 times), widest on basal fourth, sides evenly, arcuately convergent toward the narrow, but broadly rounded anterior margin; basal and lateral margins with a fine, raised line; surface apparently minutely, longitudinally strigose on anterior half, becoming smooth posteriorly, and with rather fine longitudinally elongate punctures, becoming smaller posteriorly and with a few very minute pores interspersed posteriorly. Glabrous.

Elytra 1.4 times as long as wide, 1.6 times as long as pronotum; sides straight and subparallel on slightly more than basal half, rather narrowly rounded behind; humeral angles abrupt; first striae dis-

tinctly impressed from base others feebly impressed, the punctures fine, distinct, in regular rows; interstriae about three times as wide as striae, their surface smooth but very dull, the punctures in uniseriate median rows, small, all finely graulate; basal margins almost straight and irregularly raised, interspaces two to six with up to six poorly developed subcrenulate elevations near base; scutellum small, rounded in outline, scarcely at all depressed. Declivity evenly convex, moderately steep, all striae rather narrowly impressed; interspaces one, two, three, five, seven and nine modrately convex and tuberculate, costal margin and posterior portion of ten also tuberculate, tubercles on lateral interspaces appearing somewhat larger; interspace one joins costal margin, two joins ten, three joins fused seven and nine, four and six end short of five. In dorsal profile interspace nine appears very finely serrate on posterior half of elytra; ten finely serrate on anterior half. Vestiture confined to declivity, consisting of rows of short, stout, semi-erect almost scalelike setae arising from interspacial tubercles; longest setae about one-third as long as distance between rows.

Female.— Similar to male except frons evidently more strongly impressed.

Type locality.— Chilpancingo, Guerrero, Mexico.

Type material.—The male holotype, female allotype and one male paratype were taken at the type locality on Oct. 22, 1941, at light by D. M. DeLong. All three specimens are in the collection of the writer.

Loganius prociduus, n. sp.

This species is closely allied to *impressus* but is readily distinguished by the more coarsely sculptured elytra, by the longer, more scalelike, recumbent declivital setae, and by the very different arrangement of the elytral interspaces.

Female.— Length 1.4 mm. (paratype 1.5), 2.6 times as long as wide; body color reddish brown.

Frons very shallowly, broadly concave from the sinuate epistomal margin to upper level of eyes; epistomal margin subcarinately raised and obscurely overlapping epistomal brush, with a rather narrow smooth subshining area immediately above epistomal brush; surface of impressed area finely granulate-punctate, largely obscured by abundant subplumose yellow setae of moderate length. Eye and antenna essentially as in *impressus*.

Pronotum 1.05 times as wide as long, widest on basal third, sides converging somewhat toward the broadly rounded anterior margin; basal and lateral margins marked by a fine raised line; surface dull, the punctures moderately abundant, rather small except larger in lateral areas, oval, the interspaces with a few very minute pores. Glabrous.

Elytra about 1.5 times as long as wide, 1.6 times as long as pronotum; sides straight and subparallel on slightly more than basal

half, rather narrowly rounded behind; humeral angles abrupt; striae slightly impressed, the punctures moderately large, in regular rows; interstriae less than one and one-half times as wide as striae, the punctures almost as large as those of striae, moderately spaced in single rows, those toward base with anterior margin raised, those near declivity appearing subvulcanate, surface almost smooth, dull; basal margins slightly impressed toward scutellum, subcrenulately raised, basal area somewhat irregular but not subcrenulate; scutellum almost round in outline, very slightly if at all depressed. Declivity evenly convex, moderately steep, all striae narrower and more strongly impressed than on disc; costal margin and all interspaces, except eight, convex and serrate; serrations uniseriate, moderately coarse, evidently larger laterally; interspaces one, two, three, and five (usually evidently fused to seven and nine) all reaching costal margin, four, six and eight end near middle of declivity; ten with two to five small tubercles near posterior extremity; interspace nine serrate on posterior half of elytra, ten evidently minutely serrate on anterior half. Vestiture confined to posterior half of elytra and sides, consisting of interspacial rows of short recumbent spatulate scales arising from interstrial punctures; each scale equal in length to half the distance between rows of scales, and each about four times as long as wide.

Type locality.— LaCeiba, Honduras.

Type material.— The female holotype and one female paratype were collected at the type locality on May 29, 1949, at light, by E. C. Becker. Both specimens are in the collection of the writer.

Loganius liratus, n. sp.

The transverse epistomal carina, the frontal vestiture, the sculpturing of the elytral declivity, and the small size will distinguish this species from all known representatives of the genus.

Female.— Length 1.5 mm. (paratypes 1.3-1.5), 2.5 times as long as wide; body color dark reddish brown.

Frons convex above, transversely impressed on lower half with a rather high, narrow, rounded, transverse carina occupying median half, rising abruptly below, sloping gradually above; epistoma with median portion produced in front of mandibles; surface reticulate-granulate, moderately punctured at sides and above; vestiture consisting of a conspicuous brush of short erect yellow hair on median half between carina and a point just below upper level of eyes, epistomal brush emerging from lower margin of the smooth, shining, glabrous carina. Eyes and antenna as in *prociduus*.

Pronotum equal in length and width; widest on basal third, the sides arcuately converging to the moderate transverse constriction just behind the broadly rounded anterior margin; almost smooth and subshining posteriorly, the punctures moderately coarse and deep, rather close, oval. Glabrous.

Elytra 1.5 times as long as wide, 1.6 times as long as pronotum; sides straight and subparallel on basal two-thirds, rather narrowly

rounded behind; sutural striae weakly, others not at all impressed; interspaces more than twice as wide as striae, the punctures very fine, subgranulate, sparse, surface smooth, subshining; basal margins rounded, raised and subcrenulate, with a few small submarginal crenulations on interspaces two to five; scutellum slightly depressed, almost round in outline. Declivity evenly convex; moderately steep; striae weakly impressed, odd numbered interspaces more nearly convex; interspaces dull, one, two, three, five, seven, nine and costal margin each bearing a row of fine rather widely spaced tubercles, those on seven, nine and costal margin larger, five devoid of tubercles on lower two-thirds; interspace one joins raised costal margin, two, three and five separately join the fused seven and nine, ten virtually obsolete in declivital region. Vestiture sparse, inconspicuous, confined to declivity, except extending onto disc on odd numbered interspaces; each seta fine, blunt, bristlelike, about half as long as space between rows, separated by three to four times their length from nearest bristle in same row.

Male.— Similar in all respects to female.

Type locality.— Twelve miles southeast of Matamoros, Puebla, Mexico.

Type material.— The female holotype, male allotype and 44 paratypes were taken at the type locality on July 3, 1953, by S. L. Wood. The host tree had reddish, peeling bark; the galleries were in branches varying from one-fourth to four inches in diameter.

The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Loganius fastigius, n. sp.

This species is allied to *prociduus* but may be distinguished by the convex frons, by the transverse frontal carina, by the prominent crenulate tubercles of the elytral disc, and by the finer declivital sculpture.

Female.— Length 1.6 mm. (paratypes 1.4-1.7), 2.6 times as long as wide; body color rather dark reddish brown.

Frons convex, with a broad, rather sharply elevated, transverse carina just above epistomal margin; lower slope of carina more gradual, smooth, shining, upper slope more abrupt, reticulate and bearing several setae; surface above carina minutely granulose, impunctate in central area, finely, sparsely punctured at sides and above; vestiture longer and more conspicuous along upper slope of carina and along epistomal margin, a glabrous area extending from above bases of mandibles across lower slope of carina. Eye and antenna as in *prociduus*.

Pronotum 1.05 times as wide as long, widest on basal third, sides weakly arcuate behind, abruptly converging anteriorly toward the broadly rounded anterior margin; basal and lateral margins marked by a fine raised line; surface dull minutely longitudinally strigose,

the punctures moderately abundant, rather small, oval, the interspaces with a few very minute pores. Glabrous.

Elytra 1.3 times as long as wide. 1.4 times as long as pronotum; sides straight and subparallel on slightly less than basal half, rather narrowly rounded behind; humeral angles abrupt; first striae moderately impressed, others feebly, if at all impressed; strial punctures small, in regular rows; interstriae at least twice as wide as striae, surface marked by a few irregular lines, the punctures slightly smaller than those of striae and each bearing on its raised anterior rim a low transverse crenulation about equal in length to half the width of an interspace, except crenulations entirely absent on interspaces four and six; basal margins straight, slightly impressed near scutellum, anterior margins subcrenulately elevated and with a few submarginal crenulations on interspaces two to four; scutellum round in outline, distinctly depressed below general surface of elytra. Declivity evenly convex, rather steep; striae more strongly, narrowly impressed; interspaces feebly convex, the crenulations much narrower, very slightly higher; interspaces four, six and eight entirely unarmed; interspace one evidently meets costal margin, two meets ten, three meets fused seven and nine, four and six join five and end before meeting fused seven and nine; ten bearing four or five small tubercles posteriorly; posterior costal margin with a few puncturess, sinuate, not serrate; interspace ten subserrate on basal half of elytra, nine on posterior half. Vestiture scanty, consisting of stout, sparse almost scalelike interstrial setae on declivity and posterior portion of disc except on interspaces four and six, each seta equal in length to about half the distance between rows of setae.

Fifth abdominal sternum bearing a low transverse ridge near middle of segment.

Male.— Similar in all respects to the female.

Type locality.— Nine miles northwest of Acatlan, Puebla, Mexico.

Type material.— The female holotype, male allotype and 19 paratypes were collected at the type locality on July 13, 1953, from host plant no. 50 deposited in th University of Kansas herbarium, by S. L. Wood. The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Loganius confinis, n. sp.

The concave, pubescent frons with its broad, elevated epistomal process, the impressed scutellar area of the elytra, the simple declivity, and the small size serve to distinguish this species from all other representatives of the genus.

Female.— Length 1.7 mm. (paratypes 1.4-1.9), 2.3 times as long as wide; body color rather dark reddish brown.

Frons broadly, rather deeply concave from epistomal carina to upper margin of eyes; a smooth, shining, transverse band immediately above epistomal margin elevated and subcarinate, less well

developed but similar to that of *fastigius*, extending almost from lateral margin to lateral margin; reticulate-granulate above and at sides, finely punctured in lower part of concave area; vestiture confined to concave area, fine, rather long, more abundant below and laterally, the fine, sparse epistomal brush apparently rising from beneath lower margin of lower slope of the transverse carina. Eye and antenna as in *prociduus*.

Pronotum 1.05 times as wide as long, widest on basal third, sides converging somewhat toward the constriction just behind the rather narrowly rounded anterior margin; basal and lateral margins marked by a fine raised line; surface rather dull, indistinctly, minutely longitudinally strigose, the punctures moderately small, narrowly oval, rather close. Glabrous.

Elytra 1.5 times as long as wide, 1.6 times as long as pronotum; sides straight and subparallel on basal two-thirds, rather narrowly rounded behind; humeral angles rounded; straie not impressed except first, the punctures very fine, rather close; interstriae at least three times as wide as striae, the punctures slightly if at all smaller than those of striae, rather close, in uniseriate rows, surface smooth, dull; elytral bases subcrenulately raised, except impressed near scutellum, several low crenulations on interspaces two to six; scutellum small, oval in outline, rather strongly depressed. Declivity evenly convex, rather steep; striae feebly impressed, interspaces one, two, three, seven, nine and ten very weakly convex with exceedingly minute tubercles in uniseriate rows; interspace one meets costal margin, two meets ten, three meets fused seven and nine; weakly raised costal margin with setose punctures, not at all granulate. Vestiture almost obsolete, a few minute interstrial bristles on declivity, none longer than one-third the distance separating rows of bristles.

Male.— Similar to female in all respects.

Type locality.— Four miles east of La Pas on the road to Las Cruces, Baja California, Mexico.

Host.— *Sapium biloculare.*

Type material.— The female holotype, male allotype and 88 paratypes were taken at the type locality on Dec. 23, 1958, from dead branches of the host, by H. B. Leech. The holotype, allotype and some paratypes are in the California Academy of Sciences; other paratypes are in the collection of the writer.

Loganius niger, n. sp.

This minute species is distinguished from the foregoing species by the black color, by the sexually dimorphic frons, by the simple structure of the elytral declivity, and by the small size.

Female.— Length 1.2 mm. (paratypes 1.15-1.25), 2.6 times as long as wide; body color black, vestiture white.

Frons broadly flattened from epistomal margin to upper level of eyes, transversely impressed on lower third; surface minutely granulose, very finely closely punctured in impressed area and densely pubescent from epistomal margin to upper level of eyes, the setae subplumose, moderately long, almost white, epistomal brush not separated from other setae. Eye rather finely faceted, deeply sinuate on anterior margin. Antennal club about three-fourth as long as combined length of scape and funicle; first suture reaching only one-third the length, all sutures rather broadly procurved.

Pronotum 1.1 times as wide as long, widest on basal third, sides arcuately converging slightly toward the narrowly rounded anterior margin; basal and lateral margins marked by a fine, raised line; surface subshining, the punctures fine, elongate, rather sparse. Glabrous.

Elytra 1.7 times as long as wide, sides straight and subparallel on slightly more than basal half, rather narrowly rounded behind; humeral angles rather narrowly rounded; striae not impressed, the punctures small, distinct, separated by almost twice their own diameters, in regular rows; interstriae one to three times wider than striae, one and three wider than two and four, smooth, subshining, the punctures sparse, fine, minutely subgranulate on one and three to base; basal margins almost straight, impressed toward scutellum, finely irregularly raised from about interspace two to six, a few submarginal subcrenulate elevations; scutellum small depressed, longer than wide. Declivity evenly convex, moderately steep; striae weakly impressed, the interspaces feebly convex; interstrial granules moderately large, rounded, rather widely spaced, in uniseriate rows on all interspaces except absent on four, six, eight and ten; costal margin finely raised and sinuate, confluence of interspaces with costal margin or with one another not clear, except possibly three and nine, interspace ten minutely serrate on basal half of elytra, nine minutely serrate on posterior half. Vestiture scanty, consisting of sparse rows of erect, blunt interstrial bristles on declivity and sides.

Male.— Similar to female except frons convex above, impunctate at center, and glabrous.

Type locality.— Sixteen miles west of Tehuantepec, Oaxaca, Mexico.

Type material.— The female holotype, male allotype and 28 paratypes were collected at the type locality on July 8, 1953, by S. L. Wood. The host plant was a somewhat grasslike herbaceous shrub that grew in dense shade; when cut an abundant milky fluid escaped. A sample of the host, plant no. 42, is deposited in the University of Kansas herbarium. The galleries were immediately below the thin bark where the beetles worked in pairs.

The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Hexacolus multistriatus, n. sp.

This species is allied to *schwarzi* (Hopkins) but is larger, more coarsely sculptured, and darker in color than other species known to me.

Female.— Length 2.1 mm. (paratypes 1.7-2.1), 2.3 times as long as wide; body color very dark brown.

Frons weakly convex, smooth, shining and glabrous on a small median area extending from just below upper level of eyes half the distance to epistomal margin, lower half and sides rather finely, closely punctured, gradually raised to epistomal margin; epistomal margin with a median lobe extending in front of mandibles; vestiture consisting of moderately dense, long, plumose yellow setae arising from vertex to upper and lateral margins of glabrous area, shorter and not plumose on punctured area below. Eye elongate, entire.

Pronotum 1.2 times as long as wide; widest on basal fourth, the sides almost straight and feebly converging on basal two thirds then abruptly narrowed to the rather broadly rounded anterior margin; asperities rather coarse, extending in median area to basal third, gradually decreasing in size posteriorly, similar to but coarser than in *schwarzi;* surface subreticulate and rather coarsely, closely, deeply punctured behind and at sides; subshining; lateral and basal margins acutely marked by a fine raised line; summit indefinite. Glabrous.

Elytra 1.5 times as long as wide, 1.6 times as long as pronotum; sides almost straight and subparallel on basal two-thirds, rather broadly rounded behind; striae feebly if at all impressed, the punctures small, in rows, separated by distances about equal to their own diameters; interstriae smooth, shining, more than twice as wide as striae, the punctures large, almost as large as those of striae, close, in semi-definite rows; basal margins with a fine raised line similar to that of pronotum. Declivity steep, convex; striae nearest suture weakly impressed; sutural interspace weakly raised below, two somewhat impressed; all interspaces with a few moderately large rounded, widely spaced granules on upper half; all punctures tending to become smaller and confused on lower third. Disc glabrous; sparse, rather short, slender hairlike setae arising from declivital granules.

Male.— Similar to female except frons more nearly convex, uniformly reticulate with sparse punctures, rather strongly transversely punctured above the smooth shining, slightly elevated epistomal margin, a weak median carina extending from impression to margin; and declivital granules very slightly larger.

Type locality.— Five miles west of Villa Juarez, Puebla, Mexico.

Type material.— The female holotype, male allotype and 32 paratypes were taken on June 25, 1953, from a branch of a small tree, by S. L. Wood. The galleries of adults and larvae were deep in the sapwood. They were of the radiate type, with one to four females associated with each male.

The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Hexacolus reticulatus, n. sp.

The sculpture of the pronotum of this species resembles that of *glabrellus* Schedl, but the frons and elytra are entirely different.

Female.— Length 1.6 mm. (paratypes 1.5-1.8), 2.5 times as long as wide; body color very dark brown.

Frons flattened (feebly convex) on lower two-thirds; smooth, shining and glabrous on median area on slightly more than lower half of flattened area to the poorly developed epistomal brush; coarsely, closely punctured on crescent area above impunctate portion, a few feeble punctures laterally; epistomal margin with median lobe extending in front of mandibles; vestiture consisting of rather abundant, long, fine yellow hairlike setae, arising in punctured area well below upper margins of eyes, setae less abundant and shorter at sides and along epistomal margin. Eye and antenna as in other species of genus.

Pronotum 1.04 times as long as wide; widest on basal third, the sides evenly arcuate and converging slightly toward the broadly rounded anterior margin, asperities before summit rather fine, as in *glabrellus*, but with feeble indications of their continuance well behind indefinite summit; surface dull, reticulate, with fine sparse punctures behind and at sides; basal and lateral margins marked by fine raised line. Glabrous.

Elytra 1.6 times as long as wide, 1.7 times as long as pronotum; sides straight and subparallel on basal two-thirds, rather narrowly rounded behind; striae not impressed, the shallow punctures in irregular rows, separated by about twice their own diameters; interstriae evidently two to three times as wide as striae, the surface dull, reticulate, and, on basal half, irregularly somewhat wrinkled, the punctures about two-thirds as large as those of striae, in irregular rows, somewhat obscure in wrinkled area; basal margins with fine raised line as in other species. Declivity rather steep, evenly convex; first striae very feebly impressed near middle; all punctures somewhat reduced, obsolete toward apex. Elytra glabrous, except declivity and sides with minute hairlike setae arising from interstrial punctures, each seta scarcely longer than a distance equal to diameter of a puncture.

Male.— Similar to female except frons more nearly convex, reticulate, finely and sparsely punctured, and without conspicuous vestiture; punctures of elytral disc more clearly evident, and punctures of elytral declivity more strongly reduced.

Type locality.—Twelve miles southeast of Matamoros, Puebla, Mexico.

Host.— *Ficus* sp.

Type material.— The female holotype, male allotype and 67 paratypes were collected at the type locality on July 3, 1953, from

the bark of branches of what appeared to be the strangler fig, by S. L. Wood.

The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Hexacolus tenuis, n. sp.

This small, slender, pubescent species is entirely different from all other known species in the genus.

Female.— Length 1.3 mm. (paratypes 1.1-1.3), 3.0 times as long as wide; mature body color very dark brown, almost black.

Frons transversely impressed on lower half, epistomal margin slightly elevated; surface rather coarsely, subgranulately punctured above, finely punctured in impressed area; vestiture consisting of a brush of long yellow, subplumose setae beginning well below upper level of eyes, directed ventrad, setae on lower and epistomal areas less abundant but almost as long. Eye and antenna as in other species.

Pronotum 1.3 times as long as wide; sides straight and parallel on basal two-thirds, rather narrowly rounded on the subserrate anterior margin; asperiteies rather small, moderately high, confined to anterior third; posterior and lateral areas obscurely reticulate, subshining, coarsely, deeply and rather closely punctured; summit indefinite, near anterior third; basal and lateral margins marked by a fine, raised line; vestiture short, coarse in asperate area, fine behind, rather sparse, not conspicuous.

Elytra 1.9 times as long as wide, 1.5 times as long as pronotum; sides straight and subparallel on basal two-thirds, rather broadly rounded behind; striae not impressed, the setiferous punctures rather large, deep, separated by a distance equal to less than their own diameters; interstriae as wide as striae, smooth, shining, the punctures fine, sharp, setiferous; basal margins with fine raised line. Declivity rather steep, evenly convex; strial punctures reduced, the sutural row weakly impressed, all rows equal in size to and somewhat confused with those of interspaces. Vestiture similar on disc and declivity, consisting of rather abundant, short, recumbent, hairlike strial and interstrial setae, each hair about twice as long as the width of a strial puncture; and long, erect, interstrial hairlike setae arising from every third to fifth interstrial puncture on interspaces one, three, five, seven and nine.

Male.—Similar to female except frons evenly convex with a narrow transverse impression just above epistomal margin, the frontal vestiture sparse, inconspicuous.

Type locality.— Twelve miles southeast of Matamoros, Puebla, Mexico.

Host.— *Ficus* sp.

Type material.— The female holotype, male allotype and seven paratypes were taken on July 3, 1953, by S. L. Wood, from bark of the same branch of strangler fig that contained the previous species, *reticulatus*.

The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Hexacolus obscurus, n. sp.

This species is somewhat allied to *schwarzi* Hopkins, but is not closely related; it may be distinguished from Hopkins' species by the fine sculpture and the much finer punctures of pronotum and elytra.

Female.— Length 1.3 mm. (paratypes 1.0-1.3), 2.4 times as long as wide; body color brown.

Frons flattened, feebly convex from well above eyes to epistomal margin; oval median area from well below upper level of eyes to just above epistomal margin smooth, shining, impunctate; moderately punctured above to well above upper level of eyes, at sides and above epistoma; vestiture consisting of long, subplumose yellow hairlike setae arising on punctured area above, becoming shorter and less abundant toward epistoma. Eye and antenna as in other species of the genus.

Pronotum about as long as wide; sides almost straight and parallel on basal half, broadly rounded in front; asperities fine, low, rather close, decreasing in size and abundance posteriorly to two-thirds of pronotal length from anterior margin; posterior and lateral areas dull, subrugose-reticulate, the punctures very small and shallow, almost entirely obscured by the irregular surface structures; lateral and basal margins acutely marked by a fine raised line; summit indefinite, on anterior half; glabrous.

Elytra 1.6 times as long as wide 1.7 times as long as pronotum; sides almost straight and subparallel on basal two-thirds, rather narrowly rounded behind; striae not at all impressed, the punctures small, shallow, rather indefinite; interstriae at least twice as wide as striae, rather smooth, shining, with a few minute pores scarcely visible at a magnification of 80 diameters, the usual interstrial punctures entirely absent; basal margins with a fine raised line similar to that of pronotum. Declivity steep, convex; strial punctures reduced in size but deeper than on disc; interstrial punctures minute, not clearly defined. Subglabrous with very minute strial setae and, on declivity, interstrial setae; each seta not longer than a distance equal to the diameter of a strial puncture.

Male.— Similar to female except frons evenly convex, uniformly reticulate and finely punctured, vestiture inconspicuous, hairlike.

Type locality.— Three miles southwest of Martinez de la Torre, Vera Cruz, Mexico.

Type material.— The female holotype, male allotype and 44 paratypes were collected at the type locality on June 26, 1953, from an herbaceous treelike shrub, by S. L. Wood. Galleries were of the radiate type with most of the egg galleries transverse; larval mines paralleled the axis.

The holotype, allotype and some paratypes are in the Snow Entomological Museum; other paratypes are in the collection of the writer.

Microborus Blandford

The monobasic genus *Microborus* was described by Blandford (1897, Biologia Centrali-Americana, Coleoptera 4(6):175) for a single specimen of his species *boops* that was taken in Guatemala. Since its description two additional species, *imitans* and *aberrans* have been added to the genus by Eggers. A recent opportunity to study cotypes of *Pseudocrypturgus camerunus* Eggers, from Africa, makes necessary the addition of a fourth species to the genus. With this transfer of the type species, *camerunus*, the monobasic genus *Pseudocrypturgus* Eggers (1919, Ent. Blatt. 15:236) becomes a synonym of *Microborus*.

Microborus camerunus (Eggers), n. comb.

This is the only representative of the genus known to occur outside of the Neotropical realm. As was suspected several years ago, evidence is now available that suggests it was introduced to Africa from a neotropical area. Two specimens in my collection, unquestionably belonging to this species, were taken at Olanchito and La Ceiba, Honduras. Setae on the lower portion of the declivity of the Olanchito specimen are a little stouter at their bases than those of Eggers cotypes. Two additional specimens tentatively assigned to this species, from Jamaica, are in the U. S. National Museum collection. One of these has the declivital setae as in the Olanchito specimen; in the other, the basally broad setae are more generally distributed on the declivity.

Microborus lautus, n. sp.

This species evidently is more closely allied to *boops* Blandford than to other known representatives of the genus, but may be distinguished by the shining surface of head and pronotum, by the more coarsely, closely, deeply punctured pronotum, and by the slightly smaller size.

Female.— Length 1.5 mm. (paratypes 1.25-1.55), 2.7 times as long as wide; color of eyltra light brown, pronotum dark, head almost black.

Frons rather weakly convex, somewhat flattened below, with a pair of rather short longitudinal calluses extending dorsad from a point between and just above antennal bases; calluses and epistomal margin lighter in color; surface smooth and shining in central and dorsal areas, subreticulate at sides, punctures small, deep, rather sparse, absent on calluses; vestiture short, sparse, inconspicuous. Eye somewhat reniform, the anterior margin almost straight. Antennal club small, devoid of sutures.

Pronotum 1.3 times as long as wide, widest at base; sides straight (or very feebly constricted) and converging slightly on basal three-fourths, weakly, transversely constricted just behind the rather

broadly rounded anterior margin; weakly arched from base to transverse constriction; surface smooth and brightly shining, the punctures moderately large, close, deep, except narrowly impunctate along posterior two-thirds of median line; vestiture consisting of minute, erect, sparse hairlike setae, longer near anterior margin.

Elytra 1.7 times as long as wide; sides almost straight and subparallel on basal three-fourths, rather broadly rounded behind; striae not impressed except the first, the punctures large, close, deep; interstriae very slightly narrower than striae, smooth, shining, the punctures fine, moderately close. Declivity rather steep, convex; striae one and two slightly impressed; posterior third of interspace nine and apex of seven irregularly, rather weakly carinate, the carinae fusing and continuing to costal margin at apex of interspace two; all interspaces bearing a median row of fine rounded granules. Vestiture consisting of rows of hairlike interstrial setae, fine on disc, coarse on declivity, and minute strial setae; interstrial setae on declivity almost as long as a distance equal to space between rows of setae, except longer on interspaces seven and nine.

Male.— Similar in all respects to the female.

Type locality.— Leper Island, San Juan, Puerto Rico.

Host.— *Nerium* sp.

Type material.— The holotype, allotype and seven paratypes were collected at the type locality on May 17, 1935, from dead Oleander twigs, by F. Sein.

The holotype, allotype and four paratypes are in the U. S. National Museum; three paratypes are in the collection of the writer.

Prionosceles glaber, n. sp.

This species is unique in the genus in having the elytra entirely glabrous; the comparatively large size and confused elytral punctures also serve to distinguish it from previously described species.

Male.— Length 2.6 mm. (paratypes 2.4-2.8), 2.1 times as long as wide; color black, antennae and legs somewhat lighter.

Frons broadly, uniformly convex, with a slight transverse impression just above epistomal margin; surface reticulate, the punctures rather fine, deep, moderately close, finer and more abundant on impressed area; vestiture fine, short, inconspicuous except for a rather dense brush of moderately long yellow hair directed orad. Eye elongate, entire; finely granulate. Antennal club small, with two weakly procurved sutures indicated by rows of setae.

Pronotum about as long as wide; sides straight and parallel, then abruptly narrowed to the rather narrowly rounded anterior margin; basal and lateral margins marked by a conspicuous fine raised line; rather strongly arched from basal to anterior margin; surface subshining, obscurely, very finely reticulate; punctures very fine, deep, moderately abundant, appearing subcrenulately wrinkled on anterior fourth; glabrous.

Elytra 1.3 times as long as wide, about 1.4 times as long as pronoutm; sides straight and parallel on basal two-thirds, rather abruptly, broadly rounded behind; striae obscurely indicated on base of disc, the punctures very fine and confused posteriorly with the abundant, confused, interstrial punctures. Tenth interspace costiform to declivity; ninth interspace elevated near declivital base. Declivity steep, convex; positions of striae one and two impressed, interspaces one, two and three convex on middle third; all punctures minute, deep, confused. Elytra entirely glabrous.

Female.— Similar to male except frons broadly flattened on lower two-thirds, impressed just above epistoma, and bearing a conspicuous brush of rather abundant, moderately long, fine, yellow hair uniformly distributed over entire flattened area from just below upper level of eyes of epistomal margin; impressions and elevations of elytral declivity obscure.

Type locality.— Summit, Panama Canal Zone.

Host.— *Cecropia* sp.

Type material.— The male holotype, female allotype and six paratypes were collected at the type locality during October 1946, from dead Cecropia leaf petioles, by N. L. H. Krauss, lot no. 937. Three paratypes bear the same data except they were taken during September, 1946, lot no. 810.

The holotype, allotype and seven paratypes are in the U. S. National Museum; three paratypes are in the collection of the writer.

Prionosceles panamensis, n. sp.

This species is more closely allied to *glaber* than to other known species, but may be distinguished by the smaller size, by the distinctive sculpture of the frons in both sexes, by the impressed striae, and by the more gradual elytral declivity.

Male.— Length 2.3 mm. (paratypes 2.1-2.4), 2.0 times as long as wide; color dark brown.

Frons broadly convex, with lower part of median half bearing a large, conspicuous, almost hemispherical elevation; surface reticulate, the punctures moderately coarse, rather deep and close, more abundant and slightly smaller on lower half including circular area occupied by elevation; vestiture restricted to a few epistomal hairs. Eye elongate, entire; finely granulate. Antennal club as in *glaber*.

Pronotum about as long as wide; sides straight and parallel, then abruptly narrowed to the rather narrowly rounded anterior margin; basal and lateral margins marked by a conspicuous fine raised line; rather strongly arched from basal to anterior margin; surface rather dull, reticulate; punctures very fine, deep, moderately abundant, appearing subcrenulately wrinkled on anterior fourth; glabrous.

Elytra 1.1 times as long as wide, 1.2 times as long as pronotum; sides straight and parallel on slightly less than basal two-thirds,

broadly rounded behind; striae slightly impressed, particularly the first, the punctures small, deep, close; interstriae smooth, shining, about three times as wide as striae, the punctures not more than half as large as those of striae, in rather definite rows at base, confused toward declivital base. Tenth interspace narrowly carinate from base to declivity; ninth interspace similarly raised on part of posterior half. Declivity beginning at basal third, gradual at first, rather steep on lower half, convex; striae one strongly impressed on upper half; all interspaces appearing narrower than on disc, each bearing a row of sparse, rounded granules. Vestiture consisting of sparse rows of short erect yellow hair on lower portion of declivity.

Female.— Similar to male except frons broadly subconcavely impressed, closely, deeply, rather coarsely punctured, and finely pubescent, the setae forming a sparse brush in impressed area.

Type locality.—Summit, Panama Canal Zone.

Host.—*Cecropia* sp.

Type material.— The male holotype, female allotype and seven paratypes were taken at the type locality during October, 1946, from dead Cecropia leaf petioles, by N. L. H. Krauss, lot no. 937. Five additional paratypes bear the same data except they were collected during September, 1946, lot no. 810.

The holotype, allotype and eight paratypes are in the U. S. National Museum; four paratypes are in the collection of the writer.

Eupagiocerus serratus, n. sp.

This species differs conspicuously from those previously known by the coarsely tuberculate elytral declivity.

Male.— Length 2.2 mm., 2.0 times as long as wide; color dark brown.

Frons above antennal bases convex, smooth and polished in central area, reticulate at sides and above, epistomal margin narrowly, weakly elevated with a flattened, rugose-reticulate, sparsely punctured area immediately above; antennal bases connected by a broad, wide, straight, rather high acute carina, subvertical on lower side, moderately sloping, punctured and pubescent on upper side; vestiture moderately abundant, longer and finer below, coarse and relatively short on upper slope of carina, a few setae along lateral margins above. Eye elongate, entire; finely granulate. Antennal scape elongate, bearing a small tuft of long setae; club as in *dentipes* Blandford.

Pronotum about 1.2 times as wide as long, widest at middle; sides almost straight and diverging slightly on basal half, then rather strongly, arcuately narrowed to the broadly rounded anterior margin; surface subshining with minute, rather obscure longitudinal lines in interspacial areas, becoming reticulate laterally and basally, the punctures elongate, rather coarse, close, shallow; glabrous.

Elytra 1.1 times as long as wide; sides straight and parallel on basal two-thirds, posterior profile interrupted by declivital serrations

and a sutural emargination; scutellum circular, convex; anterior margins of elytra acutely elevated along a continuous costa, extending somewhat anteriorly over pronotal base except in scutellar notch; striae impresed, feebly on anterior third, becoming strongly impressed toward declivital margin, the punctures obsolete; interstriae about one and one-half times as wide as striae, flattened basally, becoming strongly convex, almost as high as wide, toward declivity, coarsely reticulate and somewhat irregular on basal third, the punctures fine, confused, sparse on posterior half. Anterior half of side from coxal flange to elevated lateral margin impressed, the impression filled by dense yellow setae.

Declivity steep, flattened; surface granulose-reticulate over both punctures and serrations, strial punctures essentually obsolete, although positions of some punctures indicated; sutural interspace vertically, very strongly elevated, declining in height on lower third, bearing about ten low, posteriorly directed serrations; second interspace with a small pointed serration at declivital base, narrowed, very obscurely raised and unarmed below; third interspace bearing one or two moderately large teeth at declivital base, weakly elevated below and bearing about four serrations, the lower ones sometimes rounded; interspaces four to nine each bearing about two to four rather coarse, posteriorly directed serrations. Vestiture consisting of a few short, fine to coarse setae on declivity.

Female.— Similar to male except frontal carina entirely absent and replaced by a broad, shallow impression; setae on antennal scape less numerous; and declivital sculpture evidently finer.

Type locality.— Paraiso, Panama Canal Zone.

Type material.— The male holotype, female allotype and one female paratype were collected at the type locality on Jan. 25, 1911, by E. A. Schwarz.

The holotype and allotype are in the U. S. National Museum; the paratype is in the collection of the writer.

Hoplitophthorus Wood, corrected spelling

Due to an unfortunate error that occurred in printing the original description of this genus it became necessary to reset the type for part of the paper without my knowledge that it was to be done. As a result the name was incorrectly spelled as "*Hoplitoplithorus*" (Wood, 1961, Great Basin Nat. 21 (1-2):2), instead of *Hoplitophthorus* as indicated in the manuscript and on type labels. To give meaning to the name and to avoid confusion with printed type labels this correction is necessary. The antennal funicle in all four species now included in the genus consists of six segments, not seven as originally reported.

Hoplitophthorus major (Eggers), n. comb.

Following the description of the genus a cotype of *Hoplites major* Eggers (1940, Arb. Morph. u. Tax. Ent. 7:125) was examined and

found to possess the characters of this genus rather than those of the genus to which it had been assigned by Eggers.

Hoplitophthorus boliviae, n. sp.

This species is allied to *major* (Eggers), but is readily distinguished by the presence of a large, impunctate frontal bulla, and by the more finely tuberculate elytral declivity.

Holotype.— Length 1.9 mm., 2.5 times as long as wide; color testaceous, prothorax a slightly darker reddish brown.

Frons convex, transversely impressed just above the rather broad, almost smooth epistomal margin, with a large, smooth, shining, impunctate bulla occupying median half between upper limits of eyes; surface, except on median elevation, subreticulate, with rather large, shallow, moderately close punctures; epistomal margin with a short, obtuse median lobe extending in front of mandibles; vestiture short, inconspicuous except toward epistomal area. Eye shallowly, broadly emarginate; coarsely granulate. Antennal funicle six-segmented; club as in *sentosus*.

Pronotum very slightly wider than long; widest at base, sides almost straight on posterior half, converging slightly toward the broadly rounded anterior margin; surface with faint indications of reticulation, punctures moderately large, rather shallow, moderately close; almost glabrous.

Elytra 1.8 times as long as wide, 2.0 times as long as pronotum; sides straight and parallel on basal three-fourths, broadly rounded behind; scutellum very small; crenulations at bases broad, low, very poorly defined; striae not impressed, the punctures rather small, close; interstriae about one and one-half times as wide as striae, shining, somewhat wrinkled transversely, the punctures in rows, rather large, shallow, close, separated by distances slightly greater than their own diameters. Declivity very steep, convex; striae not at all impressed, all interstriae sparsely tuberculate, tubercles separated by spaces equal to width of an interspace, those on one fine; interspaces six and eight each bearing one or two tubercles; ninth interspace without a continuous costa, and not curved to meet costal margin. Vestiture consisting of sparse, short, interstrial bristles arising from posterior margins of declivital tubercles.

The sexes indistinguishable in the material at hand.

Type locality.— Route between "Boyuibe to Charagua via Cueva, Ingri, etc., Bolivia."

Type material.— The holotype, presumably a female, and four partly damaged paratypes were taken at the type locality between July 15 and Sept. 1, 1920, by G. L. Harrington.

The holotype and two paratypes are in the U. S. National Museum; the other two paratypes are in the collection of the writer.

Hoplitophthorus cubensis, n. sp.

This species is allied to *sentosus* Wood, but is much smaller, has the discal interstriae of the elytra more irregular, with larger punctures, and has smaller tubercles and longer vestiture on the elytral declivity.

Holotype.— Length 1.5 mm., 2.4 times as long as wide; color reddish brown.

Frons rather strongly convex above, with a transverse impression just above the broad, almost smooth epistomal margin; epistomal margin with an obtuse lobe projecting in front of mandibles; surface smooth, shining, the punctures coarse, deep, rather close. Eye shallowly emarginate; coarsely granulate. Both antennae and one foreleg removed and mounted previously (not at hand for description).

Pronotum very slightly wider than long, widest at base; sides weakly arcuate, converging slightly toward the broadly rounded anterior margin; surface smooth and shining, the punctures coarse, deep, close; almost glabrous.

Elytra 1.5 times as long as wide, 1.8 times as long as pronotum; sides straight and parallel on basal three-fourths, broadly rounded behind; scutellum very small; crenulations broad, low, poorly defined; striae not impressed, the punctures very large, close; interstriae distinctly narrower than striae, subcrenulate toward bases, becoming smooth behind, shining, the punctures rather small, close. Declivity very steep, convex; strial punctures somewhat smaller than on disc, second interspace impressed, the first raised; second interspace narrower than one or three and devoid of tubercles, others each with a few rather small tubercles, those on nine not joined to form a continuous costa which curves to join costal margin near apex of third interspace. Vestiture sparse, confined to declivity, consisting of rather long, slender hairlike setae.

Type locality.— Cayamas, Cuba.

Type material.—The unique holotype, presumably a female, was taken at the type locality by E. A. Schwarz, lot no. 483. It also bears printed labels "Leg mounted" and "Antenna mounted," and the manuscript names *Dolurgides* of Hopkins and *Gonoderus cubensis* of Blackman.

The holotype is in the U. S. National Museum.

NEW TINGIDAE FROM SOUTH INDIA (HEMIPTERA)

Carl J. Drake[1] and M. Mohanasundarum[2]

The present paper describes three new species of lacebugs from Coimbatore, South India. A species of tingid is also recorded for the first time as a pest of the rice plant. The illustrations were made by Elinor Stromberg, Washington, D. C., and Patricia Hogue, Arlington, Virginia. The types of the new species are in the Drake Collection (U. S. National Museum) and paratypes in the collections of both authors.

Naochila arete, n. sp.

Small, oblong. Head black, dorsal spines pale testaceous; inferior margin of bucculae brownish. Antennae testaceous, fourth segment mostly blackish. Legs testaceous, tips of tarsi brown or fuscous. Pronotum dark fuscous, collar and fore part of inflated paranota grayish testaceous. Body beneath black-fuscous, shining. Elytron with veinlets mostly brownish or dark fuscous, outer marginal vein mostly testaceous. Areolae clear, partly clouded with fuscous in discoidal and sutural areas (fig. 1). Length (male) 2.45 mm., (female) 2.50 mm., width (elytra) about 1.00 mm.

Head very short, little produced in front of eyes, dorsal spines short, appressed. Antennae slender, clothed with short pale pubescence, fourth segment with longer hairs, measurements: segment I, 0.10 mm.; II, 0.08 mm.; III, 0.75 mm.; IV, 0.32 mm. Labium not quite reaching to base of mesosternum; laminae of rostral sulcus uniseriate, channel narrow on mesosternum, much wider and cordate on metasternum. Ostiole and ostiolar sulcus not visible.

Pronotum almost entirely concealed by the large, reflexed, inflated paranota, carinae mostly concealed by reflexed paranota. The carinae low, visible on hind process of pronotum; collar raised, almost truncate in front, slightly raised at middle so as to form a small hood. Elytra slightly wider across apices of discoidal areas than pronotum at humeral angles. The sutural areas overlapping each other in repose; costal area uniseriate, with large clear areolae; subcostal area bi- or triseriate in widest part opposite apex of discoidal area; discoidal area apically with outer boundary vein extending concavely into subcostal area, widest near apex, there three areolae deep. Hypocostal lamina uniseriate. Hind pair of wings clouded with fuscous. Legs slender, femora only slightly swollen.

Holotype (male) and *allotype* (female), brachypterous, Coimbatore, South India, on *Cordia* sp., M. M. Sundaram. *Paratypes*: 7 specimens, same labels as type, and 4 specimens, same locality, 8.viii.1960. Numerous nymphs were also found on *Cordia* with the adults.

1. Smithsonian Institution, Washington, D. C.
2. Parasite Breeding Centre, Udanguida, India.

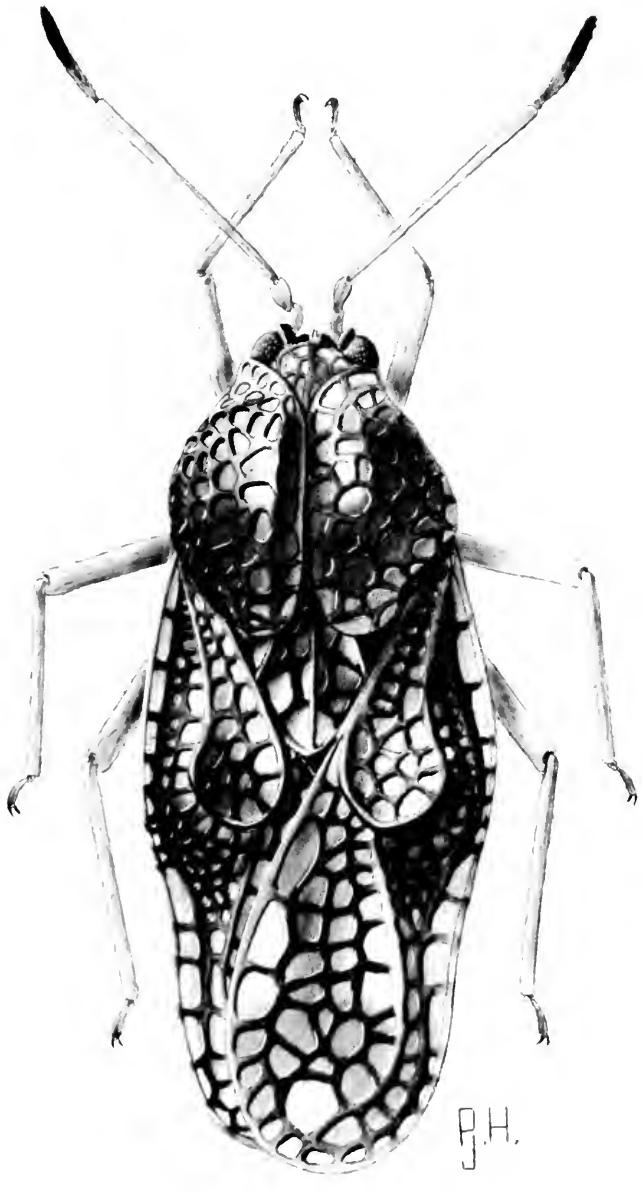

Fig. 1. *Naochila arete*, n. sp.

Separated from *N. sufflata* (Drake and Poor) by its larger size, longer appendages, reflexed paranota more inflated, and wider costal area with larger areolae.

Perissonemia ecmeles, n. sp.

Oblong, testaceous-brown to mostly dark brown, head and pronotum reddish brown, usually with a fairly large rounded spot in discoidal and a longitudinal strip in sutural area blackish; calli impressed, black-fuscous; bucculae testaceous to brown, body beneath blackish fuscous, moderately clothed with short yellowish or grayish pubescence. Antenna long, slender, blackish fuscous with basal segment mostly brown, rather densely clothed with short, yellowish or

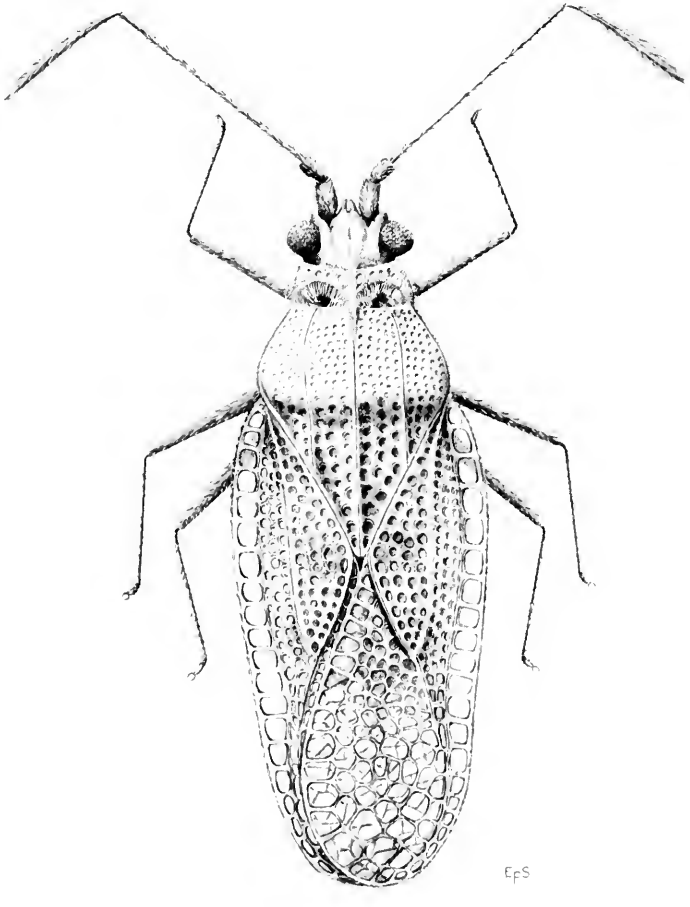

Fig. 2. *Perissonemia ecmeles*, n. sp.

grayish pubescence. Legs long, slender, brownish with tarsi blackish, sparsely clothed with short grayish pubescence. Eyes moderately large, blackish. Head, calli, and posterior projection of pronotum often with some whitish exudate. Dorsal surface sparsely clothed with fine, inconspicuous, yellowish pubescence. Length 3.40-3.70 mm., width (elytra) 1.25-1.35 mm.

Head very short, slightly produced in front of eyes, with median longitudinal sulcus, unarmed or armed with a pair of short frontal spines; bucculae areolate, closed or nearly closed in front; labium brownish, nearly reaching base of mesosternum; laminae of rostral sulcus low, indistinctly areolate, open at base. Antennae long, slender, fourth segment scarcely thicker than the third, measurements: segment I, 0.20 mm.; II, 0.12 mm.; III, 1.25 mm.; IV, 0.75 mm. Metathoracic scent glands without distinct ostiole and ostiolar canal on each metapleuron. Hypocostal lamina composed of one row of areolae.

Pronotum moderately convex across humeri, punctate, areolate on hind projection, tricarinate; median carina prominent, percurrent, without areolae; lateral carinae distinct, less raised than median, parallel, terminating anteriorly at calli; pronotum cariniform, narrow, slightly wider opposite calli, there usually with a couple of narrow cells; collar raised, truncate in front, without hood.

Elytra extending beyond apex of abdomen, scarcely wider in widest part than pronotum across humeral angles, sutural areas overlapping in repose; costal area composed mostly of three rows of nearly rounded aerolae, discoidal area scarcely attaining middle of elytra, acutely angulate at base and apex, widest near middle, there four areolae deep. Hind wings shorter than elytra, clouded with fuscous.

Holotype (male), *allotype* (female), macropterous, on *Ficus* sp., Coimbatore, India, 12.X.1960. *Paratypes*: 8 specimens, each bearing some locality label as type; 2 specimens, 8.X.1961; 2 specimens, 8.VIII.1961; and 2 specimens 8.VIII.1960.

Separated from *P. kietana* Drake and Ruhoff of the Solomon Islands by the less elevated and non-areolate median carina and the narrower paranota. The median carina is uniseriate in *kietana*.

Stephanitis charieis, n. sp.

Small, oblong, body beneath and above brownish, veinlets pale testaceous, areolae hyaline, iridescent. Appendages pale testaceous. Length 3.10 mm., width (across paranota) 1.10 mm. and (near apices of elytra) 1.65 mm.

Head very short, concealed (save eyes) by hood, armed with five pale spines; occipital spines very long, appressed, the three frontal spines much shorter, porrect; bucculae areolate, closed in front, mostly two areolae deep, three deep behind. Rostrum brownish, extending beyond middle of metasternum; sternal laminae of labial

sulcus composed of one row of fairly large areolae, with large V-shaped opening at base. Antennae very long, slender, clothed with short, inconspicuous pubescence, fourth segment with longer hairs, measurements: segment I, 0.30 mm.; II, 0.10 mm.; III, 1.25 mm.; IV, 0.56 mm.

Pronotum finely punctate, with backward projecting process very narrow, tapering and areolate; hood moderately large, inflated basally, thence anteriorly tapering, with apex slightly surpassing first antennal segment, basal length less than that of median carina (50:60); median carina strongly foliaceous, biseriate, basal row of areolae very large, superior margin distinctly convex at highest

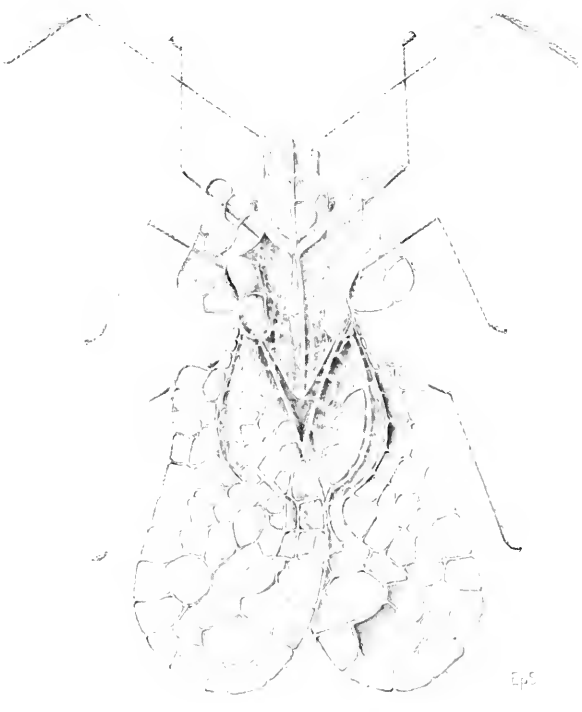

Fig. 3. *Stephanitis charleis*, n. sp.

point, slightly higher than the crest of hood (22:17); lateral carina conchate, present on hind part of pronotal disc, but absent on triangular process, two-thirds as high as median carina, composed of two large areolae; paranotum large, nearly rectangular, slightly reflexed, mostly triseriate, areolae large. Outer margins of paranota and elytra finely serrate. Veins of elytra and pronotal projections without cilia or long hairs.

Elytra considerably wider and much longer than abdomen, slightly divergent apically, with apices distinctly separated from each other; costal area wide, four areolae deep in widest part; boundary vein separating discoidal and sutural areas distinctly raised so as to form a small inflation; discoidal area scarcely reaching to the middle of elytron, usually three areolae deep in widest part; surface of subcostal area opposite discoidal area nearly erect.

Holotype (male), *allotype* (female), and 12 *paratypes*, all macropterous, Coimbatore, South India, 1.I.1961, on leaves of Jack tree, *Artocarpus integrifolia*. Nymphs were also taken with the adults.

This species belongs to the subgenus *Menodora* Horváth of *Stephanitis*. It can be separated from *S. formosa* Horváth, *S. sondaica* Horváth and *S. kardia* Drake and Ruhoff by the obsence of cilia and long hairs on the veins of elytra and pronotal projections, especially on the outer margins of the paranota and elytra.

Bako malayanus (Drake)

Galeotingis malayana Drake, 1947, Bol. Mus. Nat. (Brasil), no. 81, p. 2.

Many nymphs and adults, Coimbatore, South India, VII-VIII, 1960, taken on fodder grasses (*Panicum repens*, *Cynadon dactylon*, and *Cenchurus glaucus*) and paddy seedlings of cultivated rice (*Oriza sativa*). This is the first record of a tingid living and breeding on rice plants.

In addition to southern India, we have specimens from the Federation of Malaya (type specimens from Perit) and Philippine Islands (Manila). *B. malayanus* is similar in general aspect to *B. lebruni* Schouteden from the Congo, Africa, and differs from it largely by its slightly smaller size, thinner veins of the reticulation, smaller hood, and less abruptly expanded elytron at base. More specimens from Africa are needed to clarify the specific status of these two species.

INDEX TO VOLUME XXI

The new genera and species described in this volume appear in bold type in this index.