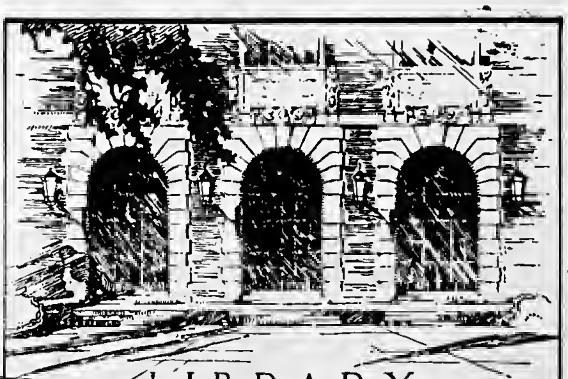


The Coleopterists' Bulletin

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

VOLUME 11, 1957

Published by THE DEPARTMENT OF BIOLOGY
SAINT JOHN FISHER COLLEGE
ROCHESTER, NEW YORK

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by the Department of Biology, Saint John Fisher College, Rochester, New York, and edited by Ross H. Arnett, Jr. Head, Department of Biology, and Associate Professor of Biology, Saint John Fisher College. It is issued six times a year beginning with February.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of that volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: Vol. 4, $5.00; Vol. 5, $4.50; Vol. 6 (4 nos. only published), $2.50; Vols. 7 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid.

Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Separates of articles torn from the issues will be supplied free. 100 copies are reserved for this purpose and will be supplied equally between the authors according to the way the issue is made up. The number of copies to each author will vary from 50 to 100 in most cases. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and in most cases, descriptions of new species must be illustrated. Descriptions of new species or genera must contain keys or be correlated with existing keys. Photographs, with or without text, suitable for printing on the front cover of each issue are desired.

TABLE OF CONTENTS

Volume 11, 1957

ARNETT, R. H., JR., Contribution towards a monograph of the Oedemeridae. 12. The oedemerid beetles of Jamaica 1

BOYLE, W. W., The use of wetting agents in Coleopterology 40

CARTWRIGHT, O. L., Records of *Strigoderma teapensis* Bates from the United States (Scarabaeidae) 32

CARTWRIGHT, O. L., Three new American *Aphodius* with notes and a key to related species (Scarabaeidae) 55

DEATH NOTICE 64

DIETRICH, H., *Harpalus puncticeps* Steph. on Long Island, N. Y. 46

EDWARDS, J. G., Entomology above timberline: II. The attraction of Ladybird beetles to mountain tops 41

FORBES, W. T. M., Notes on the Coleoptera Myxophaga 12

HATCH, M. H., A biographical memoir of the Rev. John Henry Keen 62

HATCH, M. H., The North American status of *Meligethes nigrescens* Steph. (Nitidulidae) 65

HURD, P. D., JR., (see Linsley, E. G.)

KISSINGER, D. G., Studies on North American *Apion* with descriptions of two new species (Curculionidae) 17

KISSINGER, D. J., A new name for *Zaglyptus* LeConte, 1876 (not Forster, 1868) and a review of the North American species (Curculionidae, Baridinae) 47

KISSINGER, D. G., Studies on the North American *Apion*: the *Apion nodicorne* Group (Curculionidae) 71

LEECH, H. B., Distribution records for *Grypidius leechi* (Curculionidae) 78

LINSLEY, E. G., and HURD, P. D., JR., *Melanophila* beetles at cement plants in southern California (Buprestidae) 9

LINSLEY, E. G., New subspecies of Cerambycidae mostly from Southwestern United States 33

LINSLEY, E. G., Cerambycidae from Mexico and Southwestern United States 37

LINDROTH, C. H., The best method for killing and preserving beetles 95

MARSHALL, M. Y., Studies in the Malachiidae VII 13

NEW BOOKS 39

ROZEN, J. G., JR., Biological notes on *Eucrada humeralis* (Melsheimer) (Anobiidae) 53

SANDERSON, M. W., The Paul N. Musgrave collection of Dryopoidea 16

SELANDER, R. B., A new *Nemognatha* from southern Mexico (Meloidae) 25

TENTH INTERNATIONAL CONGRESS OF ENTOMOLOGY 52

VALENTINE, B. D. and B. S., Some injurious weevils in Haiti (Curculionidae) 29

WARD'S TO MAIL COLEOPTERISTS' BULLETIN 96

YOUNG, F. N., Notes on the habits of *Plusiotis gloriosa* LeConte (Scarabaeidae) 67

YOUNG, F. N., Review of "The Polish species of the genus *Rhantus* DeJean (Coleoptera: Dytiscidae)" 94

ZIMMERMAN, E. C., *Miocalles* and *Microcryptorhynchus* (Curculionidae: Cryptorhynchinae) 79

LIST OF NEW TAXA DESCRIBED IN VOLUME 11

Alloxacis spinosus Arnett, new species (Oedemeridae) 3
Aphodius bottimeri Cartwright, new species (Scarabaeidae) 56
Aphodius lodingi Cartwright, new species (Scarabaeidae) 59
Aphodius pseudabusus Cartwright, new species (Scarabaeidae) 60
Apion buchanani Kissinger, new species (Curculionidae) 73
Apion expilator Kissinger, new species (Curculionidae) 75
Apion neocoxale Kissinger, new species (Curculionidae) 21
Apion occiduum Kissinger, new species (Curculionidae) 23
Apion saginans Kissinger, new species (Curculionidae) 72
Batyle ignicollis australis Linsley. new subspecies (Cerambycidae) 33
Batyle suturalis infuscatus Linsley, new subspecies (Cerambycidae) 33
Batyle suturalis melanicollis Linsley, new subspecies (Cerambycidae) 34
Buchananius Kissinger, new name (Curculionidae) 47
Buchananius neglectus Kissinger, new species (Curculionidae 48
Endeodes terminalis Marshall, new species (Malachiidae) 13
Euderces fenyesi Linsley, new species (Cerambycidae) 37
Euderces picipes occidentalis Linsley, new subspecies (Cerambycidae) 38
Hylobius, "new species," Valentine and Valentine (Curculionidae) 29
Miocalles setigerus Zimmerman, new name (Curculionidae) 87
Nemognatha selloa Selander, new species (Meloidae) 25
Neoclytus mucronatus vogti Linsley, new subspecies (Cerambycidae) 35
Oxycopis Arnett, raised to genus (Oedemeridae) 5
Oxycopis barberi Arnett, new species (Odemeridae) 5
Paroxacis Arnett, raised to genus (Oedemeridae) 2
Tragidion armatum brevipenne Linsley, new subspecies (Cerambycidae) 33
Tragidion dichromatium Linsley, new species (Cerambycidae) 38
Tylosis puncticollis arizonicus Linsley, new subspecies (Cerambycidae) 34
Tylosis puncticollis hilaris Linsley, new species (Cerambycidae) 34
Xylotrechus bowditchi hoppingi Linsley, new subspecies (Cerambycidae) 35

DATES OF PUBLICATION

Volume 11, 1957

Spring and Summer Issue, September 7, 1957

Fall and Winter Issue, March 24, 1958

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XI | Spring and Summer | 1957

Published quarterly beginning with March by the DEPARTMENT OF BIOLOGY, SAINT JOHN FISHER COLLEGE, Rochester 18, New York. Terms of subscription: $5.00 per year, both domestic and foreign, payable in advance. Back numbers are available.

CONTRIBUTION TOWARDS A MONOGRAPH OF THE OEDEMERIDAE
12. THE OEDEMERID BEETLES OF JAMAICA[1]

By ROSS H. ARNETT, JR.[2,3]

The Oedemeridae of Jamaica show the typical island faunal picture, that of a few representatives of what appear to be the more recent genera. There is nothing to indicate a relic fauna, but rather, recent invasions. The nine species herein described or redescribed are confined to the West Indies with the exception of *Oxycopis falli* (Blatchley) which extends no farther north than the southern tip of Florida, which for all essential purposes, must be considered a part of the West Indies; *Alloxacis costata* (Champion) which is widely distributed throughout Central America and into the United States, probably in banana shipments, and *Oxycopis thoracica* (Fab.) which is common in eastern United States and has extended south through the Greater Antilles. There are no oedermerids now known to be confined to Jamaica. I have seen material of all these species from Jamaica, with the exception of *Oxycopis lineata* (Waterhouse), and this I know from the Dominican Republic.

Key to the Jamaican Oedemeridae

1. Claws each with a small tooth near the base 2
   Claws without a tooth at the base, at most sharply angular (Oxycopis) 4
2. Right mandible only with a small subapical bifurcation (Alloxacis) 3
   Mandibles acute at the apices (Paroxacis). .... **albomarginata** (Pic)
3. Pale testaceous with a narrow lateral brown to piceous stripe on each elytron .... **costata** (Champ.)
   Pale except for elytra which are dark with pale markings .... **spinosus**, n. sp.

---

[1]The previous part of this series, part 11, will be published in the Proceedings of the Tenth International Congress of Entomology.

[2] St. John Fisher College, Rochester, N. Y., U.S.A.

[3] I am indebted to the following for the loan of material, to whom I extend my sincere thanks: Drs. C. Bernard Lewis, Science Museum, Institute of Jamaica; J. F. Gates Clarke, United States National Museum; Mont A. Cazier, American Museum of Natural History, P. J. Darlington, Jr., Museum of Comparative Zoology, and H. F. Strohecker, University of Miami.

4. Dark shining species with light pale margins at most on elytra, and paler legs 5
   More extensive pale markings. 6
5. Entirely piceous except for a somewhat paler sutural and lateral stripe on each elytron and sometimes with reddish-piceous legs .... **falli** (Blatch.)
   Dark bluish-green, shining, with white pubescence in the form of three narrow stripes on the elytra .... **lineata** (Waterh.)
6. Pronotum with a median longitudinal stripe .... **barberi**, n. sp.
   Pronotum immaculate 7
7. Elytra dark, immaculate .... **thoracica** (Fab.)
   Elytra dark, with longitudinal markings 8
8. Sutural stripe of the elytra broad, equal to one-half or more the width of the elytra .... **vittata** (Fab.)
   Sutural stripe narrow, at most only slightly wider than the sutural costa .... **tenella** (Waterh).

For a definition of the genera found in Jamaica, see my Nearctic revision (1951, American Midl. Nat., 45:257-391). The subgenera *Oxycopis* and *Paroxacis,* treated in my previous papers as subgenera of *Oxacis,* are herein given generic status. This is done in the light of recent generic studies not yet published. At the time of the Nearctic study it was felt that these subgenera were not sufficiently well known to give them full generic status. It now appears that greater consistency is achieved by considering these groups of equal status with such genera as *Alloxacis,* etc.

Paroxacis Arnett

Oxacis subgenus *Paroxacis* Arnett, 1951. American Midl. Nat., 45: 334.
This subgenus is hereby raised to generic status.

Paroxacis albomarginata (Pic)

Copidita albomarginata Pic, 1934. Mél. Exot.-Ent., 63: 21.
Type locality: "St. Dominque."

Pic's description, translated, reads: "Oblong-elongate, somewhat shiny, black, head and thorax reddish, elytra bluish, margins [of elytra] narrowly white pubescent, appendages black, tibiae at the base pale reddish; head and thorax very finely and somewhat densely punctate; elytra densely rugose punctate. Length 7 mm. St. Dominque. Related to *rubricollis* Wat., but less robust with the head reddish."

This species is close to *P. recendita* Arnett both in coloration and in the male genitalia. It may be readily separated from that species however, by the dark thorax and the narrower elytral stripes, and by the lack of tubercules at the base of the bifurcation of the paramere.

Description of the species.—Head as long as broad, including the mandibles; rugose punctate, punctures deep, oblong, space between the punctures greater than the width of the punctures, micro-rugose. Antennae with each segment six times as long as broad, second segment one-fourth the length of the basal segment. Eyes moderately small, separated dorsally by a distance greater than the width at dorsal view, slightly emarginate near the point of insertion of the antennae. Mandibles long, curved, entire, with apices sub-acute. Maxillary palpi cultiform, widest near basal third.

Prothorax subcordate, widest subapically, evenly narrowed to base; surface similar to head, but more finely and shallowly punctate, space between punctures micro-rugose. Legs normal for the genus, claws with an acute tooth at base of each. Elytral surface similar to thorax, but still more finely punctate.

Abdomen with the ventral surface minutely rugose.

Pubescence coarse, long, white, heaviest on head and clypeus.

Color basically piceous with reddish tinge on head and thorax; legs paler, reddish, sometimes nearly testaceous, except at basal three-quarter of femora which are always pale, nearly testaceous; suture and margin of each elytron with a narrow pale stripe.

Length: 7-13 mm.

Male genitalia: Normal for the genus; the median lobe is sinuate, close to *P. recendita* Arnett, but not angular at apex; parameres also similar but lack tubercle at base of each lateral lobe.

Distribution.—Jamaica, Haiti, and the Dominican Republic.

Larvae: unknown.

Biology: unknown.

Material examined.—7: Jamaica, St. Thomas, 1, Bath, 2; Portland, Port Antonio, 1; Haiti, St. Maro, 1, Hinche, 1; Dominican Republic, San Francisco Mts., 2.

Alloxacis Horn

Alloxacis Horn, 1896. Proc. Calif. Acad. Sci., (2), 6: 395.

Alloxacis spinosus, new species

In external appearance this species closely resembles *A. megateles* Arnett, but lacks the piceous staining on the pronotum. It may be separated from *A. megateles*, to which it keys in Arnett (1951), by the immaculate pronotum. The male genitalia readily separate these two species. The paramere lacks the very heavy lateral lobes found in *A. megateles.*

Holotype.—Male, Mandeville, Jamaica (A. E. Wright) [Deposited in the Museum of Comparative Zoology collection.]

Description of the species.—Head elongate, somewhat longer than wide; surface shallowly punctate, punctures not well formed, area between punctures greater than width of punctures, surface between punctures micro-rugose. Antennae with the second segment one-quarter to one-third the length of the third segment, each segment four times as long as wide. Eyes set farther apart than the width of the eyes at dorsal view; slightly emarginate near point of insertion of the antennae. Mandibles long, curved, apices subacute, right mandible with an apical bifurcation. Maxillary palpi with the apical segment triangular, widest beyond the basal third.

Thorax very slightly longer than wide . Surface of the pronotum shallowly punctate, similar to the head; two shallow anterior-lateral depressions, and one median posterior depression. Sternum finely rugose-punctate. Legs normal for the genus, claws each with a well developed tooth at base. Elytra finely rugose-punctate, costae obscure.

Abdominal sternum very finely rugose.

Pubescence very fine, short, decumbent, golden.

Color testaceous with piceous staining on palpi, segments of the antennae, meso- and meta-sternum, and abdominal sternum (the latter variable), pale to piceous stained; elytra bluish-piceous with sutural pale stripe, distinctly demarked, and a very narrow, pale marginal stripe, the latter may be nearly absent.

Length: 6-9 mm.

Male genitalia: Eighth sternite with many large, heavy spines. Paramere short, heavy at base; median lobe sub-spatulate.

Distribution.—Jamaica and Bahamas.

Larvae: unknown.

Biology: unknown.

Material examined.—48: Jamaica, no further data, 3, Mandeville, 2 (1 designated Holotype), Ocho Rios, 1, North Coast, 6, St. Ann, Sebilli, 1, St. Andrew, Irish Town, 1, Portland, Port Antonio, 18, St. Ann, Dry Harbor, Discovery Bay, 7, St. Thomas, Bowden, 1, Westmoreland, White House Inn, 1; Bahamas, South Caicos, nr. Cockburn Harbour, 6, Grand Turk, 1. (All specimens (except Holotype) designated as Paratypes.)

Alloxacis costata (Champion)

Copidita costata Champion, 1896. Trans. Ent. Soc. London 1896: 40.

This species resembles *A. floridana* Horn, but the flattened appearance and the submarginal dark stripe, as well as many differences in the male genitalia readily separate the two.

Type.—British Museum (Natural History), 1 specimen.

Type locality.—"? St. Vincent" (Champion questions locality.)

Description of the species.—Head slightly longer than broad, surface shallowly punctate, punctures poorly defined, set apart by a distance equal to the width of the punctures, surface between punctures micro-rugose. Antennae with the second segment one-fourth the length of the third, each segment four times as long as broad. Eyes set wide apart, nearly twice as far apart as width at dorsal view, emarginate near point of insertion of the antennae. Mandibles curved, acute at apices, right mandible bifid at apex. Maxillary palpi with the apical segment subtriangular, widest beyond the basal one-third.

Thorax as broad as long, widest at apical third, constricted moderately sharply behind middle. Surface of the pronotum flat, very shallowly punctate, punctures poorly defined, surface between the punctures sub-rugose. Sternum shiny, sub-rugose. Legs with the femora stout for the genus, claws each acutely toothed at the base. Elytra broad, flat, with four evident costae; surface rugose punctate, shining.

Ventral surface of the abdomen sub-rugose.

Pubescence short, fine, decumbent, golden.

Color entirely testaceous, except for a prominent submarginal brown stripe, rarely obscure, on each elytron, and variable lateral brown staining on the pronotum.

Length: 6-8 mm.

Male genitalia: Ninth sternite heavily spinose; paramere with long setae at the apices of the lateral lobes; median lobe broad and spatulate at the apex.

Larvae: unknown.

Biology: collected in banana debris at United States ports, and at light.

Distribution.—St. Vincent(?), Jamaica, Dominican Republic, Cuba, Florida, Virginia, Maryland, Alabama, Mexico, Guatemala, Honduras, Nicaragua, and Panama. This is a new record for the Nearctic Region.

Material examined.—38: Jamaica, Ocho Rios, 1, Pt. Antonio, 1 St. Ann, Dry Harbour, Discovery Bay, 1; Dominican Republic, Sanchez, 1; Cuba, Chirrivico, 1; Florida, Baldwin, 1; Virginia, Deep Creek, 1; Maryland, Piney Point, 1; Alabama (see Nicaragua); Mexico, Vera Cruz, Tecolutla, 4; Guatemala, at light on ship, 1; Honduras, La Ceiba, 2, Pta. Cortez, 1; Nicaragua, cargo intercepted at Mobile, Alabama, 1; Panama, Porto Bello, 17, San Jose, Perlas Isl., 4.

Oxycopis Arnett

Oxacis subgenus *Oxycopis* Arnett, 1951. American Midl. Nat., 45: 318.

This subgenus is hereby raised to generic status.

Oxycopis barberi, new species

This species resembles *O. mcdonaldi* Arnett, but it may be easily separated from that species by the broad pale sutural stripe on the elytra. It is named after the late H. S. Barber of the United States Department of Agriculture, who realized this was a new species as long ago as 1911 when the first specimens came to the United States National Museum.

Holotype: Male, Grand Cayman, Jamaica (Dr. Grabham) [Deposited in the United States National Museum.]

Description of the species.—Head slightly longer than broad, surface shallowly punctate, the punctures separated by a distance greater than their width, space between micro-rugose. Antennae with the second segment nearly one-half the length of the third segment, each segment five times as long as broad. Eyes set far apart, nearly two times as far apart as the width of the eyes at dorsal view; emarginate near point of insertion of antennae. Mandibles stout, curved, acute at apices, each bifid at apices. Maxillary palpi cultriform, widest at center, sides parallel for one-half the length at center.

Thorax subcordate, widest near shoulders, sides gradually tapering towards the base. Pronotum punctation similar to that of the head, punctures slightly larger. Sternum micro-rugose. Legs normal for the genus, claws without basal tooth. Elytra rugose, costae onscure.

Abdomen beneath subrugose.

Pubescence medium course, semi-erect, moderately long, white.

Color predominately metallic greenish-blue, with pale testaceous markings; pronotum pale with a median longitudinal stripe and with or without lateral piceous spots; clypeus pale; broad sutural area pale; tibiae and tarsi pale; femora variable, pale, or piceous stained.

Length: 5-7 mm.

Male genitalia: the median lobe and parameres resemble those of the genus *Oxacis* and a basal apodeme is present on the median lobe. No trace of a tegminite can be found. This places this species close to *Oxycopis falli* and both species are closely related to the genus *Oxacis*.

Larvae: unknown.

Biology: Dr. Grabham says on locality labels "blistering beetles."

DISTRIBUTION.—Jamaica.

MATERIAL EXAMINED.—29: Jamaica, Grand Cayman, 19, St. Andrew, Swallowfield, 10. [Designated as Holotype, and Paratypes.]

Oxycopis vittata (Fabricius)

Lagria vittata Fabricius, 1775. Systema entomologiae, p. 125.
Type locality.—"America."
Copidita lateralis Waterhouse, 1878. Trans. Ent. Soc. London, 1878: 307.
Type locality.—Santo Domingo.
Oxacis (*Oxycopis*) *vittata* (Fabricius), Arnett, 1953. American Mus. Novit., no. 1646, p. 4.

This species can be readily separated from *O. suturalis* (Horn), which it closely resembles, by the shape of the apical segment of the maxillary palpus, each palpus having the apical segment widest near the base in *O. suturalis* and widest apically (i.e., beyond the middle) in *O. vittata*, and by the punctuation of the pronotum, the punctures being large and closely placed in *O. suturalis*, and sparse and widely separated in *O. vittata*. It also resembles the following species, *O. tenella*, but may be separated by the features discussed under the species below. Refer to Arnett, 1953, for a full description of this species.

DISTRIBUTION.—Bahamas, Cuba, Jamaica, Hispaniola, Puerto Rico, Virgin Islands, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, and Grenada.

MATERIAL EXAMINED.—31: Jamaica, 3, Mandeville, 6, Pt. Antonio, 8, Bluefield Bay, 1, St. Andrew, Swallowfield, 2, Manchester, Christiana, 1, Clarendon, Portland Ridge, 1, St. Ann, Dry Harbour, Discovery Bay, 2; Grand Cayman Isl., (North side), 2.

Oxycopis tenella (Waterhouse)

Copidita tenella Waterhouse, 1878. Trans. Ent. Soc. London, 1878: 307.

This species is close to *O. vittata*, but may be readily separated by the absence of the broad sutural stripe; also this species has the pronotum widest at the shoulders, whereas *O. vittata* has the widest portion noticeably more basal; vestiture coarser and more erect compared with *O. vittata*.

Type.—British Museum (Natural History).

Type locality.—St. Thomas.

DESCRIPTION OF THE SPECIES.—Head as long as broad, punctures moderate, surface between punctures moderately rugose. Antennae with the second segment about one-third the length of the third segment; each segment four times as long as wide. Eyes large, set apart about the same distance as width at dorsal view. Mandibles stout, curved, apices acute, each bifid at the apex. Maxillary palpi with the apical segment triangular, widest slightly basal to the center.

Thorax slightly wider than long, sub-cordate, widest at shoulders, gradually tapering basad, sides slightly sinuate. Pronotum with the surface similar to the head with slightly deeper punctures. Sternum rugose-punctate. Legs normal for the genus, claws without basal booth. Elytra surface rugose, costae moderate.

Abdomen with the ventral surface rugose.

Pubescence long, moderately coarse, sub-erect, pale golden; denser and longer on the elytra.

Color testaceous except elytra which are bluish-piceous, with narrow sutural, and extremely narrow marginal pale stripe.

Length: 7-10 mm.

Male unknown.

Larvae: unknown.

Biology: unknown.

DISTRIBUTION.— St. Thomas, St. Vincent, Jamaica, and Hispaniola.

MATERIAL EXAMINED.—5: Jamaica, St. Andrews, Swallowfield, 2, St. Marys, Highgate, 1, Mandeville, 2.

Oxycopis thoracica (Fabricius)

Necydalis thoracica Fabricius, 1801. Syst. El., 2: 370.

The smaller size, non-metallic coloration and lack of the median prothoracic black stripe readily separates this species from *Oxycopis macdonaldi* (Arnett) which is resembles. I am unable to separate *O. thoracica* from *Asclera testaceicollis* Duval, 1857, described from Cuba, but I hesitate to place the latter in synonymy until the oedemerid fauna of the West Indies is better known.

A full description of this species is given in my Nearctic revision, previously cited.

DISTRIBUTION.—Jamaica, Cuba, Haiti, Eastern United States.

MATERIAL EXAMINED.—21: Jamaica, Portland, Port Antonio, 2; Cuba, Santa Clara, 3, Cayamas, 13; Haiti, Port-au-Prince, 3.

Oxycopis lineata (Waterhouse)

Copidita lineata Waterhouse, 1878. Trans. Ent. Soc. London, 1878: 308.

Type.— British Museum (Natural History).

Type locality.—Jamaica.

This species is similar to *Oxycopis falli* (Blatchley) but may be readily distinguished from this species by the white pubescence in the form of three narrow stripes on each elytron, which is lacking in *O. falli.* It also lacks any pale sutural and lateral stripes in the ground color of the elytra and lacks the reddish-piceous legs of *O. falli.* This species is unknown to me from Jamaica, but I have a specimen from the Dominican Republic to be described fully in a later publication.

Oxycopis falli (Blatchley), New combination

Oxacis falli Blatchley, 1928. Canadian Ent., 60: 63.

Type.—Purdue University collection.

Type locality.—Cape Sable, Florida.

Oxacis (*Oxacis*) *falli* Blatchley, Arnett, 1951. American Midl. Nat., 45: 311; Arnett, 1953. American Mus. Novit., no. 1646, p. 3.

The somewhat abscure bifurcation of the apices of the mandibles led me to treat this species as a member of the genus *Oxacis* in previous publications. I am convinced that it is really a member of *Oxycopis,* not only because the majority of specimens that I have examined since my original studies show well developed bifid mandibles, but because the male genitalia resemble more closely those of the genus *Oxycopis.*

The features described in the key, above, in the characterization of *O. lineata* above, and the full redescription in my Nearctic revision (1951) serve to characterize this species.

DISTRIBUTION.—Florida, Bimini, and Jamaica. [Preliminary studies of other West Indian material indicate a wider range than here indicated.]

MATERIAL EXAMINED.—3: Jamaica, no further data, 1, St. Andrew, Swollowfield, 1, St. Catherine, Port Henderson, 1.

MELANOPHILA BEETLES AT CEMENT PLANTS IN SOUTHERN CALIFORNIA (Coleoptera, Buprestidae)

By E. G. Linsley and P. D. Hurd, Jr.,[1]

Buprestid beetles of the genus *Melanophila* (*s. str.*) have been reported as attracted by burning trees and stumps, forest fires, oil fires, burning refuse dumps, distillation plants, sugar refineries, smelter plants, and cigarette smoke hanging over a football stadium (see reviews by Linsley, 1943 and Dethier, 1947). During this past summer near San Jose, California, one of us observed small numbers of *Melanophila occidentalis* Obenberger being attracted to an outdoor barbecue fire when large quantities of deer meat were being prepared.

In the summer of 1954 reports were received from H. J. Ryan, Agricultural Commissioner of Los Angeles County, California, that *Melanophila* were swarming about cement plants in southern California, where they are known as "stack bugs." However, it was not until late August, 1956, that it was possible to visit these plants and investigate the matter at first hand.[2] The results, although not definitive, add another small chapter to the accumulating knowledge of the remarkable reactions of these beetles.

Cement plants were visited at two localities — Crestmore, approximately 5 miles northwest of Riverside in Riverside County; and Oro Grande, 8 miles north of Victorville on the Mojave Desert in San Bernardino County.

In each locality two species of *Melanophila* were present, *M. consputa* LeConte, and *M. occidentalis* Obenberger; the first predominant at Oro Grande, the second at Crestmore. The former species has been reported as breeding in various pines, including *Pinus ponderosa, P. murrayana, P. radiata, P. torreyana, P. attenuata,* and *P. contorta* (Sloop, 1937; Barr and Linsley, 1947) as well as *Libocedrus decurrens* and *Eucalyptus globulus,* although the last two records have been questioned. *M. occidentalis,* however, appears to breed regularly in broad-leaved trees and shrubs, including oak, madrone and *Eucalyptus.*

Generally speaking the beetles congregate in the vicinity of the kilns.

---

[1]University of California, Berkeley.

[2]We wish to express our appreciation to Mr. Garner A. Beckett, President of the Riverside Cement Company of Los Angeles, California, for making arrangements to visit the company plants at Crestmore and Oro Grande, and to Mr. John P. Kinard, Vice-President and General Manager and Mr. John Sauer, Division Manager at Oro Grande, and Mr. S. E. Poulter, Division Manager and Mr. Leo Long, Plant Foreman at Crestmore for extensive courtesies and assistance provided for us at the cement plants. Mr. P. H. Timberlake assisted in taking samples at Oro Grande.

At Crestmore they were flying about a catwalk directly over the kilns near a conveyer which carried hot clinkers from the ovens to the clinker pile. The *Melanophila* were concentrated along a 20-foot stretch of walkway where the black globe thermometer registered 48.5°C. About half of the beetles seen were resting in the shade on the metal frames and railings of the catwalk; the others were running about over the metal in the sun. A robber fly, *Erax* sp., had captured one of the beetles and was feeding on it on a frame above the conveyor with the hot clinkers. One specimen of *M. consputa* and 7 specimens of *M. occidentalis* were represented in the small sample which was captured between 1:00 and 2:30 p.m. Pacific Standard Time. Although not all the beetles observed were captured, no other examples of *M. consputa* were seen.

At the Oro Grande Plant the beetles were far more abundant, and thousands must have been present. Our sample was taken between 1:30 and 3:00 p.m. Pacific Standard Time, and contained 117 examples of *M. consputa* and 35 of *M. occidentalis*. These were collected from a variety of stations about the plant, always in hot areas. They were especially numerous in the vicinity of the burning zone of the kiln where the air temperatures registered 50.6°C. on the black globe thermometer. They became less abundant as one walked away from the kiln and at a distance of 40 feet were quite scarce. At the opposite end of the kiln (350 feet long) the air temperatures registered 45.6°C. where the *Melanophila* were resting in the shade on the warm concrete surface of a 50 foot building; 56.7°C. where they were flying about in the sun. A large part of the sample was taken from our clothing and those of plant personnel. The beetles generally crawl upward and when they reach the neck have a tendency to bite or pinch with the mandibles. They are heartily disliked by the workmen in the plants.

Elsewhere in the plant beetles were found resting on walls with surface temperatures estimated to be between 43.3°C. and 48.9°C., or running rapidly about in the sun on surfaces which were much hotter. In one site large numbers were swarming about moist clinker dust where the black globe registered 51.1°S. In the vicinity of the clinker pile where the temperature of the newly added clinkers is nearly 426.67°C., *Melanophila* were flying about but at a distance of 6 to 10 feet from the surface of the pile.

As in other cases of attraction of *Melanophila,* all the indirect evidence points to flight from a distant area. At Crestmore there were several groves of Eucalyptus within a half mile of the plant and many of these were dead—some burned. However, although these had been heavily attacked by *Xylotrechus nauticus* Mannerheim (Cerambycidae), no borings of *Melanophila* were found. The nearest coniferous forests are about 20 air line miles away to the north. At Oro Grande the air distance from forested areas is even greater, 40 miles S.S.W. Nevertheless, it would appear that the dust given off by the stacks, and which can be seen to drift for miles, is the means of attracting the beetles to the plants. A large percentage of the beetles seen were covered with a very fine cement dust which they presumably encountered while flying through this dust.

The mode and probable evolutionary significance of this unusual habit have been discussed previously (Linsley 1943:342). It is concluded that under natural circumstances the initial attraction by smoke leads the beetles to forest fires where they normally oviposit in scorched wood and, further, that the beetles are stimulated by heat in the vicinity of the source since they fly rapidly and run about over hot surfaces.

Literature Cited

Barr, W. F. and E. G. Linsley. 1947. Distributional and biological notes on the species of the subgenus Melanophila occurring in Western North America. Pan-Pacific Ent., 23(4):162-166.

Dethier, V. G. 1947. Chemical insect attractants and repellants. Blakiston Co., Philadelphia. ix + 289 pp.

Linsley, E. G. 1943. Attraction of Melanophila beetles by fire and smoke. Jour. Econ. Ent., 36(2):341-342, fig.

Sloop, K. D. 1937. A revision of the North American buprestid beetles belonging to the genus Melanophila. Univ. of Calif. Publ. Ent., 7(1):1-20, figs.

NOTE ON THE COLEOPTERA MYXOPHAGA

By WILLIAM T. M. FORBES[1]

Crowson (1955) has very recently proposed a fourth suborder of the Coleoptera, based on a few minute forms, and in the first place on their thoracic "endoskeleton."

This note is to indicate that the group is also homogeneous on the wing folding and instantly separable from all other beetles examined, Archostemata, Adephaga and Polyphaga. In my wing folding paper (1926) I examined all four genera (each representing a family), considering them a homogeneous group ("Hydradephaga C"), and transferring them from several places in the Polyphaga to lie together next the Halplidae, largely because two of them showed a well formed oblong cell. But I noted that the oblong cell was not folded under cubitus, as in the Archostemata and Adephaga proper, thinking this was a minor effect of their minute size.

In fact then the Myxophaga can be sharply defined on wing folding as follows: hinge-area (C+D) extending clear down to cubitus, unlike all other Coleoptera studied, and working directly with the oblong area (W), so that it swings down, forward and over the outer part of cubitus. This is unique and shown in my diagrams of Cyathocerus (now called Lepicerus), Sphaerius, Hydroscapha and Calyptomeris. The only other form which has a similar folding is Eucinetus, but here the wing is sufficiently well developed to show this is not the true hinge fold, but the secondary one within the cell characteristic of the Dascillid-Cyphon-Lymexylid type of folding.

I had accepted Clambus, which has a highly modified ambiguous type of folding, as related to Calyptomeris (following everybody), but Crowson is sure this is on another line, rather close to Eucinetus, which he considers one of the most primitive of Polyphaga. Its folding can in fact be interpreted as an extreme reduction of Eucinetus, though I know no third beetle wing that could be connected with it.

Other wing features of the Myxophaga, though not limited to it, or not found in all four genera = families are: oblong cell present, longer than high (unique but limited to the first two genera), costal hinge chitinized (also Adephaga); anal area relatively extremely reduced (sporadic); outer costal fold or folds concave (also Adephaga, Archostemata).

REFERENCES CITED

CROWSON, R. A. The Natural Classification of the Families of Coleoptera, 1955. (Myxophaga proposed on p. 10)

FORBES, W. T. M. Wing-Folding patterns of Coleoptera. Jour. New York Ent. Soc. 24, pp. 42-68, 91-139, 1926. Calyptomeris fig. 23, Lepicerus (Cyathocerus) figs. 19, 20, Sphaerius fig. 21, Hydroscapha fig. 22, Clambus fig. 24, Eucinetus fig. 69.

[1] 16 Garden St., Cambridge 38, Mass.

STUDIES IN THE MALACHIIDAE VII

by M. Y. Marshall, M.D., *Murfreesboro, Tenn.*

The present number of these Studies contains merely the description of two new species from the Southwest and a few distributional records not previously published.

Endeodes terminalis new species.

Male.—Oblong, elytra abbreviated and slightly widened posteriorly. Blackish piceous, the head (except the labrum and palpi), prothorax, apical elytral margins and legs rufotestaceous. *Head* short, rounded, 1.08 times longer than wide, anterior portion of frons shallowly bi-impressed, surface rather heavily encrusted with a brownish indument, apparently alutaceous where visible between the crusts, the details of sculpturing and pubescence obscured. Eyes small, situated about midway of the length of the head, a few erect blackish setae at the anterior angles of the clypeus and on the tempora. *Antennae* moderate in length, reaching to about the posterior pronotal margin, the segments rounded triangular, feebly serrate, finely and rather densely pubescent. *Pronotum* transverse, 1.4 times wider than long, the sides slightly convergent posteriorly, the anterior margin moderately produced, the posterior with a faint emargination at the center; surface alutaceous, not nearly so heavily encrusted as the head, no punctures visible, pubescence fine and moderately dense, a few erect setae along the anterior margin. *Elytra* 1.3 times longer than wide and occupying about 0.6 of the abdominal length, measured from the elytral base to the tip of the pygidium; humeri prominent; sides parallel, slightly diverging posteriorly; sutural margins in contact almost to the apices, which are separately rounded; surface apparently alutaceous, almost as heavily encrusted as the head; pubescence about as on the pronotum, except somewhat coarser, a few erect black setae on the humeri and along the lateral margins. The pale apical margins are somewhat crescent shaped and extend up the suture about one-seventh of the distance to the elytral base. The last four abdominal tergites are completely exposed, are shining piceous black and very finely pubescent. The shape of the pygidium cannot be definitely ascertained, as the lateral edges of the last two tergites are gnawed, apparently by dermestid larvae. *Ventral surface* shining piceous black, except the terminal sternite and the posterior margins of the other sternites, which are rufotestaceous. Lateral lobes of the terminal sternite are elongate triangular and almost reach the tip of the pygidium. Legs are rather long, the posterior tibiae slightly arcuate. Second protarsal segments extend in a lobe over the third, reaching the tip of third segments, the ends of the lobes rounded and furnished with a narrow black comb, perpendicular to the face of the lobe, the teeth of the comb visible only under high magnification. Length 2.8 mm.

Female unknown.

Holotype, male, "Baja. Calif., Mexico. SE end of Isla Caballo. III-20-53. J. P. Figg-Hoblyn, collector," in the collection of the California Academy of Sciences. No paratypes.

The genus *Endeodes* was reviewed by Blackwelder in 1932. He gave a rather detailed redescription of the genus and added two species to the three known up to that time. The present species agrees very well with

Dr. Blackwelder's description, except for the portion that states: "The elytra are never more than half as long as the abdomen," although Blackwelder states in his description of *abdominalis* (Lec.): "Elytra nearly as long as the abdomen." I assume that he is measuring the "abdomen" as I have done in the above description, since the anatomical anterior border of the abdomen proper is concealed both anteriorly and posteriorly. In my specimens of *abdominalis,* measured on this basis, the elytra are slightly less than half as long as the abdomen. I do not believe that the slightly longer relative length of the elytra in the present species would warrant its exclusion from the genus. The antennae and protarsi of the present species appear to be identical with Blackwelder's figures of these parts for *E. collaris* (Lec.). Positive reasons for placing it in *Endeodes,* rather than *Attalus,* are its rounded head, small eyes, combed border of the second protarsal segments and the encrustation of the dorsal surface, which would seem to indicate that the insect had been in contact with wet sand or mud. Its place of capture, at the "SE end of Isla Ceralbo," would also make it probable that it was taken on the beach, which is the habitat of all known species of the genus. It is most closely related to *E. abdominalis* (Lec.), but in this species the coloring is reversed, the elytra being black with the *base* ferrugineous.

In my 1948 key to the North American genera of Malachiidae, the present species would be referred to *Attalusinus* Leng, on account of the sutural margins being in contact almost to the tips. However, the males of the only two described species of *Attalusinus,* which were not known at that time, have the front of the head excavated, a character which separates the two genera better than those given in the key.

Since several Malachiidae with abbreviated elytra have been placed in the genus *Attalus,* it becomes necessary to consider the described Mexican species of that genus. The present species appears to resemble *A. teapanus* Champion more closely than any other species listed by Champion (1914). *Teapanus,* however, is said to have the eyes large, the head short and differs in several details of coloration. *E. terminalis* does not at all resemble any of the six Mexican species listed by Champion as having the head "more or less elongated behind the eyes," which is the case in the present species. Since the above description was written, I have discovered that Mr. Ian Moore recently (1954) described a new species of *Endeodes,* from Baja California. Mr. Moore has very kindly given me paratypes of his new species, *E. blaisdelli.* It may be separated at once from *terminalis* by the fact that the elytra are "concolorous, ferruginuos."

Attalus leechi new species.

Male.—Form oblong, very slightly widened posteriorly. Black; labrum and anterior border of clypeus clear yellow, the basal portion of the labrum slightly infuscate; ventral surface of first five antenal segments, mandibles (except the tips), tarsi and anterior tibiae piceotestaceous. *Head* short, 1.2 times wider than long, not elongate behind the eyes, front faintly biimpressed, surface shining, punctures and pubescence very fine, a row of about eight anteriorly directed setae at the anterior edge of the cylpeus. *Antennae* short, reaching almost to the posterior pronotal margin, very faintly serrate, the pubescence rather conspicuous. *Pronotum* quadrate, 1.2 times wider than long, the sides slightly arcuate, parallel, all the angles rounded; surface and white pubescence about as on the head, a few black setae at the anterior and posterior angles. *Elytra* dull, the surface minutely and transversely rugulose, not sooty or iridescent; punctures scarcely visible, pubescence white, fine and dense, conspicuous in certain lights; erect black setae numerous and evenly distributed. Ventral surface shining, punctuation and pubescence very fine, coarser on the legs; abdominal margins, posterior margin of fifth sternite, terminal sternite and pygidium rather heavily clothed with long black setae. Pygidium moderate in size, the apex broadly and squarely truncate. Lobes of second protarsal segments broad, conspicuous, reaching the tips of the third segments, with their own tips rounded and broadly bordered with black. Length 2.3 mm.

Female unknown.

Holotype, male, "Arizona, Sunnyside Cn., w. side Huachuca Mts., Cochise Co. 6000 ft. 4-VIII-52. H. B. Leech and J. W. Green collectors," in the collection of the California Academy of Sciences. No paratypes.

The present species runs to *Attalus pallifrons* (Motschulsky) in my 1951 key to the genus. *Pallifrons,* however, is larger, is Eastern in distribution and has the elytra definitely sooty and iridescent. In Champion's key to the Mexican and Central American species it runs to *laeviusculus* Champion. This species, also described from a unique male, from Vera Cruz, Mexico, and represented in my collection by three specimens, has the elytra strongly shining, with practically no pubescence visible and only a few erect black setae, distributed along the elytral margins. Also, the labrum in *laeviusculus* is black.

The following distributional records are in addition to those previously reported in Leng's Catalogue (1920) and Supplements and in the previous numbers of these "Studies."

Collops necopinus Fall, Colo., Wyo. *C. floridanus* Schaeffer, N. C. *C. balteatus* Lec., Tenn. *C. bridgeri* Tanner, Colo., Mont. *Temnosophus bimaculatus* Horn, Mich. *Tanaops testaceus* Marshall, Utah. *Attalus futilis* Fall, So. Dak. *A. atripennis* Fall, N. Mex. *A. humeralis* Lec., Wis. *A. unicolor* Horn, Calif. *A. zebriacus* Blatchley, Mich.

References Cited

Blackwelder, R. E. 1932. The Genus Eleodes Leconte. Pan-Pacific Entom., 8:128-136.

CHAMPION, G. C. 1914. Revision of Mexican and Central American Malachiidae and Melyridae. Trans. Entom. Soc. of London, pp. 13-127.

LENG, C. W. 1920. Catalogue of the Coleoptera of America, North of Mexico. John D. Sherman, Jr., Mt. Vernon, N. Y.

MARSHALL, M. Y. 1948. Studies in the Malachiidae II. Entom. Americana, 28 (new series) :113-144.

1951. Studies in the Malachiidae III. Proc. Calif. Acad. of Sciences (4th series), 27 :77-132.

MOORE, IAN. 1954. Notes on Enedeodes Leconte with a Description of a New Species from Baja California. Pan-Pacific Entomol, 30 :195-198.

THE PAUL N. MUSGRAVE COLLECTION OF DRYOPOIDEA

In the spring of 1930 I discovered my first water beetle of the family Elmidae in a small spring-fed stream near Lawrence, Kansas. It intrigued me that this beetle could not swim and I was challenged to learn something of its identity. Blatchley's Coleoptera of Indiana told me that it belonged to the family Parnidae and to the genus *Stenelmis* but I was unable to satisfactorily identify it further. This very early acquaintance with the long-toed or riffle beetles soon brought me into contact with my first professional correspondent, Paul N. Musgrave of Fairmont, West Virginia, a junior high school teacher who then was the recognized specialist in the Parnidae. Mr. Musgrave graciously offered to aid me with determinations, and for 25 years we have corresponded about Parnids. Time changes many things, including names and classifications, and soon the Parnidae was changed to Dryopidae, and the Dryopidae were divided to include Elmidae, Psephenidae, and Limnichidae. But Dr. Musgrave and I still continued to use Parnidae in correspondence to include the family assemblage.

In 1938, after earning a Ph.D. in entomology at West Virginia University, Dr. Musgrave moved to Huntington, West Virginia, where he now is Professor of Education at Marshall College. With increased responsibilities in education, especially at the teacher-training level, he found less and less time to devote to his beloved Parnids. Early in 1956 Dr. Musgrave wrote me that he had given up all work on water beetles, and with his characteristic generosity offered his collection to the Illinois Natural History Survey. On October 26, 1956, the Musgrave collection was accepted and transferred to the Survey.

This collection, totaling some 16,000 specimens, of adults and larvae, is perhaps the richest North American accumulation in the Dryopoidea. It contains an estimated 300 species of Dryopoidea, including nearly all of the United States species of Elmidae and Dryopidae plus considerable material from Mexico, the West Indies, Europe, Australia, and the Philippines. Dr. Musgrave earlier deposited holotypes of his own species in the collection of the U. S. National Museum, but the following *Stenelmis* types (Elmidae) are included in the Musgrave collection: *knobelae* Sanderson (holotype, allotype), *parva* Sanderson (holotype), *antennalis* Sanderson (holotype), and *convexula* Sanderson (holotype, allotype). In addition there is paratype material representing nearly 75 species.

The Musgrave collection will be incorporated into the general collection of Dryopoidea at the Illinois Natural History Survey. Each specimen will bear the Paul N. Musgrave Collection label. MILTON W. SANDERSON, Illinois Natural History Survey, Urbana.

STUDIES ON NORTH AMERICAN APION WITH DESCRIPTIONS OF TWO NEW SPECIES (Curculionidae).[1]

By D. G. KISSINGER,[2]

This is the first of a series of papers in which the North American species of *Apion* will be reviewed. The weevil genus *Apion* is cosmopolitan and includes about 1500 described species of minute, mostly somber colored beetles. Since there is no distinct faunal line between Mexico and Central America the magnitude of the problem of treating the North American species is increased because of the possible occurrence in Mexico of species previously thought to be Central American. Therefore Central American species will be included in this review at least in the keys to be presented bringing the total number of described species under consideration to about 250.

The males of the majority of species of North American *Apion* exhibit peculiar secondary sex modifications of the coxae, femora, tibiae, or tarsi in the form of tubercles, mucrones, or long, stiff cilia, or by modifications of the general outline of those appendages, i.e., incrassate femora, or flattened or curved tibiae. These secondary sex modifications are constant for each species and are useful in separating species. In general the male beak is shorter, stouter, and more pubescent than is true of the female. Usually the fifth ventral abdominal segment is deflected and visible in side view and the elytral tips are broadly rounded.

The female lacks the secondary sex characters of the male. In general the female beak is longer, more slender, smoother, and tends to be glabrous; the fifth ventral segment is retracted and invisible; and the elytral tips are acute and in some cases obviously prolonged.

All measurements of total length in this review exclude the beak and are based on a straight line extending from the front margin of the eye to the tip of the elytra. Width is measured at the widest portion of the elytra. The beak is measured along a straight line taken from the front margin of the eye to the tip of the beak, excluding the mandibles. The prothorax is measured along a straight line at right angles to the axis of the posterior margin and extending to the dorsal anterior margin as seen laterally; the head and prothorax are measured in the same way, the line extending to the anterior margin of the eye. The frons is measured at its least width.

---

[1] Scientific Art. No. A594 Contribution No. 2767 of the Maryland Agricultural Experiment Station, Department of Entomology; based in part on a thesis submitted to the Graduate School of the University of Maryland in partial fulfillment of the requirements for the degree of Master of Science.

[2] University of Maryland, College Park.

Measurements used in this paper were made with an eye piece micrometer in a binocular microscope with magnifications of 15x, 60x, and 120x.

Grateful ackowledgment is made to Sir Guy Marshall, world authority on the Circulionidae, for his willingness to compare specimens with types in the British Museum; much basic study would have been impossible without his aid; to Mr. J. Balfour-Browne, Principal Scientific Officer of the British Museum (N.H.), for being extremely helpful in making it possible to study material from the B.C.A. collection and for other favors; to the following individuals for making available the *Apion* material in their care: Drs. W. J. Brown of the Insect Systematics and Biological Control Unit of the Canadian Department of Agriculture; M. A. Cazier, curator of insects at the American Museum of Natural History; H. Dietrich of Cornell University; T. H. Hubbell of the University of Michigan; P. D. Hurd, Jr., to the California Insect Survey; W. E. LaBerge of the University of Kansas; H. B. Leech of the California Academy of sciences; A. T. McClay of the University of California; M. W. Sanderson of the Illinois Natural History Survey; and to the following individuals for material from their private collections: D. M. Anderson, N. M. Downie, C. A. Frost, J. M. Kingsolver, G. H. Nelson, E. L. Sleeper, B. D. Valentine. Special thanks are due to Dr. J. F. Gates Clarke, curator of insects at the U. S. National Museum, for making available the unstudied material in the T. L. Casey Collection; to Dr. P. J. Darlington, Curator of Insects at the Museum of Comparative Zoology, for generously aiding the author while studying the Fall and Leconte types; to Miss Rose Ella Warner, U.S. Department of Agriculture Specialist in charge of the Curculionidae at the U.S. National Museum, for offering many constructive suggestions as well as making material available for study; and to Dr. E. N. Cory, formerly Head for 42 years, Department of Entomology of the University of Maryland, Dr. Wm. E. Bickley, Acting Head, Department of Entomology, University of Maryland and Mrs. Ernestine B. Thurman, Entomologist, U.S. Public Health Service, for critically reading the manuscript and providing technical guidance.

The following lists abbreviations that will be employed throughout the series of papers in this review to designate the deposition of specimens.

(AMNH) American Museum Natural History
(BMNH) British Museum (Natural History)
(CAS) California Academy of Sciences
(CIS) California Insect Survey
(CNC) Canadian National Collection at Ottawa
(CU) Cornell University

(DGK) Authors Collection
(MCZ) Museum of Comparative Zoology
(INHS) Illinois Natural History Survey
(TLCC) Thomas Lincoln Casey Collection in U.S. National Museum
(UC) University of California
(UK) University of Kansas (Snow collection)
(UM) University of Michigan
(UMD) University of Maryland
(USNM) United States National Museum

Apion coxale Group

Five North American species, two of which are here described for the first time, comprise a group similar in structure to *Apion coxale* Fall. The group ranges from Northeastern North America to Panama. Nothing is known regarding host plants of its members. Two distinctive characters easily separate the *coxale* group from other North American *Apion:* The deeply impressed striae on the frons adjacent to the eye and the tuberculate front coxae of the male. Additional characters of the group are as follows:

Body narrow, subparallel in form; derm black, elytra with more or less brassy luster; pubescence at base of third and to lesser degree second, fourth, and fifth elytral intervals conspicuous and coarse, on remainder of the dorsum of the elytra and prothorax, finer, less conspicuous, dense on sides of mesothorax and metepisternum; prothorax subcylindrical and subquadrate in form, apex not less than four-fifths as wide as base, sides at base slightly expanded laterally; frons narrow, wider than dorsal tip of beak, canaliculate, stria adjacent to eye deeply impressed, eyes not prominent; beak slender, curved, feebly dilated at antennal insertion; third tarsal segment strongly bi-lobed; claws with acute basal tooth; second and third tibiae of male armed with minute mucrones.

Only one other North American species, *Apion cavifrons* Lec., exhibits a frons similar to that of the *coxale* group. The beak of *A. cavofrons* is stout and in both sexes distinctly shorter than head and prothorax combined, and the species occurs along the Pacific Coast of the United States.

KEY TO NORTH AMERICAN SPECIES OF A. COXALE GROUP

1. Males 2
   Females 6
2. Dorsum of prothorax deeply, coarsely pitted, interspaces between pits cariniform and smooth; Mexico to Panama .... **colon** Sharp
   Dorsum of prothorax finely punctured, interspaces between punctures flat and alutaceous 3
3. Beak distinctly shorter than head and prothorax 5
   Beak equal in length to head and prothorax 4
4. Black with obscure bronzy luster on elytra; dorsum of elytra beyond basal third with inconspicuous, minute pubescence; head in lateral view constricted behind eyes interrupting dorsal outline; Mexico to Panama .... **lassum** Sharp
   Black with strong brassy luster on elytra; dorsum of elytra with scant but evident pubescence; head not constricted behind eyes, dorsal outline from frons to vertex nearly a straight line; Mexico .... **neocoxale** n. sp.

5. Beak one-third to two-fifths longer than prothorax, somewhat deflexed beyond middle; nearly clylindrical beyond middle; Eastern United States .... **coxale** Fall
   Beak one-fourth longer than prothorax, nearly straight, distinctly depressed in apical half; Arizona .... **occiduum** n. sp.
6. (1) Dorsum of prothorax deeply, coarsely pitted, interspaces between pits cariniform and smooth; Mexico to Panama .... **colon** Sharp
   Dorsum of prothorax finely punctured, interspaces between punctures flat and alutaceous 7
7. Pubescence of dorsum of elytra beyond middle inconspicuous; beak three-fourths longer than prothorax; Mexico to Panama .... **lassum** Sharp
   Pubescence on dorsum of elytra conspicuous 8
8. Beak not more than three-fifths longer than prothorax; prothorax in side view feebly convex; elytra with feeble greenish brassy luster; Eastern United States .... **coxale** Fall
   Beak three-fourths longer than prothorax; prothorax in side view convex, highest point in front of middle; elytra with strong brassy luster; Mexico .... **neocoxale** n. sp.

Apion colon Sharp

Apion colon Sharp, 1890, Biol. Centr.-Amer., Col., 4 (pt. 3): 57, pl. 3, fig. 5; Chittenden, 1908, U.S. Agric. Bull., 64 (4): 31.

Length: 2.00 to 2.18 mm.; width 0.81 to 0.93 mm. Black, elytra with obscure brassy luster, base of antennae piceous; pubescence white, fine, on dorsum of prothorax and elytra minute, inconspicuous, base of third elytral interval with dense spot of coarse scales, base of second, fourth, and fifth intervals with several coarse scales. Beak slender, feebly curved; of male slightly shorter than head and prothorax, one-half longer than prothorax, attenuate to basal two-fifths, apical three-fifths nearly cylindrical; dull, finely alutaceous, punctation sparse, shallow, tip more shining; of female slightly longer than head and prothorax, three-fourths longer than prothorax, nearly cylindrical, finely alutaceous, tip shining. Antennae inserted at distance fron eye equal to width of frons, of male behind basal fifth, of female behind basal sixth of beak; first segment as long as next three; second segment slightly shorter than next two; club 0.20 x 0.08 mm. Frons one-third wider than dorsal tip of beak. Prothorax at base as wide as long, widest at basal third; in profile feebly convex; punctation very coarse, irregular, deep, from 0.03 to 0.06 mm. in diameter on dorsum of prothorax, interspaces very narrow, cariniform; basal fovea moderately deep, linear, extending one-third length of prothorax. Elytra at humeri two-fifths wider than prothorax at base, 2.75 times as long as prothorax, length to width as 10: 6; intervals nearly twice as wide as striae, nearly flat, with minute transverse rugae and one row of indistinct punctures bearing minute scales; striae deep, with minute scales. Front femora four times as long as wide.

Special male character: mucro of second tibiae larger than mucro of third tibiae.

MATERIAL EXAMINED.—Six females, three males, one male compared with type by G. A. K. Marshall.

KNOWN DISTRIBUTION: MEXICO: Cuernavaca (BMNH) (CAS), Chilpancingo (BMNH), Temescaltepec (USNM), Tepeltapa (BMNH); Morelos: Pte. de Ixtla (TLCC); Puebla: 35 mi. S. Puebla (DGK). GUATEMALA: Zapote (BMNH). PANAMA: Taboga Is (BMNH).

The coarsely, deeply, irregularly sculptured dorsum of the prothorax easily distinguishes this species from its allies.

Apion lassum Sharp
FIGURE 7

Apion lassum Sharp, 1890, Biol. Centr.-Amer., Col., 4 (pt. 3): 55.

Length: 1.88 to 2.20 mm.; width: 0.81 to 0.94 mm. Black, elytra with obscure brassy luster, antennae piceous. Pubescence on dorsum of elytra minute, inconspicuous except at base of third through fifth elytral intervals where it is coarse and evident, especially the male. Beak feebly, evenly curved, in basal three-fourths dull, alutaceous, moderately punctured, apex smooth, shining; of male as long as head and prothorax, one-half longer than prothorax; of female slightly longer than head and prothorax, three-fourths longer than prothorax, nearly cylindrical. Antennae inserted at distance from eye one-half greater than width of frons, at basal one-fourth of beak; first segment nearly as long as next four; second segment stout, one-half as long as first, a little longer than next two; club 0.22 x 0.08 mm. Frons but little wider than dorsal tip of beak. Prothorax as wide or slightly wider at base than long, widest at basal third, in side view feebly convex; punctation 0.03 mm. in diameter, shallow, somewhat deeper toward apex of disc, interspaces flat, alutaceous, less than diameter of punctures, becoming wider laterally in basal one-fourth, basal fovea shallow, short. Elytra at humeri one-fourth wider than prothorax at base, nearly three times as long as prothorax, length to width as 11: 6.5; intervals flat, nearly smooth, twice as wide as striae, bearing a single row of fine, inconspicuous punctures with minute pubsecence; striae deep. Ventral abdominal punctation deep, moderate, moderately dense.

MATERIAL EXAMINED.—5 males, 5 females, one male determined by Hans Wagner.

KNOWN DISTRIBUTION.—The United States: Arizona: Chiricahua Mts. (UK). MEXICO: San Luis Potosi: 40 mi. W. Antiguo Morelos, El Salto (DGK); Tamazunchale (DGK); 30 mi. S. Tamazunchale (CAS). PUEBLA (CAS). Mexico: Temescaltepec (CAS). Vera Cruz: 60 mi. SE Cordoba (DGK); Jicaltepec (MCZ). GUATEMALA: (BMNH). PANAMA: Taboga Is. (BMNH); Summit, Panama C. Z. (BMNH).

The long, evenly curved beak and nearly glabrous posterior dorsum of the elytra easily distinguish this species from its allies.

Apion neocoxale new species
FIGURE 5 & 6

Holotype: Male, Cordoba, Vera Cruz, Mexico, Dr. A. Fenyes, in California Academy of Sciences.

Length: 2.13 mm.; width: 0.88 mm.

Elongate, moderately slender. Black, elytra with strong brassy luster; pubescence white, fine, very sparse, base of third elytral interval with a double row of coarse scales, base of fourth and fifth intervals with several coarse scales. Beak slender, moderately, evenly curved, equal in length to head and prothorax, one-half longer than prothorax, moderately dilated ventrally, feebly laterally at antennal insertion; basal fourth of beak dull, with sparse scales, two short rows of coalesced punctures, apical three-fourths more shining, with fine, sparse punctures arranged in rows, becoming deeper laterally. Antennae inserted at basal one-fourth of beak at distance from eye one-half greater than width of frons; first segment slightly shorter than next three, second segment shorter than next two, club 0.25 x 0.09 mm. Frons narrow, slightly wider than dorsal tip of beak, canaliculate, broadly impressed adjacent to eyes, with a narrow cuneiform raised median area widest at base; eye not prominent. Prothorax subcylindrical in form, at base slightly wider than long, sides nearly parallel to middle, feebly arcuate to constricted apex, apex four-fifths as wide as base; in profile feebly arcuate; punctation of dorsum 0.03 mm. in diameter, deep, interspaces flat, alutaceous, irregular, generally less than diameter of punctures; basal fovea fine, moderately deep, short. Elytra at humeri one-fourth wider than prothorax at base, three times as long as prothorax, length to width as 11: 7, sides feebly diverging to widest point behind middle thence rounding to apex; intervals nearly flat, with fine transverse rugae, nearly twice as wide as striae, with one row of distinct punctures bearing fine scales, third interval twice as wide as striae with two irregular rows of punctures; striae moderately deep, with fine scales. Ventral abdominal punctation deep, moderately fine, moderately sparse. Front femora four times as long as wide. Claws with acute basal tooth.

Special male characters: front coxae bear a conical tubercle on apex, second and third tibiae armed with minute mucrones.

Allotype: female, 37 mi. S. Mexico City, Mexico, 15 March 1953, D. G. Kissinger, (USNM).

Length: 2.25 mm.; width 1.00 mm.

Beak one-sixth longer than head and prothorax, three-fourths longer than prothorax, nearly cylindrical, feebly, evenly curved, above antennal insertion beak shining, beyond basal two-sevenths dull, alutaceous, tip more shining, punctation very fine, sparse, in rows. Antennae inserted at basal fifth at distance from eye one-half greater than width of frons; first segment as long as next three, second segment shorter than next two. Frons finely striate, striae adjacent to eye finely impressed, median half elevated longitudinally above level of eyes. Dorsal surface of prothorax more densely punctate; prothorax in lateral view unevenly convex, highest point in front of middle.

One paratype, male, same data as allotype (DGK).

The male is distinct from allied species by the long beak, double row of coarse scales at base of third elytral interval, and the evident pubescence on the disc of the elytra beyond the middle. The female is distinct by the unevenly convex prothorax, more strongly convex than any allies, also by the long beak and evident elytral pubescence beyond middle.

Apion coxale Fall

FIGURES 1, 2, AND 3

Apion coxale Fall, 1898, Tr. Am. Ent. Soc., 25: 13;4 Blatchley and Leng, 1916, Rhynch. N.E. Am., p. 77.

Length: 1.75 to 2.18 mm; width 0.75 to 0.93 mm. Black, elytra with feeble greenish bronze luster. Pubescence white, fine, very sparse, basal sixth of first four elytral intervals with a single row of sparse, coarse scales. Beak slender, feebly curved; of male generally shorter than head and prothorax, from one-third to two-fifths longer than prothorax, feebly deflexed beyond middle; basal half dull, finely strigose, with laterally strong punctation, apical half shining, more sparsely punctate; of female slightly longer than head and prothorax, from one-half to three-fifths longer than prothorax, nearly cylindrical, more evenly curved than male, moderately sparsely punctate, basal fourth and apical fourth smooth, moderately shining, portion between dull, finely strigose. Antennae inserted at distance from eye one-half greater than width of frons, male at basal fifth, female at basal sixth of beak; first segment of male shorter than next three, of female as long as next three; second segment stout, shorter than next two; club from 0.18 x 0.08 to 0.24 x 0.09 mm. Frons narrow, distinctly wider than dorsal tip of beak. Punctation of prothorax deeper on apical one-half of disc, interspaces variable, usually less than diameter of punctures; basal fovea elongate, deep basally, extending one-third length of prothorax. Elytra at humeri one-third wider than prothorax at base, three times as long as prothorax, length to width as 9: 6; intervals less than twice as wide as striae, feebly convex, with one row of fine, indistinct punctures bearing fine scales, with fine, transverse rugae. Ventral punctation of abdomen deep, moderate, moderately sparse.

MATERIAL EXAMINED.—75 specimens including material studied by Fall. Lectotype hereby designated as the ♂ from N. C. in Fall Collection, M.C.Z. Cat. No. 25048 Lectoparatype, ♂ D. C., U.S.N.M. Cat. No. 4212.

KNOWN DISTRIBUTION.—Illinois: Fountain Bluff (INHS); Pulaski (USNM). Ohio: Adams Co. (ELS) (DGK); Ashland Co. (ELS); Scioto Co. (ELS); Cincinnati (USNM. Pennsylvania: Berks Co. nr. Reading (DGK) (MDU); Easton (UC). New Jersey: Anglesea (USNM); Irvington (USNM); Gt. Notch (USNM); Mt. View (USNM); Orange Mt. (USNM); Phillipsburg (UC); Ridgewood (USNM); Raritan (USNM); Montclair and "Upper" Montclair (USNM); Woodside (USNM). Maryland: Takoma Park (DGK) (UMD); Sparrow Pt. (UC). District of Columbia (USNM). Virginia: Alexandria Co. (USNM); Chain Bridge (USNM). North Carolina: Asheville (USNM). Tennessee: Hamilton Co. (USNM). Alabama: Chambers Co., Landsdale (USNM). Mississippi (TLCC).

The males of this species can be distinguished from allies by the single row of coarse, sparse scales on the basal sixth of the second through fifth elytral intervals, the pubescence on the remainder of the elytral disc is finer than that on the basal area but is much more evident than is true of *A. lassum* Shp.; from *neocoxale* n. sp. it differs by its shorter beak and single row of scales on base of elytra. The females may be distinguished by the evenly curved beak, conspicuous pubescence on posterior dorsum of elytral, and the feebly, evenly convex prothorax as seen laterally.

Apion occiduum new species

FIGURE 4

Holotype: Male, Arizona, U.S.N.M. Cat. No. 63132.

Length: 1:75 mm.; width: 0.63 mm.

Pubescence similar to *A. coxale* Fall. Beak four-fifths as long as head and prothorax, one-fourth longer than prothorax, slender, nearly straight; basal one-fourth dull, strongly alutaceous, apical three-fourths polished, with strong, sparse punctures becoming finer apically, tip impunctate; apical one-half somewhat depressed. Prothorax slightly wider at base than long, apex six-sevenths as wide as base, punctation as in *A. coxale* Fall. Elytra at humeri one-fourth wider than prothorax at base, nearly 3.2 times as long as prothorax, length to width as 19: 11; intervals slightly convex, with moderately strong transverse rugae.

Female unknown. The female specimen from L. Calf. mentioned by Fall may belong here but was unavailable for study.

The short, nearly straight beak; the more nearly parallel prothorax; and elongate, narrow elytra easily distinguish this species from *A. coxale* Fall, to which it is very closely related.

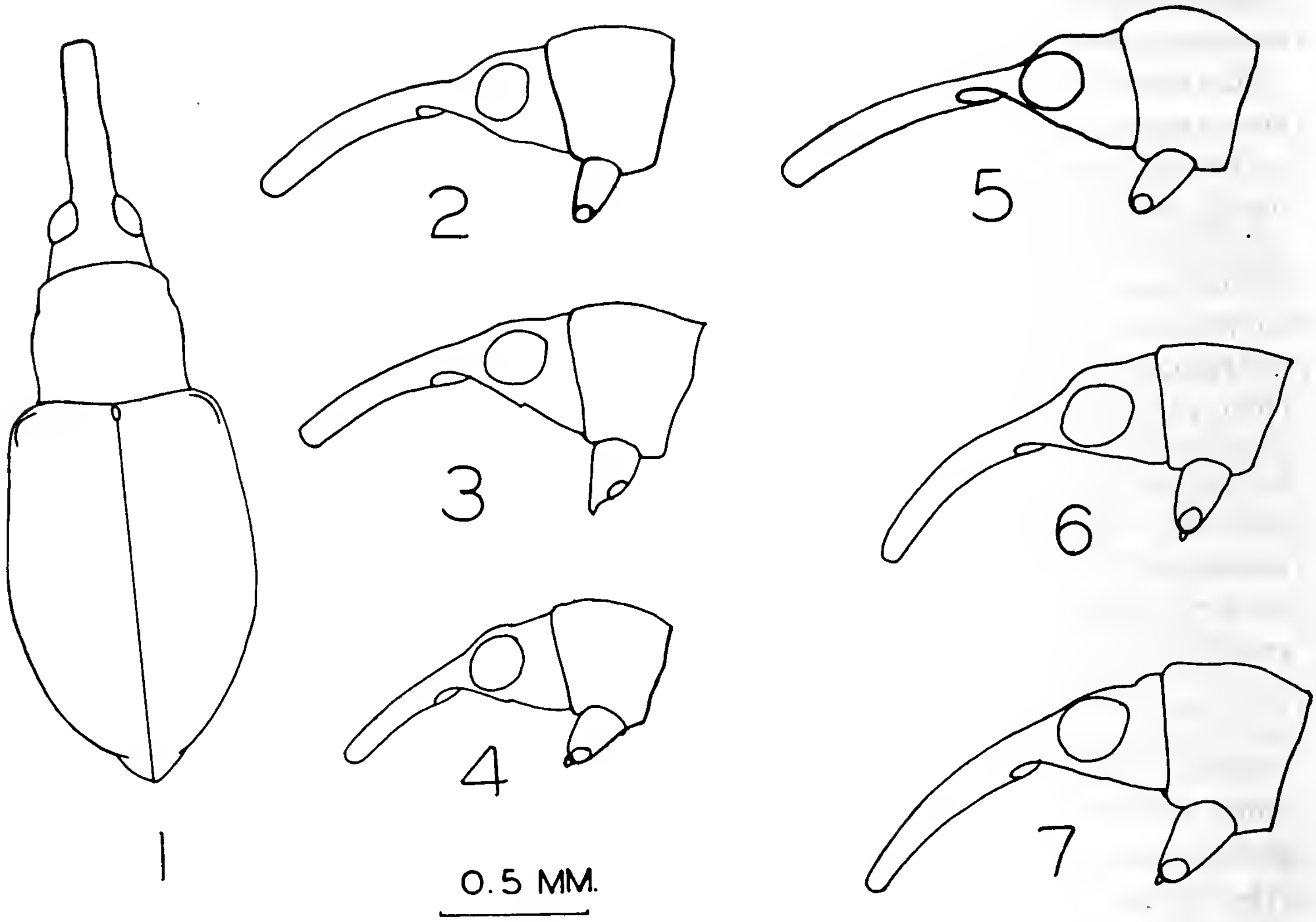


FIGURE 1. Dorsal view ♂ *A. coxale* Fall. FIGURE 2. Lateral view, head and prothorax ♀ *A. coxale* Fall. FIGURE 3. Same of ♂ *A. coxale* Fall. FIGURE 4. Same of ♂ *A. occiduum* n. sp. FIGURE 5. Same of ♀ *A. neocoxale* n. sp. FIGURE 6. Same of ♂ *A. neocoxale* n. sp. FIGURE 7. Same of ♂ *A. lassum* Sharp.

REFERENCES CITED

BLATCHLEY, W. S. *and* C. W. LENG. 1916. Rhynchophora or weevils of North Eastern America. The Nature Publ. Co., Indianapolis, 682 pp., 155 fig.

CHITTENDEN, F. H. 1908. An injurious North American species of *Apion* with notes on related forms. United States Dept. of Agric., Bur. Ent. Bull. 64, pt. 4, pp. 29-32.

FALL, H. C. 1898. Revision of the species of *Apion* of America north of Mexico. Trans. American Ent. Soc., **25:** 105-184, pl. 2-5.

SHARP, D. 1890-91. Biologia Centrali-Americana, Coleoptera, vol. 4, pt. 3, pp. 48-86, pl. 2-3.

A NEW NEMOGNATHA FROM SOUTHERN MEXICO (MELOIDAE)

By RICHARD B. SELANDER[1]

Most of the specimens described below were collected in 1955 by my wife and myself in the course of field work partially supported by grants from the Sigma Xi-RESA Research Fund and the Penrose Fund of the American Philosophical Society. Additional specimens were made available to me by Mrs. Patricia Vaurie, of the American Museum of Natural History.

Nemognatha selloa, new species

Head black, lacking a pale frontal spot. Pronotum orange with a brown or black streak on each side of disk in basal half (as in figure 4) and often with an additional one on midline; median streak when well developed tending to fuse with lateral streaks. Scutellum black. Elytra orange, sometimes with lateral margin at apex broadly piceous. Wings dark brown. Under surface of thorax and legs black. Basal abdominal sterna black; apical two or three sterna orange. Pubescence black throughout. Length: 9-11 mm.

Head strongly triangular, narrower than pronotum; width at tempora one-tenth to nearly one-fifth greater than length of head from top of vertex to base of labrum; top of vertex markedly tumid at center; tempora well defined, inflated, prominent; surface smooth, shiny, moderately coarsely, irregularly punctate; punctures sparse on vertex, rather dense on frontal area; a longitudinal impunctate area on front of head above middle of eyes; pubescence long (as long as or longer than antennal segment II), erect. Eyes moderately large, prominent, moderately deeply emarginate. Mandibles heavy. Galeae short, reaching middle of metasternum, sparsely clothed with bristle-like setae. Antennae long, three to three and one-half times as long as pronotum, tapered to apex; segments moderately compressed; III to VI subequal in length; VII to X progressively barely shorter; XI nearly one-third longer than X. Pronotum (fig. 4) transverse, one-third to two-fifths wider than long, widest before middle; basal margin very shallowly emarginate; surface smooth, shiny, moderately coarsely, irregularly punctate, with several impunctate areas; punctures sparse before middle, denser behind. Scutellum large; apex broad, squarely truncate; sides weakly arcuate. Elytra obsolescently rugose, shiny, coarsely, shallowly, regularly punctate; punctures becoming finer at apex; average distance between punctures at middle of elytra equal to or less than diameter of a single puncture; setae semi-erect, little more than half as long as those on head. Hind tibial spurs short, sticklike, flattened, deeply grooved behind; outer spur moderately thickened, noticeably heavier than inner spur, parallel-sided, not flared or expanded apically, truncate at apex; inner spur weakly tapered, bluntly rounded at apex.

Male: Fourth and fifth abdominal sterna each with a large, transversely oval, heavily tufted, punctulate impressed area at center. Sixth sternum medially cleft, impressed. Genitalia as in figures 1-3; lip of median tube of aedeagus with a pair of small, compressed, somewhat sclerotized lobes, these not articulated with body of aedeagus.

Female: Pubescence of fore tarsi not noticeably longer or denser than in male. Fourth and fifth abdominal sterna unmodified; posterior margin of fifth sternum

[1]Illinois Natural History Survey, Urbana

fringed with fine setae at middle, above emargination of sixth sternum. Sixth sternum not impressed, deeply emarginate medially.

Type Material: Holotype male and allotype female from 9 miles southeast of Tejupan, Oaxaca, June 26, 1955, R. B. and J. M. Selander (Illinois National History Survey collection). Paratypes: *México:* San Juan Teotihuacán, July 28, 1947, B. Malkin, 1 ♂. *Oaxaca:* [Asunción] Nochixtlan, 7000 ft., July 18, 1955, P. and C. Vaurie, 2 ♂ ♂; Tejupan, June 26, 1955, R. B. and J. M. Selander, 1 ♀; eutopotypical, 3 ♀ ♀. *Puebla:* Tlacotepec [between Tehuacán and Puebla], July 2, 1955, R. B. and J. M. Selander, 1 ♀. *Tlaxcala:* 8 miles west of Calpulalpan, June 28, 1955, R. B. and J. M. Selander, 1 ♂, 3 ♀ ♀. Paratypes in the American Museum of Natural History and the collections of W. R. Enns and R. B. Selander.

This species is a member of the subgenus *Pauronemognatha* as defined by Enns (1956, Univ. Kansas Sci. Bull., vol. 37, pt. 2, p. 764). Its affinities are apparently South American rather than Nearctic. Among the species of the genus *Nemognatha* previously known from México and Central America it seems to be most similar to *scutellaroides* Wellman (= *nigripes* Champion), the form to which it traces in Champion's key (1892, Biol. Centrali-Americana, Coleoptera, vol. 4, pt. 2, p. 373). Judged by Champion's description, *scutellaroides* is easily distinguished from *selloa* by its flavo-testaceous head, longer galeae, densely punctate elytra, and slender hind tibial spurs, in addition to several other differences.

Specimens from Tlacotepec, Tejupan and 9 miles southeast of Tejupan, and 8 miles west of Calpulalpan were collected from flowers of *Selloa glutinosa* Sprengel (determined by F. Miranda). This plant is a yellow-flowered composite resembling in growth form a small species of *Chrysothamnus.* According to Kearney and Peebles (1951, Arizona flora, p. 851), it ranges from Texas and southern Arizona to Central America. It is fairly common along the road and on dry hillsides in the Río Balsas Valley of Puebla and south on the tableland to near Oaxaca de Juárez, Oaxaca. At Tejupan and 9 miles southeast of Tejupan and at Tlacotepec it occurs below the oak belt at elevations between 6000 and 7000 feet. To the north, on the Mexican Plateau proper, I noted seeing it only in Tlaxcala. In the Calpulalpan region of Tlaxcala it is found in open pine-juniper savannah at elevations between 8500 and 9500 feet. In 1955 the *Selloa* did not flower in southern México until after the middle of June. The beetles were found singly in the flowers and were decidedly rare.

Attached to the under side of the head of one of the female beetles from 8 miles west of Calpulalpan were four first instar larvae of a species of *Nemognatha.* It is fairly safe to assume that these represent *selloa* inasmuch as there is no indication that *Selloa glutinosa* supports a species of *Nemognatha* other than *selloa.* Furthermore, the relationships suggested by the morphology of the larvae are not in conflict with those indicated by the morphology of the adult beetles. A description of the larvae follows:

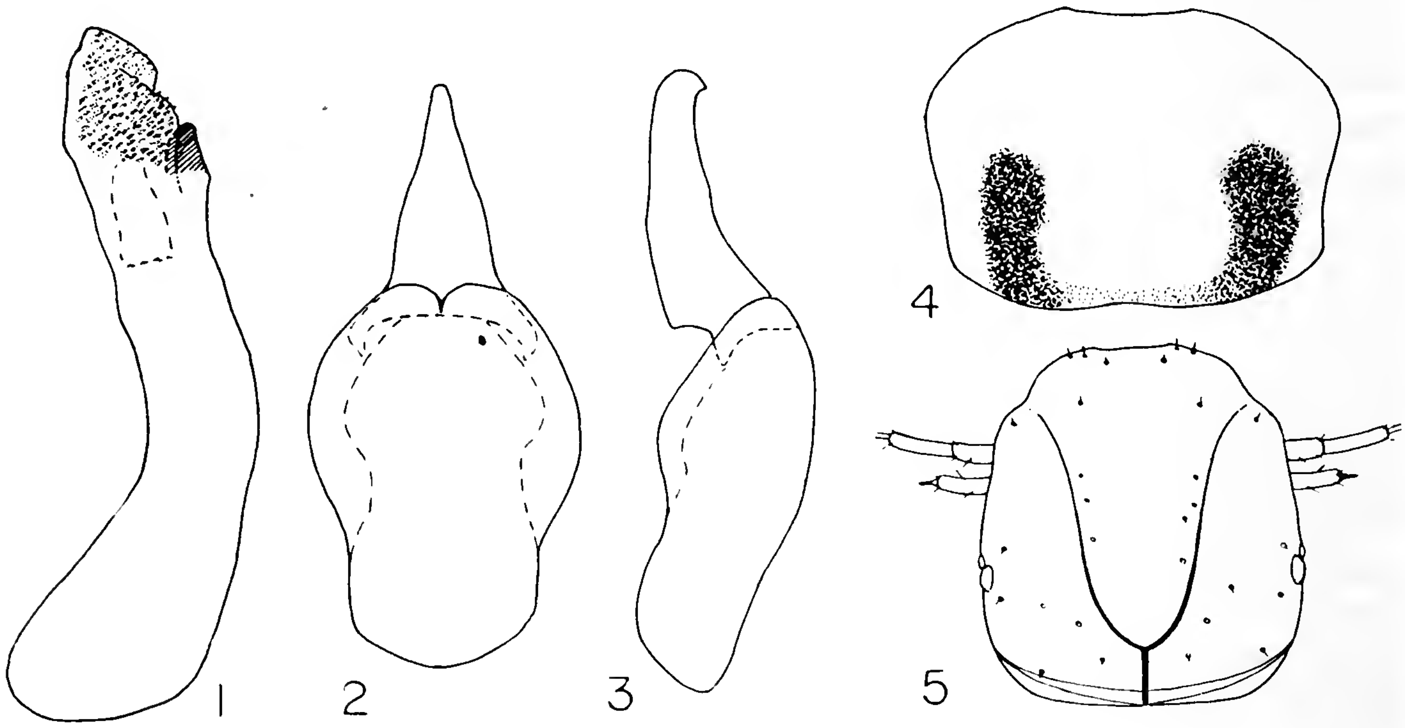
Color yellow. Body surface finely, weakly reticulate; frons smooth; under surface of prothorax scalloped. Form moderately slender; length four times greatest width. Head longer than wide, 31 : 25, broadly rounded in front (fig. 5); epicranial suture well developed. Antennae three-tenths as long as head; segment II slightly less than twice as long as I, slightly shorter than III; terminal seta six times as long as its segment. Mandibles each with three transverse toothlike ridges; basal ridge incomplete. Maxillary palpi three-tenths longer than antennae; second segment one-half longer than first segment, nearly half as long as third. Thorax moderately robust, longer than greatest width, 30 : 22; mesothoracic spiracle equal in diameter with first abdominal spiracle. Abdomen gradually tapered; diameter of first spiracle about two-fifths greater than that of second; first seven terga each with a posterior marginal row of eight setae and a median transverse row of four setae; mesal four setae of posterior marginal row very short, fine, about one-eighth length of tergum; outer seta on each side of tergum longer and heavier, subequal to sternal setae except on seventh tergum where outer seta is even larger; seta on posterior margin of each paratergum as large as outer seta of tergum except on seventh segment; median length of seventh tergum greater than that of spiracle-bearing elevation of eighth segment; distance between bases of spiracle-bearing elevations about three-fourths distance from inner base to apex of one process; two setae on eighth tergum between bases of elevations; posterior sterna with longest setae about one-fourth length of sternum. Legs with setae of all trochanters shorter than corresponding femora (on longer, in fact, than trochanters themselves); tarsal claws about two-fifths as long as tibiae; tarsal setae long, slender; longest seta of first tarsus reaching a point three-fourths distance from base to apex of claw. Length: 1.2-1.3 mm.

The larva of this species agrees fully with MacSwain's (1956, Univ. California Publ. Ent., vol. 12, p. 126) diagnosis of *Nemognatha* except that the posterior marginal setae of the sterna are less than half the length of the sterna. It is most similar to the larva of *nigripennis* LeConte. *Scutellaris* LeConte, the only other species of the subgenus *Pauronemognatha* whose larva is known, is as distinct from *selloa* as from *nigripennis.*

It is noteworthy that the larval specimens of *scutellaris* which I have studied (Walker Mine, California) will not run to *scutellaris* in MacSwain's key to the species of *Nemognatha* because none of the setae of the third trochanters are longer than the corresponding femora. In order to overcome this difficulty and to incorporate *selloa,* the following modification of the first couplets of MacSwain's key is suggested.

1. Abdominal tergites [terga] without a median transverse row of setae; frontal sutures diverging at or near transverse basal elevation (pl. 28) .... **scutellaris**
   Abdominal tergites with a median transverse row of four (rarely two) setae; frontal sutures, when present, diverging at a distance from transverse basal elevation.......... 2
2. Trochanters with all setae shorter than corresponding femora 2a
   Trochanters with some setae considerably longer than corresponding femora 3

2a. Abdominal tergites with a median transverse row of two setae and a posterior marginal row of six; epicranial suture faint, discontinuously marked .... **nigripennis**
   Abdominal tergites with a median transverse row of four setae and a posterior marginal row of eight; epicranial suture well developed, continuously marked. .... **selloa**



Nemognatha selloa, new species

FIG. 1. Aedeagus (holotype), lateral view. FIG. 2. Male gonoforceps (holotype), dorsal view. FIG. 3. Same, lateral view. FIG. 4. Pronotum (paratype, Calpulalpan, Tlaxcala). FIG. 5. Head of first instar larva, dorsal view.

SOME INJURIOUS WEEVILS IN HAITI (CURCULIONIDAE)

By BARRY D. VALENTINE AND BUENA S. VALENTINE[1]

This note is the first in a proposed series covering rhyncophora collected by us in Haiti and Jamaica during the summer of 1956. Its purpose is to record, for the first time in Haiti, several weevil genera of widespread economic significance. At least three appear to be new records for the Island of Hispaniola, and two are new for the West Indies.

The Republic of Haiti occupies the western end of Hispaniola, and is one of the most interesting and least known sites for entomological research. The fauna contains many unique genera and species which are unknown outside the island, and also others which appear to be ancestral to mainland forms. The great majority of coleopterous species are still undescribed, for in most families, little has been published. We were fortunate in being able to collect insects in the three major zoogeographic regions of Haiti: the two-thirds of the country north of Port-au-Prince; the Massif de La Selle, south and east of Port-au-Prince; and the Massif de La Hotte, forming the western half of the southern peninsula.

The courtesy and helpfulness of the officials of the Haitian Department of Agriculture are gratefully acknowledged, for without their assistance and planning, we would have been unable to collect in the Forêt des Pins, the pine forest which clothes Morne La Selle and the surrounding mountains.

Pissodes sp. It was a surprise to discover a close relative of our white pine weevil, *Pissodes strobi* (Peck) living in the magnificent 45,000 acre forest of *Pinus occidentalis* which covers the higher altitudes of southeastern Haiti. This appears to be the first record of the genus in the West Indies, all previously known localities being continental, where species occur from Canada to Mexico, and still others in Europe. The Haitian specimens actually appear closest to *Pissodes nemorensis* Germar, of southeastern United States, but can be separated from that species by their longer beaks. Differences between some members of the genus, however, appear quite variable, so final allocation must await further studies.

Hylobius n. sp. The same pine forest also yielded a species of curculionid related to the pales weevil (*Hylobius pales* Boheman) of eastern United States. The genus contains several species distributed from Canada to Brasil, and others in Europe. The Haitian specimens can be distinguished from all the New World forms by the presence of a punctured, but otherwise smooth pronotum, and smooth elytral intervals; while the pronotum in mainland species has well-developed longitudinal

[1] Department of Biology, Mississippi Southern College, Hattiesburg, Mississippi.

grooves and ridges, or if smooth, the elytra are carinate. Available descriptions of the European species are vague, but at least two are said to possess thoraxes and elytra similar to those of the Haitian insects.

The only record for the genus in the West Indies is that of Wolcott who, in his series on the insects of the Puerto Rico (1948, Jour. Ag. Univ. P. R. 32(2) :398), mentions the occurrence of *Hylobius pales* ''in a room in San Juan.'' It is possible that Wolcott's material is not *H. pales,* certainly the finding of the first autochthonous West Indian species in Haiti suggests that the Puerto Rican specimens should be reexamined and verified.

Both of the above genera were found on slash, and under boards and logs of *Pinus occidentalis,* the only native pine. The collections were made at an approximate elevation of 5,500 feet at the settlement called Refuge on Haitian maps, about 22 kilometers (by road) southeast of Fond Verrettes, during the period July 17, to 19, 1956. Most of the specimens were concentrated around the lumber mill at Refuge, a few came to lights at the guest houses about a half mile away. It was difficult to make any assessment of damage to the pines because large numbers of young trees had been killed by an unusually heavy frost the previous winter. Ordinarily, it is these young trees which show the most weevil damage. Final description of the Haitian species of *Pissodes* and *Hylobius* must await the opportunity for comparison with European species and some additional study.

Pantomorus godmani (Crotch). Fuller's Rose Beetle. This widely distributed and omnivorous pest has been recorded from all continents and many countries. We wish to make known what may be the first record from the West Indies. Seven specimens were collected about two miles north of Furcy, Haiti, on July 10, 1956, by sweeping a weedy, roadside legume. The species is of particular interest for two reasons. First, it is flightless, and therefore was probably introduced to the island by man. If this were the case, the weevil would logically be expected in the lowlands around Port-au-Prince. Strangely, no specimens were found during lowland collecting, the Furcy locality being about ten miles (twenty by road) above Port-au-Prince at an elevation close to 4,500 feet. Second, the species reproduces parthenogenetically, no males having ever been found among over a thousand individuals. The significance of a parthenogenetic condition in an economic pest is due to the fact that any individual is sufficient to start a new colony, and in addition, any beneficial mutation occurring during the development of one individual is immediately passed on to all of the offspring, providing a mechanism for rapid evolution.

Cosmopolites sordidus (Germar). The Banana Root Borer. This sluggish, black bill-bug is widely distributed in the banana growing regions of the world. Wolcott (*op. cit.*, p. 413) mentions the abundance of *Cosmopolites* in Puerto Rico and Cuba, and its absence in Hispaniola and Jamaica. We found it abundant in both of the latter localities. Both larvae and adults attack living plants, boring in the bulbs and pseudostems. In Haiti, the species occurs mostly at lower elevations (Damien and Plaisance). Several careful attempts were made to collect specimens (at elevations around 4,000 feet) in the vicinity of Kenscoff. Neither adults, larvae, nor larval workings were found. The species is an extremely constant one, specimens from Haiti, Jamaica, Honduras, and Ecuador being remarkably uniform.

Metamasius sp. (*hemipterus* Linnaeus or *sericeus* Olivier). Sugar Cane Borer. The taxonomic status of *hemipterus* and *sericeus* is not clear. Both names are commonly linked with sugar cane, while only *sericeus* is discussed with bananas. All authors agree that the two species are very closely related, and none give an adequate means of separating them. The recorded distribution is also interesting. In the Greater Antilles, *M. hemipterus* is recorded from Jamaica, Puerto Rico, and the Virgin Islands, while *M. sericeus* is listed from Cuba and Hispaniola. In the Lesser Antilles, *hemipterus* is from Antigua, Barbados, Dominica, Guadeloupe, and St. Vincent, while *sericeus* is from St. Lucia. In Central America, *hemipterus* is not listed, while *sericeus* is recorded from British Honduras, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, and Panama. In South America, *hemipterus* is mentioned from Brasil, French Guiana, and Venezuela, while *sericeus* is mentioned from Peru. The only localities in which both are included are St. Kitts and Colombia. Out of twenty-two countries or islands, only two are listed as having both forms. It appears possible that the records all apply to a single, variable, wide ranging species, but unfortunately, available literature is too vague to settle the point, and all of the extensive series of specimens studied by us (from Jamaica, Honduras, Costa Rica, and Ecuador) have been associated exclusively with bananas. Until we have seen the sugar cane insects it is impossible to decide on the correct status of the two names.

The banana specimens can run rapidly and fly readily. They are said to be secondary pests, inhabiting plants which have been killed or injured by other causes. Actually, the species has often been observed in living pseudostems, and there is ro reason why it could not become a primary pest during periods of abundance.

We did not collect *Metamasius* in Haiti, but its presence in the country is attested to by specimens from Damien in the insect collections of the

Bureau of Entomology of the Haitian Department of Agriculture. Pin label data definitely associate the specimens with banana.

As soon as taxonomic studies on the above material can be completed, specimens of each species will be deposited with the Bureau of Entomology at Damien, Haiti. At the moment, all specimens are at Mississippi Southern College.

RECORDS OF STRIGODERMA TEAPENSIS BATES FROM THE UNITED STATES (SCARABAEIDAE)

By O. L. CARTWRIGHT[1]

Recently a small scarab beetle submitted for determination from Brownsville, Texas, was found to be *Strigoderma teapensis* Bates, a Mexican species apparently not previously listed in the literature as occurring in the United States. The collection of the United States National Museum now contains nine specimens from Texas bearing other data as follows: 1, El Paso, October 22, 1922, L. E. Dorland, det Ohaus; 3, Eagle Pass, April 2, 1923, C. E. Bellis; 2, Columbus, May 26, Wickham, and Hubbard and Schwarz; 2, Galveston, May, F. H. Snow; and Brownsville, April 17, 1956, J. E. Mabry, Jr.

Strigoderma teapensis Bates varies from 6.5 to 8 mm. in length, and from 4 to 5 mm. in width. Six of the specimens seen have the elytra, the base of the pronotum opposite the scutellum, and the lateral margins of the pronotum rather narrowly flavo-testaceous, all other parts fuscous; the other three specimens are concolorous brownish black or fuscous. The head and pronotum in all cases have a faint coppery lustre. Specimens with light colored elytra have the scutellum, the extreme elytral margin apically, and parts of the four lateral striae near the shoulders brownish black. The head and sparsely hairy pronotum are closely punctate. The elytra are short and wide, usually less than 0.5 mm. longer than wide. The distinctly punctate elytral striae number six or seven between the suture and humeral callus. The posterior femora and tibiae are unusually short and wide, the tibiae being shorter than the femora and slightly less than twice as long as wide.

Strigoderma teapensis Bates is easily separated from *arboricola* (Fab.) and *pygmaea* (Fab.), the two common species in the United States, by its intermediate size, the number of discal striae between the suture and humeral callus, and especially by the wide, short femora and tibiae. *Strigoderma arboricola* is 10 to 12 mm. in length with 8 striae, while *pygmaea* is only 5 to 6 mm. in length with five discal striae.

---

[1]United States National Museum, Smithsonian Institution, Washington, D. C.

NEW SUBSPECIES OF CERAMBYCIDAE MOSTLY FROM SOUTHWESTERN UNITED STATES

By E. Gorton Linsley[1]

Tragidion armatum brevipenne Linsley, new subspecies

Form smaller and shorter than *T. armatum armatum;* antennae about as long as body in male, about three fourths as long as body in female; elytra short, exposing last abdominal tergite. Length, 18-20 mm.

Holotype male and allotype female from Daggett, San Bernardino Co., California, April 28, 1937 (T. Aitken) (California Academy of Sciences, Entomology). Paratypes from the same series in the collections of the California Academy of Sciences, the California Insect Survey (University of California, Berkeley) and the American Museum of Natural History.

This subspecies occurs on the Mojave Desert and lives at the expense of the Joshua Tree (*Yucca brevifolia*). It is distinguished by the short antennae and abbreviated elytra.

Batyle ignicollis australis Linsley, new subspecies

Form as in *B. ignicollis ignicollis;* pronotal pubescence very long and dense; elytral pubescence dense, nearly as long as that of pronotum, erect over basal half, suberect posteriorly. Length, 8.5-12 mm.

Holotype male, allotype female and two paratypes from Mobile, Alabama, May 20, 1917 (L. S. Slevin collection, Calif. Acad. Sci., Ent.). Additional material is at hand from various localities in Georgia, Florida, Alabama and Mississippi.

This form differs from both *B. ignicollis ignicollis* (Say) and *B. ignicollis oblonga* Casey by having distinctly longer and more erect pubescence.

Batyle suturalis infuscatus Linsley, new subspecies

Form slender; integument black, shining, without any bright red coloration, pronotum and abdomen sometimes piceous or brownish, elytra sometimes longitudinal streaked with brown, anterior and intermediate tibiae, and tarsi sometimes piceous or brownish pubescence black; elytral punctation denser, shallower; thoracic sterna rather densely pubescent. Length, 6-8.5 mm.

Holotype male, allotype female, and ten paratypes, male and female, from Paonia, Delta Co., Colorado, June 13-14, 1926 (E. C. Van Dyke) (California Acad. Sciences).

This subspecies is smaller and more shallowly and densely punctate than *B. suturalis pearsalli* (Bland) and appears to express the extreme in development of melanism in the *B. suturalis* complex. However, the coloration appears to have been derived from that of *pearsalii* by addi-

[1]University of California, Berkeley.

tion of black pigment, just as that of *B. suturale remota* Casey appears to have been derived by reduction of black pigment.

Batyle suturalis melanicollis Linsley, new subspecies

Form robust; integument black, shining, abdomen and basal two thirds of elytra pale reddish-orange; pubescence black; elytra coarsely, sparsely punctate. Length, 6-8 mm.

Holotype male, allotype female and twelve paratypes, male and female, from 8 miles E. of Hueco, Hudspeth Co., Texas, July 9, 1950 (Ray F. Smith) (Amer. Mus. Nat. Hist.). Additional material has been examined from 15 mi. E. of El Paso, Texas, June 22, 1942 (E. C. Van Dyke) (Calif. Acad. Sci., Ent.) and Gallego, Chihuahua, August 6, 1954 (M. Cazier, W. Gertsch, G. Bradt) (Amer. Mus. Nat. Hist.).

The thirty-one examples of this form available for study are remarkably constant and have the aspect of a species distinct from *B. suturalis.* However, the elytral pattern is that of *B. suturalis rutilans,* and it appears to me to be a melanic form derived from that type.

Tylosis puncticollis arizonicus Linsley, new subspecies

Tylosis puncticollis, Schaeffer (not Bates, 1885), 1908, Bull. Brooklyn Inst. Arts Sci., vol. 1, pp. 162, 340.

Form of *T. puncticollis puncticollis;* elytra with a common basal dark area which reaches anterior margin and envelopes scutellum, median dark areas obliquely oval, separated anteriorly, contiguous or joining behind, distinctly separated from common subapical dark area, the latter not touching or enveloping apex; antennae of male exceeding elytral apices by but two or three segments. Length, 9-12 mm.

Holotype male, allotype female, and paratypes from Palmerlee, Arizona, July 10 (H. A. Wenzel) (Calif. Acad. Sci., Ent.). Additional paratypes from 10 mi. E. of Sonoita, Arizona, August 10, 1940 (E. S. Ross) and Chiricahua Mts., Arizona, August and September (D. K. Duncan) (Calif. Acad. Sci., Ent.).

This subspecies may be distinguished from the Mexican *T. puncticollis puncticollis* Bates by the short antennae and separated posterior black spot of the elytra.

Tylosis puncticollis hilaris Linsley, new subspecies

Form of *T. puncticollis puncticollis;* elytra without a common basal dark area, median dark spots narrow, oblique, converging but rarely reaching suture, posterior comon dark area reaching apex; antennae of male exceeding elytra by four or five segments. Length, 6-14 mm.

Holotype male, allotype female and 44 paratypes, male and female, from Oaxaca, Oaxaca, Mexico, elev. 5000 ft., July 20, 1937 (M. A. Embury) (Calif. Acad. Sci., Ent.).

This subspecies, because of the narrow, oblique elytral markings, has the aspect of a distinct species.

Xylotrechus bowditchi hoppingi Linsley, new subspecies

Xylotrechus mormonus, G. Hopping (not LeConte), 1932, Ann. Ent. Soc. America, vol. 25, p. 540, pl. 2, fig. 12, pl. 5, fig. 1; R. Hopping, 1941, Pan-Pacific Ent., vol. 17, p. 29.

Xylotrechus obliteratus, G. Hopping (not LeConte), 1932, Ann. Ent. Soc. America, vol. 25, p. 542 (part).

Pronotum with pubescent fasciae at apex; metathoracic episterna and sternum and first four abdominal segments margined posteriorly with white pubescence. Length, 12-15 mm.

Holotype male, allotype female, and three paratypes from Jemez Mts., New Mexico, June 18 and July 24 (J. W. Green) (Calif. Acad. Sci., Ent.). Additional paratypes: Cloudcroft, Sacramento Mts., New Mexico, 9000 ft., July 5, 1917 (Wheeler), Santa Fe Canyon, New Mexico, July 23, 1926 (E. C. Van Dyke), Tres Ritos, New Mexico, July 7, 1918 (R. Hopping), all in the collection of the California Academy of Science.

The fully marked individuals of this form were regarded by G. Hopping as *obliteratus,* those with reduced markings as *mormonus.* However, both the latter species belong to the group of *X. insignis* Le Conte.

Neoclytus mucronatus vogti Linsley, new subspecies

Form and size of the typical subspecies, but integument generally of a paler reddish-brown, the pronotum distinctly margined with yellow at base and apex, the pubescent bands of the elytra bold, bright yellow, the median band evenly arcuate, uniformly wide, rarely attenuated laterally or expanded or angulate at the suture, post-median and subapical bands distinct, usually connected on the suture, the former often attenuated laterally but usually reaching the margin, shoulders usually suffused with yellow pubescence, apices often obscurely so, ventral surfaces extensively clothed with white pubescence.

Holotype female and three paratypes from Donna, Hildalgo Co., Texas, March 13, 1935 (K. L. Maehler) (Calif. Acad. Sci., Ent.). Additional paratypes as follows: 1 ♀, Mission, Hidalgo Co., Texas, September 1, 1936 (P. C. Avery) (C. A. S., Ent.); 1 ♂, Hilalgo Co., Texas, August 4 (G. M. Greene) (U.S. National Museum); 6 ♂, 3 ♀, from locality 10,* about 6 mi. west of Mission, Hidalgo Co., Texas, on fresh cut logs of *Celtis laevigata,* in March, July, October, 1946 and reared from this host from March 9 through October 20, 1946 (G. B. Vogt); 6 ♂, 2 ♀, same locality, reared from dead limbs of *Ulmus crasifolia* in early July, 1946 (G. B. Vogt), and 3 ♂ and 2 ♀, from locality 7,* about two miles southeast of Mission, Hidalgo Co., Texas, on decadent *Parkinsonia aculeata,* June 14, 1946 (G. B. Vogt). Other material at hand includes: 2 ♀, from Rincon Mts., Cochise Co., Arizona, reared from *Celtis occidentalis,* September 3, 1908 (J. L. Webb) (U. S. Nat. Mus.); 1 ♂ from Brown's Cañon, east side of Baboquivari Mts., Pima Co., Arizona, July 29-30, 1952 (H. B.

Leech and J. W. Greene) (C.A.S., Ent.) ; 1 ♂. Davis Mts., Texas (C.A.S., Ent.) ; 1 ♂, Devil's River, Vel Verde Co., Texas, May 3, 1907 (E. A. Schwarz) (U.S. Nat. Mus.) ; 1 ♂, Brownsville, Cameron Co., Texas, June, 1899 (H. F. Wickham) (U. S. Nat. Mus.) ; 2 ♂, Nuevo Leon, Mexico (Barrett) (Fenyes coll., C.A.S., Ent.) ; and 1 ♂, 1 ♀, intercepted from Mexico in plant quarantine inspections at Laredo, Texas, March 29, 1938 and May 26, 1943 (U.S. Nat. Mus.).

This subspecies apparently occurs near the southern boundary of the United States from the Baboquivari and Rincon Mts. of Arizona to the Lower Rio Grande Valley of Texas and adjacent areas in northern Mexico (at least in Nuevo Leon). It appears to be associated with *Celtis, Ulmus crassifolia* and *Parkinsonia,* the typical northern subspecies primarily with hickory and pecan. The influence of the color pattern of this form is observable in samples from San Antonia and Victoria, Texas and a specimen from the latter locality was taken on *Celtis* (the remainder lack host data). North of these areas (Comal, Caldwell, Travis, Milan, Hamilton and Brown counties) in central Texas, the pattern blends into that of the typical form and in material available from northern Texas (Dallas, Collin and Montague counties) the influence is no longer evident. In the collection of the U. S. National Museum there is a male marked like the typical subspecies from La Grange, Fayette Co., Texas, November 17, recorded as "living in *Celtis,*" a female from Plano, Collin Co., Texas, November, taken "at roots of persimmon."

This subspecies is named for George B. Vogt, who not only first recorded precise host data concerning it but also kindly selected for me the Texan material in the collection of the United States National Museum and made it available for study.

---

*For details see: Vogt, G. B. 1949, Pan-Pacific Ent., vol. 25, pp. 137-144.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XI | Fall and Winter | 1957

Published quarterly beginning with March by the DEPARTMENT OF BIOLOGY, SAINT JOHN FISHER COLLEGE, Rochester 18, New York. Terms of subscription: $5.00 per year, both domestic and foreign, payable in advance. Back numbers are available.

Edited by Ross H. Arnett, Jr.

CERAMBYCIDAE FROM MEXICO AND SOUTHWESTERN UNITED STATES

By E. Gorton Linsley[1]

In the course of identifying some Cerambycidae in the collections of the American Museum of Natural History and the California Academy of Sciences, the following forms, apparently undescribed, were encountered.

Euderces fenyesi Linsley, new species

Female: Form small, ant-like; integument black or piceous, antennae somewhat rufo-piceous; pubescence sparse, long, erect, except for a dense patch of white pubescence on sides of mesothorax and metasternum; eburneus fascia of elytra near basal one-third, transverse, straight, not attaining suture or lateral margin. *Head* densely, shallowly, somewhat striate-punctate; antennae reaching to middle of elytra, third segment without trace of an apical spine. *Pronotum* longer than broad, apex nearly as wide as sides at middle, surface densely longitudinally striate, sparsely clothed with erect hairs; disc somewhat granulate posteriorly. *Elytra* two and one-half times as long as basal width, sides narrowed slightly at middle, widest at apical one-third; surface coarsely punctate over basal two-thirds, disk strongly depressed at middle, moderately so anteriorly, convex over apical one-third and finely densely deticulate punctate, thinly clothed with long erect hairs; apices conjointly rounded, unarmed. *Legs* moderately short, sparsely punctate, sparsely clothed with long erect hairs; femora clavate, posterior pair attaining elytral apices. *Abdomen* shining, very sparsely punctate, sparsely clothed with long suberect hairs; fifth sternite rounded at apex. Length, 3.5 mm.

Holotype female and one paratype female from Cuernavaca, Mexico, June (A. Fenyes) (Calif. Acad. Sci., Ent.). The paratype is slightly larger (4 mm.) and darker than the holotype.

This small blackish species may be recognized by the sculpturing and the straight transverse eburneous fascia of the elytra. It belongs to *Euderces* s.str. with the antennae and elytral apices unarmed.

---

[1]University of California, Berkeley.

Euderces picipes occidentalis Linsley, new subspecies

Form of *E. picipes picipes*, but a little smaller; integument reddish to rufo-testaceous, abdomen and apex of elytra piceous or black. Length, 5-6.5 mm.

Holotype male and allotype female from Fedor, Texas (Birkman) (Calif. Acad. Sci., Ent.). Additional material at hand is from Dallas, Texas, without further data, and from Latimer Co., Oklahoma, June 10, 1931 (R. D. Burd).

In size and coloration this subspecies approaches *E. reichei* LeConte, which occurs in the same area. It may be distinguished at once, however, by the striate pronotum and oblique ivory fasciae of the elytra. It also resembles closely *E. pini* (Olivier) but differs by having the dorsal and ventral lobes of the eye connected by a line, the pronotum not constricted anteriorly and the striae extending to the apical margin which is narrowly elevated, the abdomen with the first sternite densely pubescent, and the elytra without an oblique, pubescent scar on apical dark area.

In the range of *E. picipes picipes* (Fabricius) occasional pale individuals occur with the basal half of the elytra brown (9 specimens of 392 at hand are of this type), but the prothorax is black or piceous. Examples from Kansas superficially resemble this pale variety, but usually have the pronotum or prosternum or both more or less reddish, approaching the subspecies *occidentalis.*

Tragidion dichromaticum Linsley, new species

Male: Form elongate, slender; integument brown, antennae, pronotum and elytra more or less reddish-brown; pubescence fine short brownish, longer on face, cheeks and prosternum, with brilliant bluish reflections on posterior tibiae, less conspicuously so on dorsal calluses of pronotum. *Head* finely densely punctate; antennal tubercles prominent; antennae twelve-segmented, exceeding elytral apices by six segments, segments three to seven carinate externally at apex, the carina produced as a spine, twelfth segment less than one-fourth shorter than eleventh, filiform, apex arcuate. *Pronotum* less than one and one-fourth times as wide as long, surface moderately finely, very densely punctate, lateral tubercle with apex subacute, disk with a broad, arcuate dorsal callus extending from base to apical one-third and more or less joined posteriorly to a median longitudinal basal callus, calluses minutely punctate, pubescence not concealing surface; prosternum moderately finely, closely punctate, anterior margin very finely punctate; metasternum finely punctate, uniformly clothed with suberect pubescence. *Elytra* about three times as long as broad, base not wider than pronotum across tubercles; surface finely densely punctate, densely clothed with short, fine, appressed yellowish pubescence; disk with three longitudinal costae; apices obliquely truncate, outer angle obtuse. *Legs* slender; posterior femora not attaining elytral apices, finely densely punctate externally, thinly clothed with short suberect brownish pubescence; posterior tibiae arcuate, densely finely punctate, densely clothed with dark pubescence with a brilliant bluish caste, longer, denser, and erect on dorsal surface; tarsi relatively short, broad, first segment of posterior pair as long as two following together, second segment one and one-fourth times as long as third. *Abdomen* with sternites finely densely punctate except apical margins, finely pubescent; fifth sternite shallowly rounded, apex slightly emarginate at middle. Length, 22.5 mm.

Female: Integument black, elytra reddish-orange; pubescence black with brilliant bluish reflections, except that of elytra which is very short and golden; antennae eleven-segmented, reaching to apical one-third of elytra, segments three to ten slightly expanded apically, acute or spinose externally; pronotum across tubercles narrower than elytra at base; abdomen with fifth sternite broadly truncate and fringed at apex. Length, 20 mm.

Holotype male, allotype female, and six paratypes, one male and five females, from Mexcala, Guerrero, Mexico, June 3, 1946 (J. and D. Pallister) (American Museum of Natural History), and two paratypes, both female, from Alpuyeca, Morelos, Mexico, July 3, 1951 (P. D. Hurd) (California Insect Survey, University of California). These last two specimens exhibit congenital defects which have affected the apex of the right elytron, one also the posterior right tibia and tarsus, but otherwise they agree well with the examples from Mexcala.

This species may be recognized by the pronounced sexual dimorphism and dichromatism, slender form, and the brilliant bluish reflections of the black pubescence of the female and of the posterior tibiae of the male.

NEW BOOKS

The following publications have recently appeared:

BLACKWELDER, R. E., 1957. *Checklist of the Coleopterous insects of Mexico, Central America, the West Indies, and South America,* pt. 6, pp. vii + 927-1492. Bulletin 185, U. S. National Museum, Washington. This completes this bulletin.

UHMANN, ERICH, 1957. *Coleopterum Catalogus, supplementa,* pars. 35, fasc. 1, *Chrysomelidae: Hispinae,* vii + 153. Junk, 's-Gravenhage. 40 guilders.

JOLIVET, P., 1957. *Coleopterum Catalogus, supplementa,* pars. 51, fasc. 3, *Chrysomelidae: Orsodacninae,* 16 pp., Junk, 's-Gravenhage. 4.50 guilders.

R. H. ARNETT, JR.

PANIN, S. 1957. *Fauna Republicii Populare Romine. Insecta.* Vol. X, Fasc. 4. *Coleoptera, Familia Scarabaeidae.* (Acad. Rep. Populare Romine.) 316 pp., 36 pls. + page of errata.

This volume completes the treatment of the Roumanian Scarabaeidae begun by Panin in Vol. 10, Fasc. 3 (Melolonthinae and Rutelinae) in 1955. The present fascicule provides keys and diagnoses for 173 species. General distribution of each species is given, and specific localities in Roumania are cited for rarer forms. There is a brief introductory portion on ecology, and the life history and other aspects of ecology are discussed under some species. The plates include photographs and figures of morphological details of adults and some larvae. The work should be valuable as a manual for those interested in the central European fauna.

FRANK N. YOUNG, *Indiana University*

THE USE OF WETTING AGENTS IN COLEOPTEROLOGY

By W. WAYNE BOYLE[1]

Many of the aspects of beetle study involve the use of water in one way or another. Dried specimens may be soaked in water for relaxing and cleaning prior to mounting, of course; and water is commonly used as a vehicle in the clearing, staining, and manipulation of dissected organs such as genitalia and mouth parts. The time required for these processes to occur and the difficulty in accomplishing them appear invariably to bear a direct correlation with the surface tension of the water used. As a consequence they may be speeded up or done more easily by decreasing the surface tension of the water, or, in non-technical parlance, ''softening'' it.

Surface tension may be reduced by adding a small amount of a household detergent or a commercial wetting agent (also called surface-active agents or surfactants) to the water to be used. I have used ''Triton X-100'' (one of the older commercial wetting agents) for several years with good results. A stock solution of one part of this material to 20 parts of water is made up and kept in a 250-ml. bottle on my desk. One to several drops of this are then added to small amounts of water whenever it is used in working with beetles. There seems to be little difference in effectiveness between the powdered and liquid materials, but the latter are somewhat more convenient to use in making up the stock solution. Processes involving the use of detergent-treated water may be accelerated even further by applying heat to the solution.

Water that has been ''softened'' by the addition of a detergent yields the following advantages. Dried specimens may be quickly and conveniently relaxed prior to pinning or dissection by soaking for a few minutes. Absorption of water by the internal tissues is greatly accelerated by detergents, however; and it is important to see that specimens to be mounted, especially small ones, do not become unduly distended by separation of the tagmata, for this distension is seldom reversed by drying. Beetles less than 5 mm. in length should not be soaked for more than ten or fifteen minutes and should be mounted on paper points by means of a water-soluble glue. (The use of any other type of adhesive renders subsequent removal of the specimen for any purpose difficult without damaging it.) The adhesive qualities of water-soluble glues are improved by the addition and thorough mixing in of a few drops of water containing a detergent.

Either dried or freshly killed specimens that are encrusted with dirt, grease, or lepidopterous scales can be easily cleaned by manipulation with forceps and a camel's-hair brush in softened water; and the relaxing of dried specimens is accomplished at the same time. Dissected sclerotized parts, such as genitalia and mouth parts, can be cleared in potash solution more quickly if the water contains a detergent. If it is desirable to stain such preparations with mercurochrome or other water-soluble stains, the staining process is accelerated by using water softened with detergent. Moreover, tiny sclerotized parts can be pushed below the surface film easily for observation, staining, or other treatment in softened water. It seems likely that the use of a detergent would expedite the staining in aqueous solutions of any histological preparation.

---

[1]University of Hawaii, Honolulu 14, Hawaii.

ENTOMOLOGY ABOVE TIMBERLINE: II. THE ATTRACTION OF LADYBIRD BEETLES TO MOUNTAIN TOPS

By J. GORDON EDWARDS[1]

I have devoted eight summers to the task of climbing every major mountain in Glacier National Park, Montana, as a special research project in connection with my duties as Ranger Naturalist in that park. The primary object of these ascents was the compilation of detailed guide sheets describing the best routes up each peak, but I took advantage of the opportunity to also make many entomological observations far above timberline on those rugged mountains. Although all kinds of arthropods were sought, I was especially interested in becoming familiar with the Coleoptera and Diptera of that rigorous environment. Some general aspects of entomology above timberline were recently discussed in the Mazama Club Annual (Edwards 1956), but the subject is so vast that it should be more leisurely covered in a series of more specific publications. The present article is intended to be the first of these more detailed treatments, and will discuss only the mountain-frequenting Coccinellidae.

The enigmatic behavior of ladybird beetles above timberline is certainly interesting to many coleopterists, and our ignorance of the factors involved should reveal the need for further research on alpine insects in general. My acquaintance with the problem began on 19 June 1952, when I climbed Pinnacle Peak, Washington (on the south side of Mt. Rainier). There at nearly 7,000 feet, surrounded by thousands of acres of spring snowfields, I encountered a living scourge of "ladybugs." They swarmed over my body and face, they violated my lunch, and they tried to crawl into the lens of my camera. I had to brush them off my sandwiches between bites and shake them out of the camera between exposures. For months thereafter I found squashed ladybug remnants in odd places in my equipment. They were mostly *Hippodamia oregonensis* Cr., but there were also many *H. 5-signata* Kby. and a few *Coccinella nivicola monticola* Muls. I was especially surprised because on two previous climbs of this peak I had not noticed any large numbers of the beetles (although on 27 June 1948 I collected one specimen of *H. oregonensis* in the snow near the summit).

After leaving Washington I travelled to Montana, where I discovered thousands of ladybird beetles atop 9,365 foot Allen Mountain in Glacier National Park on 3 July 1952. Beneath each large slab of limestone near the summit cairn were hundreds of ladybugs, but they did not annoy me that time, because they were all dead (and had apparently been so for

---

[1]San Jose State College, California.

several months). In contrast to this abundance of corpses, not a single live one was seen on the summit at that time. I had already made more than 30 major climbs in the Park, but had never seen more than two or three ladybugs on any other peak, even though I usually looked carefully beneath the rocks on the summit for insects and spiders. During the next four summers I continued to climb mountains at least one or two days every week, but never discovered any other congregations of ladybugs (dead or alive) above timberline. Meanwhile I induced many other climbers en route to Allen Mountain to look for beetles under the rocks on top, but with no success evident until 1956. Near the end of June that year a party reported no ladybirds at the summit, but on 9 July 1956 Jerry Barnes found them present there by the hundreds. He stated that they were extremely annoying to him during his stay on top, but he found no dead beetles beneath the rocks there. During the summer much more climbing was done than ever before in this area, including at least four additional ascents of Allen Mountain, but no other parties ever encountered swarming ladybugs, not even on that peak. I believe we can account for the situation there by assuming the following behavior by members of the local populations of coccinellids:

In early July thousands of adults accumulate on the summit of Allen Mountain (and not on neighboring peaks, even though several are approximately the same height). Many of them mate during this lateral migration, then after a day or two on the mountain the swarm disperses, most individuals flying to the prairies a few miles away. There the eggs are laid about five days after mating, and the adults and larvae share the same habitat during much of the summer, feeding on aphids and other small insects. In autumn the newly-emerged adults (possibly accompanied by many of the year-old individuals) slowly migrate to the mountain-top again. During Indian Summer (in October) they return to the valleys around Allen Mountain and form overwintering masses in protected places, under an insulating blanket of heavy snow.

The concentration of dead bodies beneath the summit rocks in spring 1952 probably resulted from the unusually heavy snows of the preceding fall (359 inches at Marias Pass as compared with the normal 239 inches there). If the beetles were so completely entombed by snow that they could not escape to the valleys, they were certain to freeze to death during the winter (in the prairies 5,000 vertical feet below the summit the winter temperatures often sink below —40°F.).

It is hoped that future observations will either verify or disprove the hypothesis outlined above. Many authors have commented on this curious behavior, but there seems to be much disagreement among them. Some have stated that the beetles do NOT mate while on the peaks, but I observed many in coitus on Yakima Peak, Pinnacle Peak, and Telescope Peak (California). Many authors have noted that most summit masses are predominantly a single species, but there are other observations of mixed congregations. Balduf believes that the ascent of the beetles to mountain peaks in late fall and their occasional overwintering at high elevations "seems explicable in terms of air current." Many persons have observed them working upward on windless days or even advancing against the wind, hence it seems doubtful that winds are primarily responsible. Also, they are often seen flying about near mountain-tops on calm days when they could easily fly downhill in any direction without difficulty. It is true that Snyder saw hundreds of them being blown past him at the 9,000 foot elevation in Utah, but possibly they were merely being aided in their instinctive ascent by a favorable wind and would otherwise have been forced to crawl uphill or await a cessation or change of the wind. I am convinced that winds and convection currents are defintely *not* responsible for the lateral migrations of these insects. Balduf also noted increases in the proportion of fat to water in the body of the beetles after a season of intensive feeding, which seems to make them lose their hunger and wander aimlessly about. The distinctive odor of the hypodermal secretions of the beetles probably attracts migrating individuals toward the aggregations in certain favored places (although other places, apparently just as favorable, have no beetles). This causes tremendous accumulations of the adults in some places, including the vast over-wintering masses in sheltered valleys.

Possibly the major causes of these mass movements are then: (1) an urge to congregate prior to mating in the spring; (2) a subsequent dearth of food causing the beetles to leave the summit; (3) the high valley temperatures coupled with a condition of lipoid satiety in the fall impelling them to wander aimlessly, often retracing their route to the mountain-top; (4) the increasingly frigid temperatures of early winter, driving them down into more sheltered places and (5) the attraction of the hypodermal secretions resulting in their gathering into tremendous over-wintering masses in appropriate places, covered by sufficient snow to protect them from fatal temperatures. Whatever the causes and effects, the phenomenon is common wherever there are large mountains.

The same factors which regulate the mass migrations to and from Allen Mountain probably are in effect elsewhere in western United States. In addition to the congregation of *Hippodamia oregonensis* on Pinnacle Peak, Washington, I have also encountered this species on near-by Yakima Peak (6,231 feet high, just east of Mt. Rainier). They were swarming there on 20 September 1952, in addition to which there were hundreds of year-old ladybug carcasses beneath the summit rocks. The unusually cold summer and early heavy snows of 1951 struck there as well as in Montana, and the dead bodies on the peaks in both areas the following summer must have been a result of this widespread cold wave. The migration to the summit is apparently a rapid process and the beetles do not linger there long, hence if one is a few days too early or too late he may miss the swarming activity entirely. This could account for their abundance on Yakima Peak on 20 September 1952 and their absence there on 9 September 1956, as well as explaining their sudden appearance on Allen Mountain in early July after being absent near the end of June (1956). On 18 September 1951 I observed thousands of ladybugs migrating up the lofty southwest shoulder of Mt. Shuksan, near the northwest corner of Washington, in Mt. Baker National Forest, but was unable to determine how near the summit they were at that time. In addition to the Montana and Washington records mentioned above, ladybird beetles have also been found swarming in Oregon, Idaho, Utah, California, Arizona, and New Mexico. Chapin (1946) mentions the following four collection reports: Knowlton and Nye got 68 specimens of *Hippodamia 5-signata* ("typical" variety mixed with the heavily spotted variety *uteana* Csy.) above 9,700 feet on Mt. Logan, Utah (May 13, 1939). Dr. C. G. Abbott collected 2,856 over-wintering individuals of *H. convergens* Guérin (with all degrees of maculation of elytra represented) near the Smithsonian Institution Solar Observing Station at Tyrone, New Mexico. H. S. Barber collected 188 specimens of *H. 5-signata* on the 8,270 foot summit of Peavine Peak, Nevada (near Reno) on 16 January 1923. Most individuals there were the heavily spotted variety *uteana* Csy., but a few were the "typical" variety. Further south, this spotted variety was observed by Th. Dobzhansky on a 5,500 foot peak in the Argus Mountains near Death Valley, California, on 30 May 1933. I personally encountered thousands of ladybugs at the summit of Telescope Peak (11,000 vertical feet directly above Death Valley) on 26 March 1956. Dr. Kenneth Hagen identified these as *H. 5-signata uteana* Csy., and notified me that he has found them abundant in Death Valley (Furnace Creek Ranch) during the month of April.

Elsewhere in the world, Dr. M. S. Mani, during his entomological expeditions into the Himalayas of India, has often found ladybugs. One mass assemblage of *Coccinella septempunctata* L. was observed and photographed on a glacier near Lakka Pass (15,000 foot elevation) in the Dholadhar Range. Professor Dobzhansky observed that accumulations of ladybugs on mountains in Turkestan (1925) were always on bare, un-forested peaks which the wind kept free of snow. He estimated that these masses contained 60,000 to 70,000 beetles or more. A high percentage of the individuals in each mass belonged to the same species, but often there were a few individuals of several other species present.

The accounts of beetles overwintering on the mountain-tops do not necessarily dispute the belief, stated earlier, that they overwinter in the valleys in mountainous areas of western United States. Indeed, the lower, warmer mountains and hills in this country often are chosen as overwintering sites by these insects. Unless there is a great difference in amount of snow cover, the mountain tops or the south-facing slopes near them are likely to be so warmed by the sun that they are more favorable than lower, more shaded localities. Johnson (1910) collected 15,415 *H. 5-signata* from a single mass atop a butte near Fairfield, Washington, and in the southwestern states such mountain-top estivations are common. Nevertheless, I believe it is very unlikely that ladybugs will intentionally overwinter on the high, frigid, snowy peaks of the Cascades, the Rockies, or the Sierra, and it is these "major" peaks where the true alpine conditions exist with which I am primarily concerned in this article.

There are usually no ill effects from the migratory habit, but occasionally this seasonal swarming results in disaster for the beetles, as in the case of the severe autumn of 1951. Another hazard for the aggregations of beetles is the possibility that they may be devoured by animals which are not repelled by their hypodermal secretions. On 10,000 foot McDonald Peak (in the Mission Range of Montana) twelve grizzly bears were observed near the summit by John Romer (1955). They were overturning rocks and eating something beneath them. Later investigation revealed great masses of ladybird beetles under the rocks, and apparently the bears considered them edible. Another Montanan reported seeing grizzlies rolling over rocks above timberline on the same peak and eating the accumulations of ladybugs. John Stark (1955) investigated these reports, and estimated that five to ten gallons of the beetles could be collected per day in the vicinity. This brings up the possibility of collecting them and selling them to farmers to aid in the control of aphid infestations, but according to G. C. Quick of Phoenix, Arizona (Kobler, 1953), the only species suitable for rearing and liberation as a biological control agent is *Hippodamia convergens* Guérin. In his vicinity, he collects them and rears them and sells them by the gallon for agricultural purposes. Unfortunately, the adult beetles still respond to their inexplicable urges, and soon forsake the lowlands to migrate to the tops of the hills surrounding their new home.

As the years pass, more and more entomologists will find their way to the lofty summits where these amazing insects are wont to gather. Surely someday their fascinating secrets will be revealed, and another amazing chapter can be added to our accounts of insect biological phenomena. I have appealed to all mountain-climbers in the Pacific Northwest to aid in this research by reporting all aggregations of coccinellids they encounter, with the pertinent data concerning them. The same appeal is extended to all readers of the Coleopterists' Bulletin. This coordinated effort should soon result in bettering our understanding of the unusual behavior of these hordes of persistent six-legged mountaineers.

USEFUL REFERENCES

BALDUF, W. V. 1935. The bionomics of entomophagous Coleoptera. St. Louis: John Swift.

CHAPIN, E. A. 1946. Review of the New World species of *Hippodamia* Dejean. Smithsonian Misc. Coll. **106** (11): 1-39, plus 22 pls.

CHAPMAN, J. A. 1954. Studies on summit frequenting insects in western Montana. Ecology **35** (1): 41-49, 5 figs.

CHAPMAN, J. A., ROMER, J. I. AND J. STARK. 1955. Ladybird beetles and army cutworm adults as food for grizzly bears in Montana. Ecology **36**: (1): 156-58.

DOBZHANSKY, TH. 1925. Ueber das Massenauftreten einiger Coccinelliden im Gebirge Turkestans. Zeits. Wiss. Insektbiol. **20**: 249-56.

EDWARDS, J. G. 1956. Entomology above timberline. Mazama Club Annual (Portland, Oregon) **38** (13): 13-17.

EWING, H. E. 1913. Notes on Oregon Coccinellidae. Jour. Econ. Ent. **6**: 404-407.

JOHNSON, R. H. 1910. Determinate evolution in . . lady-beetles. Carnegie Inst. Publ. No. 122, 55 pp.

KOBLER, J. 1953. He lives on ladybugs. Colliers Magazine, Sept. 4, 1953, pp. 82-85, illus.

MANI, M. S. AND S. SINGH. 1955. Entomological survey of the Himalayas, Part XIII. Second entomological expedition to North-west (Punjab) Himalayas. Agra Univ. Jour. of Research **4** (suppl.): 717-40, 17 figs., 1 pl.

POULTON, E. B. 1904. A possible explanation of insect swarms on mountain-tops. Trans. Ent. Soc. London 1904: xxiii-xxvi.

HARPALUS PUNCTICEPS STEPH. ON LONG ISLAND, N. Y.

In his annual shipment of beetles, Roy Latham of Orient sent in specimens of the above ground beetle collected by him as follows:

Orient, L. I., N. Y., April 30, 1954 a female.

Montauk, L. I., N. Y., June 9, 1956 a male.

Orient, L. I., N. Y., Sept. 5, 1956 a female.

Orient, L. I., N. Y., Sept. 7, 1956 a female.

The females were taken at lights on Roy's house. The single female collected in 1954 had been sent in at the time but was not recognized. All the specimens were sent to Carl H. Lindroth of Lund, Sweden who verified the identification as *Harpalus* (*Ophonus*) *puncticeps* Steph. (*angusticollis* J. Mueller). No doubt the species must be spreading in the sand on Long Island and collecting this Spring might turn up a good series for Lindroth writes that the species is common in harbours on the SW coast of England. HENRY DIETRICH, Ithaca, N. Y.

A NEW NAME FOR *ZAGLYPTUS* LECONTE, 1876 (NOT FORSTER, 1868) AND A REVIEW OF THE NORTH AMERICAN SPECIES (Curculionidae, Baridinae)[1]

By D. G. Kissinger[2]

Buchananius Kissinger, new name

Buchananius, **new name,** is proposed to replace *Zaglyptus* LeConte, 1876 (not Förster, 1868). The name is proposed in honor of the American Coleopterist, L. L. Buchanan, who has contributed much toward the systematics of the North American Curculionidae.

No type has been previously selected for the preoccupied name. *Zaglyptus striatus* LeConte, is now designated as the type species of the genus.

The genus contains the smallest members of the Baridinae ranging in size from 1.1 to 2.0 mm. The genus occurs in the Eastern United States from Pennsylvania west to Iowa south to Louisiana and Florida, and from Southern Mexico to Venezuela and St. Vincent Is.

In the United States members of the genus have been found on the ground under leaves. E. A. Schwarz found *B. striatus* LeConte and *B. sulcatus* LeConte under small oak branches lying on the ground. The author has found 2 specimens of *B. sulcatus* LeConte, one in mold and fungus under a portion of a small oak branch partially buried in a grassy roadway and the other in a discarded, mildewed leather suit-case.

Distinctive characters of the genus are: form abbreviated, robust, very convex, with sparse, coarse appressed setae and scattered, long erect setae on the dorsal surface, ventral surface glabrous; pygidium covered; anterior coxae widely separated, prosterum shallowly sulcate; third tarsal segment narrow, undilated, tarsal claws slender, free. It is distinguished from *Zaglyptoides* Champion by having the eyes not strongly transverse and the prothorax not abruptly tubulate anteriorly, according to Champion.

Four Central and South American species were not available for study, viz., *B. crispus* (Champion, n. comb.), *B. carinifer* (Champion, n. comb.), *B. quadriguttatus* (Champion, n. comb.), and *B. seriatus* (Faust, n. comb.). Also *Zaglyptoides ferrugineus* Champion was not seen. They are not included in this study.

---

[1]Scientific art. No. A610 Contribution No. 2790 of the Maryland Agricultural Experiment Station, Department of Entomology.

[2]R. D. #4, Reading, Penna.

KEY TO NORTH AMERICAN SPECIES OF BUCHANANIUS KISSINGER

1. Dorsal surface of prothorax distinctly punctured 2
   Dorsal surface of prothorax dull, finely striate, not distinctly punctured; Guatemala (Fig. 5) .... **neglectus**, sp. n.
2. Elytral intervals narrow, strongly convex; prothorax laterally distinctly constricted apically 3
   Elytral intervals nearly flat; prothorax not constricted apically 4
3. Elytra nearly uniform dark ferrugineous; sides of metasternum indistinctly punctured, dull with distinct, fine striations (Fig. 3); size generally less than 1.5 mm.; Guatemala .... **costatus** Champion
   Elytra black with paler humeral spot; sides of metasternum with coarse, deep punctures, shining with sparser very fine striations (Fig. 4); size generally greater than 1.5 mm.; Eastern United States .... **sulcatus** LeConte
4. Prothorax and base of elytra clothed with fine, sparse, appressed scales; eyes nearly round (Fig. 1); Eastern United States & Southern Mexico .... **striatus** LeConte
   Prothorax and elytra glabrous except for erect serae; eyes strongly transverse (Fig. 2); Guatemala .... **minutissimus** Champion

B. sulcatus (LeConte) and *B. costatus* (Champion) are very similar allopatric species. They are distinct from *B. striatus* (LeConte), *B. minutissimus* (Champion), and *B. neglectus,* sp. n., in that the prothorax is constricted laterally so that the apex is somewhat tubulate and elytral intervals are narrow and very convex. The prothorax of the latter three species is not at all constricted apically, and the intervals are wider and nearly flat and the the strial punctures are finer. With the exception of *B. striatus* (LeConte) the eyes of the species are transverse as in Figure 2. The prothorax is clothed with appressed hair-like scales with the exception of *B. minutissimus* (Champion) and *B. neglectus*, sp. n.

Buchananius neglectus, new species
(Figures 2 and 5)

This species is described from a unique female labeled April 24, Cacao, Trece Aguas, Alta Vera Paz, GUATEMALA, Schwarz and Barber collectors, U. S. N. M. Cat. No. 62812. The specimen was considered a paratype of *minutissimus* by Champion who referred to it as a variety probably due to immaturity. I am greatly indebted to Sir Guy Marshall who has examined the type of *B. minutissimus* (Champion) and ascertained that it is the specimen with the punctured prothorax and not the one with the finely striate, nearly impunctate prothorax characteristic of *neglectus.* A second specimen of *neglectus* is in the British Museum (N. H.).

Length: 1.25 mm.; width: 0.81 mm.

Derm dark reddish, head, beak, antennae and legs somewhat paler; nearly glabrous except for long, white, fine, sparse erect setae on the elytra, prothorax, and head. Beak from apex to bottom of eye longer than head and prothorax combined; with a shallow, broad, dorsal median sulcus which extends from above antennal insertion to base and narrows basally, extending onto the frons as an impressed line; with two pairs of erect setae in front of the eyes. Antennae inserted at middle of beak, at distance from eye slightly greater (1/6th) than length of eye; scape as long as eye, about as long as 7-segmented funicle; 1st segment of funicle as long as next two, as stout as apical segment; club twice as long as wide, 0.12 × 0.06 mm. Eyes narrow, transverse, twice as long as wide; frons ¾ths as wide as beak (from above) at base immediately distad of eye, about as wide as dorsal tip of beak. Prothorax transverse, subconical, distinctly narrowed in apical third, but not tubulated; at base ⅔rds wider than long, sides evenly converging in basal half, abruptly narrowed to sub-constricted apical third; dorsal surface nearly impunctate except for fine, distinct punctures bearing erect setae, surface dull, rather densely, finely strigose; base strongly bi-sinuate, with a raised, shining basal margin, median line a raised, shining carina extending from base to apical third; in lateral view dorsal margin strongly convex behind middle. Front coxae separated by distance less than width of a coxa, prosternum very shallowly, broadly sulcate distad of coxae. Elytra at humeri 1/5th wider than prothorax at base; 2.3 times as long as prothorax; length to width as 14: 12.5; intervals about twice as wide as striae, moderately convex, each with a single row of distant, fine punctures bearing erect setae separated by a distance twice as great as width of an interval; striae fine, with deep, elongate punctures separated by about one-half width of interval, strial punctures encroach on intervals. Ventral surface rather shallowly, indistinctly punctured, finely, densely strigose. Front femora 3.75 times as long as wide, moderately clavate apically.

The elytral intervals are moderately convex in this species and not narrowly costate as in *B. sulcatus* (LeConte). The strigose, nearly impunctate prothorax will separate this species from all others that are described.

Buchananius costatus (Champion, *new combination*)

(*Figure 3*)

Zaglyptus costatus Champion, 1908, Biologia Centrali-Americana, Coleoptera, vol. 4, pt. 5, p. 340, pl. 17, fig. 24, 24a.

Type locality: GUATEMALA: Alta Vera Paz, San Juan (BMNH).

A paratype labeled April 11, Cacao, Trece Aguas, Alta Vera Paz, GUATEMALA, Barber and Schwarz collectors (USNM) was studied. Apparently there are only two specimens known.

This species is very closely related to *B. sulcatus* (LeConte) and differs mainly in its slightly smaller size; uniformly dark ferrugineous elytra; and more finely, sparsely, and indistinctly punctured sides of the pro-, meso-, and metathorax.

Buchananius sulcatus (LeConte, *new combination*)

(*Figure 4*)

Zaglyptus sulcatus LeConte, 1876, Proc. American Philos. Soc., 15: 237.

Type locality: UNITED STATES: Alabama: Mobile

Material has been seen from the following localities:

District of Columbia. Florida: Crescent City. Georgia. Kentucky: Louisville. Louisiana: Covington. Mississippi: Hancock Co. Missouri: Jefferson Barracks; St. Louis. Ohio: Cincinnati. Pennsylvania: Berks Co. nr. Reading. Tennessee: nr. Nashville.

Buchananius striatus (LeConte, *new combination*)

(*Figure 1*)

Zaglyptus striatus LeConte, 1876, Proc. American Philos. Soc., 15: 237.

Zaglyptus perminutus Casey, 1920, Mem. Coleopt., vol. 9, p. 515. *New synonymy.*

Zaglyptus atomicus Casey, 1920, Mem. Coleopt., vol. 9, p. 515. *New synonymy.*

Type locality of *striatus: Pennsylvania.*

Type locality of *perminutus:* District of Columbia.

Type locality of *atomicus:* Mississippi: Vicksburg.

Additional material has been seen from the following localities:

District of Columbia. Illinois: White Heath. Iowa: Story Co. (Bleasdell, 1937). Louisiana: Baton Rouge. Maryland: Beltsville; Chesapeake Beach. Michigan: Detroit. New York: Staten Is. North Carolina: 10 mi. W. Asheville. Virginia: Rosslyn.

MEXICO: Vera Cruz: Coyame, Catemaco (June, 1954, D. G. Kissinger).

The types of Casey's two species are somewhat more abraded than his determined specimens of *B. striatus* (LeConte). These types exhibit no differential character worthy of an additional name.

Two specimens that appear to be this species have been collected by the author in Vera Cruz, Mexico. The figure for this species was drawn from one of these specimens. They differ slightly from specimens taken in the United States in that the dorsal margin of the head, in side view, is more concave where the rostrum merges with the head immediately in front of the dorsal margin of the eye. In the typical *striatus* there is no distinct interruption in the evenly rounded dorsal outline of the head from the base of the rostrum to the vertex. The two Mexican specimens appear to be females. The rostrum is about as long as the prothorax and is rather stout. In the typical *striatus* the beak is distinctly longer than the prothorax and is slightly more slender.

It is felt that the differences discussed do not warrant an additional name for the Mexican forms. However these distinctions seem to indicate that there may be a barrier between the United States *striatus* and the population in Mexico. It appears from existing collections that about one thousand miles separate the United States and Mexican populations. This may be due to lack of collections rather than to absence of this species.

B. striatus (LeConte) is distinct from the species considered in this study by the nearly round eyes.

Buchananius minutissimus (Champion, *new combination*)

Zaglyptus minutissimus Champion, 1908, Biologia Centrali-Americana, Coleoptera, vol. 4, pt. 5., p. 341.

Type locality: GUATEMALA: Senahu.

A paratype labeled March 28, Cacao, Trece Aguas, Alta Vera Paz, GUATEMALA, Barber and Schwarz collectors (USNM) was studied. Apparently only two specimens are known.

References

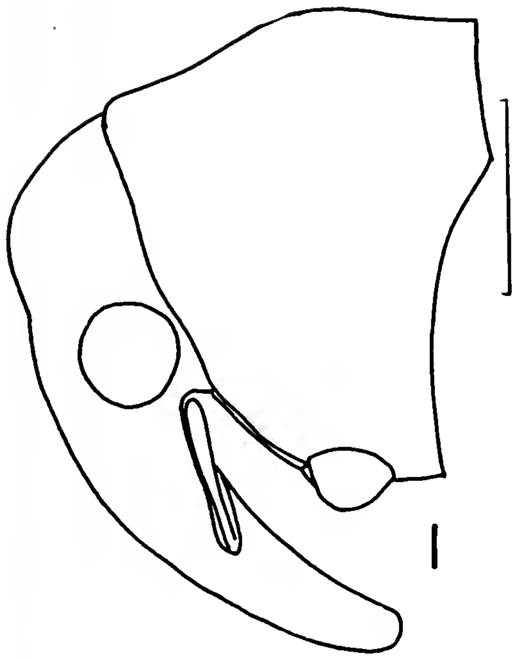
Bleasdell, G. G. 1937. The Rhynchopora of Iowa. Iowa State College Jour. Sci., 11 (no. 4): 405-445.

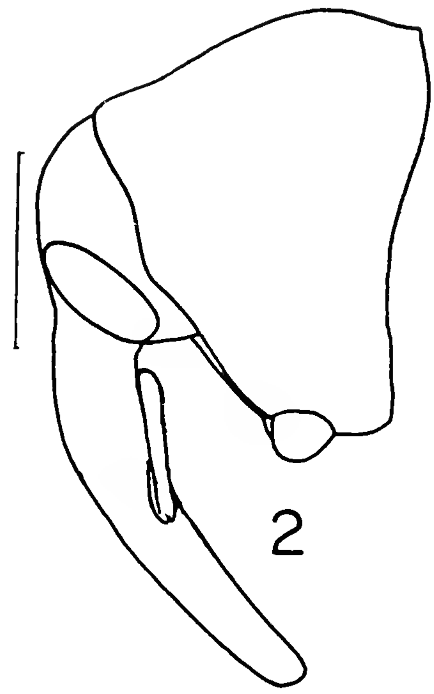
Casey, T. L. 1920. Memoirs on the Coleoptera, vol. 9. New Era Printing Co., Lancaster, 529 pp.

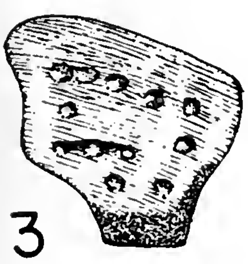
Champion, G. C. 1906-1909. Biologia Centrali-Americana, Coleoptera, vol. 4, pt. 5. Godman and Salvin, London, 513 pp., 23 pls.

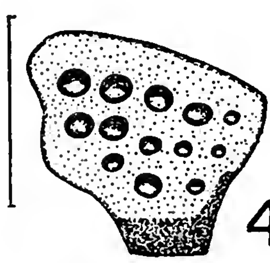
Faust, J. 1896. Reise von E. Simon in Venezuela, 3rd part. Stett. Ent. Zeit., 57: 33-136.

LeConte, J. L. and G. H. Horn. 1876. The Rhynchophora of America north of Mexico. Proc. American Philos. Soc., vol. 15, no. 96, 455 pp.


1


2


3


4

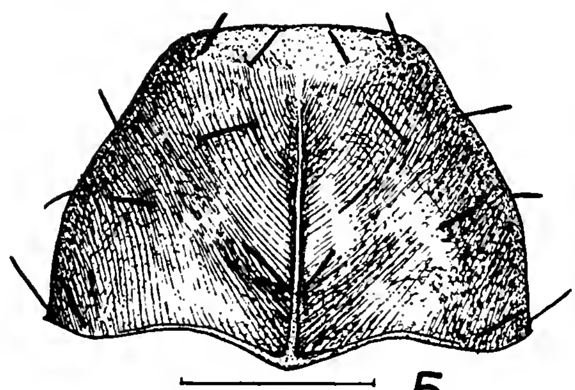

5

Figure 1–Lateral view of head and prothorax of female *B. striatus* (LeConte) from Vera Cruz, Mexico. Figure 2–Same of female *B. neglectus*, sp. n. Figure 3–Lateral view of metasternum of *B. costatus* (Champion). Figure 4–Same of *B. sulcatus* (LeConte). Figure 5–Dorsal view of prothorax of *B. neglectus*, sp. n. Note: line equals 0.25 mm.

TENTH INTERNATIONAL CONGRESS OF ENTOMOLOGY

The Tenth International Congress of Entomology, at Montreal, August 17 - 25, 1956, was beyond any shadow of doubt, the most successful meeting of entomologists of the century. The organization of the activities of this meeting were perfect down to the most minute detail. Those who attended the meeting need not be told, and those who did not would hardly believe me if I were to try to express the delight I feel in recalling the memories of that meeting. The proceedings of the meeting, about to be published, will show the range of subjects and the quality of papers that were given. It is unfortunate that printing costs are such that the practical scientist cannot publish an account of the informal meetings that were held also. However, the following picture of the Coleopterists attending the meeting should serve to illustrate the opportunity we had to discuss beetles during the many social functions. It is too bad that this picture does not include all Coleopterists who were in attendance, and I do not have a list of those who are missing.

This photo was supplied through the courtesy of the Canadian Department of Agriculture and of Mr. J. A. Downes, Secretary of the Tenth International Congress. On behalf of the Coleopterists, if I may be so presumptuous, I would like to publically extend my thanks to Mr. Downes and his staff, all members of the Canadian Department of Agriculture and other Canadian entomological centers, for their work in making this meeting the tremendous success it was.—EDITOR.

Top row, left to right: Karl E. Schedl, R. L. Wenzel, C. H. Seevers, J. L. Gressit, R. H. Arnett, Jr., J. B. Wallis, E. C. Becker. *Second row, l. to r.:* W. J. Brown, R. B. Selander, F. G. Werner, J. A. Wilcox, W. H. Anderson. *Bottom row, l. to r.:* H. E. Hinton, M. H. Hatch, J. B. Thomas, H. S. Dybas, S. L. Wood, E. B. Britton, C. H. Lindroth, L. M. Walkley, F. I. van Emden, W. Y. Watson.

BIOLOGICAL NOTES ON EUCRADA HUMERALIS (MELSHEIMER) (Anobiidae)

By JEROME G. ROZEN, JR.[1]

Little information is available concerning the two species in the genus *Eucrada*. Although incomplete, the following data concerning the life history of *humeralis* (Melsheimer) are offered now, since I see no opportunity to continue the observations in the near future. Every attempt has been made to include details of comparative value as an aid in the future systematic studies of the family Anobiidae. The mature larva of the species has been described by Böving (1954).

The larvae were discovered in a dead oak tree near Four-Mile Run, Arlington County, Virginia, on March 3, 1957. The tree, 5 inches in diameter and of solid wood, leaned against live trees. Its bark in most places was removed easily, revealing numerous various stage larvae of *humeralis* in their frass-filled burrows. These tunnels occurred on all sides of the trunk from approximately 6 feet above the ground to the base.

Although burrows that house mature larvae vary in length, they average about 4 inches, and the bore of each lies half way in the wood and half way into the bark. Because tunnels were not discovered deeper in the wood, it is concluded that the species will not be of economic importance. Tunnels excavated by newly hatched larvae are narrow but widen as the insect grows, so that the average diameter of a tunnel of a mature or nearly mature form measures 3-3.5 mm. Burrows may advance in any direction and, although their course may curve and turn, there is a tendency for them to parallel the long axis of the trunk. Occasionally burrows made by two individuals will meet, and frequently a tunnel will double back on itself, resulting in an excavation twice as wide as a single burrow.

The frass, which solidly packs the tunnels, is composed of rough or even jagged, fine but not powderlike bits of fecal material, some of which are dark and others light; it is not formed into the rounded pellets characteristic of certain other anobiids.

Before pupation the larva bores at an angle into the bark at the end of the tunnel, so as to come close to the surface. It then spins a cocoon, which completely fills the chamber, and pupates. Although some pupae and adults developed during the course of the observations in the spring, the coexistence of pupae, mature larvae, and early-stage larvae sug-

[1]Entomology Research Division, Agricultural Research Service, United States Department of Agriculture.

gested that there may not be a definite period for adult emergence.

The cocoon is quite different from known pupal cases of most other anobiids but resembles remarkably those of certain bees. Cocoons have been deposited in the U. S. National Museum, where the cocoons and pupal cases of other anobiid species are also stored. The cocoon of *humeralis* is an elongate spheroid, with broadly rounded ends, approximately 5 mm. long and 2.5-3 mm. wide. Although constructed of many layers of moderately fine, threadlike strands, presumably an anal secretion, the finished casing appears parchment-like, the strands being matted together to form a tough, light brown, moderately rigid though thin fabric. In spite of the fact that bits of frass may adhere to the outside of the cocoon in various places, the frass is obviously not a part of the structure.

Though perhaps paler, the cocoons spun by *Hedobia granosa* Lec. (original observation), in the genus most closely related to *Eucrada,* resemble in every other way those of *E. humeralis. H. imperialis* (L.) (Xambeu, 1894), *regalis* (Duft.) (Portevin, 1896), and *pubescens* (Oliv.) (Wachtl, 1876) also construct silken cocoons, although the information available does not permit a further comparison of their appearance. The cocoons produced by *Ptilinerus marmoratus* (Reitt.) (original observation) differ from those of *E. humeralis* only by being much paler and perhaps not quite so rigid.

It seems that most anobiids do not spin a silken cocoon. Evidence on hand indicates that many and possibly all the others prepare a pupal enclosure by gluing together debris and fecal material with what may be a modified silk secretion.

After the adult of *Eucrada humeralis* emerges from the pupal exuviae, it gnaws an exit through the end of the cocoon closest to the surface of the bark and then through the thin partition of bark. Since the vacated case bears the cast larval and pupal exuviae at the end opposite the opening, it is concluded that the larva pupates with its head pointing toward its future exit path.

References Cited

Böving, A. G. 1954. Mature larvae of the beetle-family Anobiidae. Biol. Meddel., 22(2), 298 pp., pls.

Portevin, G. 1896. Description de la larva de *Hedobia* (*Ptinomorphus*) *regalis* Duft. Bull. Soc. Ent. France, pp. 15-16.

Wachtl, F. 1876. Beschreibung der Metamorphose und der Lebensweise von *Hedobia pubescens* Oliv. Verhandlungen der kaiserlichköniglichen zoologisch-botanischen Gesellschaft in Wien 26:709-712, figs.

Xambeu, V. 1894. Moeürs et métamorphoses des insectes. Ann. Soc. Ent. France 63:459-504.

THREE NEW AMERICAN *APHODIUS* WITH NOTES AND A KEY TO RELATED SPECIES (SCARABAEIDAE)

By O. L. CARTWRIGHT[1]

The beetles treated in the following notes are closely allied to *Aphodius crassulus* Horn. They are found from New Jersey to Arizona and Temascaltepec, in the state of Mexico. All are comparatively rather small, shining, usually pitchy black species of strongly convex habitus. One new species, because of its quadridentate clypeus, would fall in Horn's group A; all others have the clypeus bidentate or at least strongly biangulate and would be placed in a subdivision of group B (Horn, 1887, p. 8). Many of them apparently are attracted only to deer droppings in shady, wooded areas.

Group characters, aside from the dentate clypeus, compact convex form, and shiny black appearance, are as follows: scutellum small; posterior tibiae apically fimbriate with equal spinules; anterior tibiae tridentate, crenulate above the teeth, anterior face smooth; first segment of anterior tarsi shorter than the second; head more or less trituberculate, clypeus almost always with few to many, small, rounded tubercles at sides and anterior edge, often masked by punctate-rugose sculpture.

Key to species

1. Clypeus with two triangular teeth or angulations 2
   Clypeus with four equal, spiniform, slightly recurved teeth; Texas .... **bottimeri**, new species.
2. Elytral intervals concave, especially at shoulders; New Jersey .... **odocoilis** Robinson
   Elytral intervals flat or convex 3
3. Terminal abdominal segment with a distinct concavity; mountains of North and South Carolina .... **brimleyi** Cartwright
   Terminal abdominal segment without concavity 4
4. Elytral striae noticeably wider over apical declivity with the intervals becoming very strongly convex 5
   Elytral striae not noticeably wider over apical declivity and the intervals not strongly convex at apex 6
5. Elytral intervals flat on disc, striae coarse and punctures crenating edges of intervals; larger species, 3.6 to 6.0 mm.; Virginia to Florida .... **crassulus** Horn
   Elytral intervals usually slightly to moderately convex on disc, the striae finer and the punctures not noticeably crenating edges of intervals; small species, 3.3 to 3.7 mm.; México .... **spiniclypeus** Hinton
6. Clypeus not punctate-rugose but with small, rounded, well-separated tubercles, otherwise relatively smooth; pronotal punctures fine, separated by at least the diameter of the coarse punctures even in the anterior angles 7
   Clypeus strongly rugose-punctate; pronotal punctures usually closer and not as fine 8

---

[1]United States National Museum, Smithsonian Institution, Washington, D. C.

7. Basal tooth of anterior tibia slightly nearer base than apex; antennae light colored; strial punctures and crenations of intervals of elytra not or scarcely evident over apical declivity; first four striae subparallel, only slightly converging at apex; South Carolina .... **windsori** Cartwright
   Basal tooth of anterior tibia nearer apex than base; antennae fuscous; strial punctures of elytra very slightly larger and more noticeable over declivity than on disc; South Carolina to Texas .... **lodingi**, new species
8. Elytra relatively short, four-fifths as wide as long; pronotal punctures relatively coarse, dense at sides and in anterior angles where they are separated by less than the diameter of the fine punctures, often some merging together; Texas .... **abusus** Fall
   Elytra longer, three-fourths as wide as long; pronotal punctures more widely separated in anterior angles 9
9. Apex of elytra shining, not alutaceous; pronotum with mixed punctures, some three or four times as large as adjacent fine punctures, this disparity more noticeable laterally; Texas, New Mexico, Arizona .... **crassuloides** Fall
   Apex of elytra always alutaceous; punctures of pronotum almost uniform in size, evenly, closely spaced throughout; Oklahoma .... **pseudabusus**, new species

Aphodius bottimeri, new species

Holotype. — Length 4 mm., width 2 mm. Oblong, convex, piceous, shining. Head strongly convex, without frontal tubercles, surface behind frontal suture with close, moderately coarse punctures separated by less than one to two diameters, middle third anterior to suture closely, moderately, coarsely punctate to roughly rugose, anterior third similarly rugose with numerous low, rounded tubercles added; anterior clypeal margin broadly, weakly emarginate and bearing four very distinct, equal, slightly recurved, spiniform teeth, each tooth at least twice as long as its basal width, the middle teeth separated by twice the distance to those on either side; lateral edge of clypeus narrowly reflexed, nearly straight to the slightly depressed obtusely right-angled genae. Palpi and basal joints of antennae castaneus, club of antennae grayish-brown. Pronotum three-tenths wider than long, sides straight, not quite parallel, two-sevenths shorter than middle line, anterior angles rounded, posterior angles distinct but obtuse, base and sides finely margined, surface closely, evenly punctate throughout, fine to moderate punctures of disc separated by one to two diameters, a little closer at sides and tending more noticeably to two sizes. Elytra about three-quarters as wide as long, sides nearly parallel, diverging to slightly beyond the middle, striae strong and deep, crenately not closely punctate, the striae becoming wider over apical declivity, intervals very weakly convex, finely, distinctly, biseriately punctate. Mesosternum finely alutaceous, close, shallow, coarse punctures except at middle, a row of four or five punctures extending back nearly the full length of the carina between the middle coxae. Metasternum shining, scattered, moderate punctures separated by about two diameters over disc, median line weakly impressed. Posterior coxal plates strongly alutaceous. Abdominal segments alutaceous, each with a transverse row of four or five hair-bearing punctures at each side. Anterior tibiae strongly tridentate, crenate above the teeth, spur strong, acuminate, arcuate downward, first tarsal segment shorter than the second. Middle and hind femora with scattered, moderately close punctures. Posterior tibiae with fringe of short equal spinules, long spur, first tarsal segment, and the following three together approximately equal in length. Sex not determined.

Holotype, USNM No. 63579. collected at Camp Stanley, Texas, 22 March 1947, by L. J. Bottimer in whose honor the species is named.

Forty-five paratypes, all collected in Texas by L. J. Bottimer, all taken at deer droppings except one in cow dung, as follows: 9, Camp Stanley, March 22, 1947;

3, Camp Stanley, March 7, 1951; 23, Camp Stanley, March 16, 1953; 2, Camp Stanley, February 25, 1955; 4, Kerrville, 3-17-48, 1-20-49, 2-6-49, and March 1951; 1, Fredericksburg, October 22, 1950; 3, Rock Springs, April 18, 1950.

There is little variation among the specimens. In size the largest is 2.2 mm., and the smallest is 2.0 mm., in length. In two or three specimens the small rounded tubercles of the clypeus are more noticeable because the surface is less wrinkled otherwise.

None of the specimens shows distinct frontal tubercles but a few have a small smooth spot where the median tubercle would be expected if present. Whether or not there is a carina between the middle coxae is uncertain, some specimens showing a distinct carina more or less masked by coarse punctures, others showing none whatever. Because of these more or less uncertain characters it is not easy to place the species in Horn's 1887 key to the Aphodiini of the United States; however, the size, shape, color, and gneral appearance place it near *A. crassulus* Horn and allied species. The four sharp, prominent clypeal teeth easily distinguish the species. In occasional specimens of *A. conspersus* Horn from California, the head is superficially very similar to that of *bottimeri* but *conspersus* has a distinct clypeal carina and lacks the small rounded tubercles anteriorly. *A. conspersus* is also a flatter, relatively longer species, usually with small round pale spots on the elytra. In *quadridentatus* Harold, described from Cuba, the middle teeth are larger, sharper, and project forward while the sides of the pronotum, apices of the elytra, and elytral spots are reddish yellow.

Paratypes will be placed in the collections of the American Museum of Natural History, the British Museum (Natural History), Canadian Department of Agriculture, California Academy of Sciences, Chicago Natural History Museum, Museum of Comparative Zoology, Naturhistoriska Riksmuseum, and the private collections of L. J. Bottimer, Henry Howden, and Mark Robinson.

Aphodius odocoilis Robinson

Aphodius odocoilis Robinson, Ent. News, 50, p. 24, 1939.

Mark Robinson described this species from New Jersey, stating that it had been taken only in deer and rabbit excrement. In the present study I have examined five specimens from Mt. Misery, the type locality, and Clementon, New Jersey. It is one of the smallest species in the group, ranging from 2.7 to 3.7 mm. in length. The type is in the Robinson collection in Philadelphia, Pennsylvania.

Aphodius brimleyi Cartwright

Aphodius brimleyi Cartwright, Ann. Ent. Soc. America, 32 p. 357, 1939.

This species is found in the mountains of North and South Carolina in deer droppings. The 26 specimens examined were collected from May 25 to August 26 in Pisgah Forest near Brevard, North Carolina, and on Sassafras Mountain above Rocky Bottom, South Carolina. The concavity of the terminal abdominal segment is unique. The type is in the United States National Museum.

Aphodius crassulus Horn

Aphodius crassulus Horn, Trans. American Ent. Soc., 3, p. 118, 1870.

Aphodius crassulus, the first known and largest species of the group was described from Georgia and Florida. Forty-four specimens bear the following locality labels: Okefenokee Swamp, Georgia; Seabrooks Island, and Caspary Plantation near Ritter, South Carolina; and Deep Creek, Norfolk County, Virginia. C. S. Brimley listed *Aphodius crassulus* Horn from Cape Hatteras, in his Insects of North Carolina, 1938. The South Carolina and Virginia specimens were collected at deer droppings in shady woods. The specimens range from 3.5 to 6.0 mm. in length. Dr. Horn's specimens are in the Academy of Natural Sciences of Philadelphia.

Aphodius spiniclypeus Hinton

Aphodius spiniclypeus Hinton, Stylops, 3, p. 190, 1934.

This small Méxican species was described from Real de Arriba, District of Temascaltepec, State of México, from specimens collected at an elevation of 6000 feet. Eight specimens in the United States National Museum were studied, 3 paratypes, and 5 from the Casey collection labelled simply, México, D. F. The type is reported to be in the California Academy of Sciences.

Aphodius windsori Cartwright

Aphodius windsori Cartwright, Ann. Ent. Soc. America, 32, p. 357, 1939.

The holotype and single paratype remain the only specimens of this species known to the writer. They were taken under horse or mule dung in a sandy long-leaf pine woods near Windsor, South Carolina. A number of characters set *windsori* apart from others of the group found in the same general area: the light-colored antennae, the weakly rounded genae, the anterior tibial teeth far apart with the upper tooth very slightly nearer the base than to the tip of the apical tooth, the elytral striae with punctures and crenations scarcely evident over the apical declivity, the first four striae subparallel, converging only slightly and all reaching the apical edge, the small size, and the redder color. The holotype is in the United States National Museum.

Aphodius lodingi, new species

Holotype male.—Length 4.2 mm., width 2.2 mm. Oblong-oval, convex, piceous, shining. Head convex, trituberculate along frontal suture, punctures behind suture moderate in size, slightly larger than those on pronotal disc, separated by about their diameters; clypeus sharply bidentate, the upturned teeth rather widely separated, the distance between them greater than from tooth to genal suture, broadly shallowly emarginate between the teeth, sides weakly arcuate to genae, surface with very distinct, rounded tubercles separated by one to two times their diameters over anterior two-thirds, scattered fine punctures posteriorly to frontal suture, genae sharply rounded, greater than a right-angle. Club of antennae grayish fuscous. Phonotum strongly convex, 1.95 mm. long by 1.4 mm. wide, sides weakly arcuate, nearly straight posteriorly, all angles obtuse and rounded, sides and base finely margined; punctures fine, quite uniformly distributed, a little closer anteriorly at sides, a few slightly coarser punctures intermixed, separated by about two diameters on disc. Elytra short, 2.2 mm. in width by 2.5 mm. in length, strongly convex, sides nearly straight over basal half, striae moderately deep, the strong punctures crenating the sides of the intervals even at apex, intervals nearly flat with scattered very fine punctures. Mesosternum closely, rather coarsely, setigerously punctate. Metasternum with scattered fine punctures, coarse setigerous punctures anteriorly at sides. Posterior coxal plates alutaceous. Abdominal segments alutaceous, with transverse rows of very shallow, coarse, setigerous punctures, the hairs of each anterior row about as long as the length of the segment. Anterior tibia smooth in front, the basal tooth slightly nearer apex than base, crenate above the teeth, second tarsal segment longer than the first, spur moderately heavy, its tip slightly bent downward. Middle and hind femora shining, sparsely punctate. Posterior tibiae fimbriate with short almost equal spinules, first tarsal segment subequal to long spur, and to the following three segments combied.

Holotype, USNM No. 63580, collected at deer droppings, Caspary Plantation, near Ritter, South Carolina, November 30, 1939, by W. M. Upholt.

Thirty paratypes: 15, collected with holotype by O. L. Cartwright and W. M. Upholt; 1, Savannah, Georgia, Hubbard and Schwarz; 1, Lafayette, Louisiana, B. R. Coad; 1, Fort Deposit, Alabama, February 2, 1938, J. G. Watts; 11, Mobile, Alabama; 1, Texas, Hubbard and Schwarz. They range from 3.6 to 4.7 mm. in length.

Aphodius lodingi, named after Henry P. Löding who collected and studied the Gulf Coast fauna for many years, is very close to *Aphodius windsori.* It differs in having the third or basal tooth of the anterior tibia nearer the apex than the base, the antennae darker, the tubercles of the clypeus more distinct, the elytral striae distinctly crenate-punctate apically, and in being relatively shorter and more convex.

Aphodius abusus Fall

Aphodius abusus Fall, Trans. American Ent. Soc. 33, p. 242, 1907.

Aphodius abusus Fall was described from Texas. It is very close to *crassuloides* but on direct comparison is found to be shorter and more convex. The pronotal punctures are very close and especially dense in the anterior angles; the elytra are noticeably shorter, more convex in profile, with deeper striae, the strial punctures scarcely crenating the very flat intervals. It is rare in collections. I have seen only five specimens including the holotype. One of the two specimens from Winnfield, Louisiana, in the Fall collection labeled *abusus* is correctly determined, the other is the species described as *lodingi* in this paper. There were three in the Liebeck collection simply labeled "Texas." One of these is now in the National Museum collection.

The type of *abusus* is in the H. C. Fall collection in the Museum of Comparative Zoology at Harvard College, Cambridge, Massachusetts.

Aphodius crassuloides Fall

Aphodius crassuloides Fall, Trans. American Ent. Soc., 33, p. 243, 1907.

Dr. H. C. Fall described *Aphodius crassuloides* from Cloudcroft, New Mexico, comparing it with *abusus, ruricola,* and *granarius.* The latter two are superficially quite similar in general appearance, *ruricola* particularly so, but they never show the distinct clypeal teeth so evident in the species here discussed. *Aphodius crassuloides* is perhaps most closely related to *pseudabusus* n. sp., however, it practically never shows more than a faint trace of alutaceous sculpture at the tips of the elytra, a type of surface sculpture always noticeable in *pseudabusus.* The pronotal punctures are more nearly of one size in the latter species also, whereas there is very often considerable disparity in *crassuloides,* especially at the sides. Over one hundred specimens of *crassuloides* have been examined from the following localities: Kerrville, Texas and "Texas" (Belfrage); Cloudcroft and Las Vegas, New Mexico; and Flagstaff, Fort Grant, Chiricahua Mts., Palmerlee, Huachuca Mts. Madera Canyon, Santa Rita Mts., Patagonia Mts., and Southwestern Research Station, 5 miles west of Portal, Arizona.

The type of *crassuloides* is in the Fall collection at the Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts.

Aphodius pseudabusus, new species

Holotype male.—Length 4.1 mm., width 1.95 mm. Oblong, convex, piceous, shining. Head not strongly convex, frontal tubercles weak but evident, surface with moderate punctures throughout, separated at middle on each side of frontal suture by one to two times their diameter, a little closer laterally, anterior third roughly rugose-punctate but without rounded tubercles; anterior clypeal margin broadly emarginate, bordered each side by a small sharp tooth or angulation, sides weakly arcuate to moderate, rounded genae. Club of antennae grayish brown. Pronotum strongly convex, 1.8 mm. long by 1.3 mm. wide, sides weakly arcuate, anterior angles rounded, posterior angles distinct but obtuse, base and sides finely margined, surface uniformly, moderately punctate throughout, the punctures separated on the disc by one to two diameters, only very slightly closer laterally and in the anterior angles. Elytra one-fifth longer than wide, sides nearly parallel, striae strong and deep, the strial punctures weakly crenating the sides of the intervals, intervals shining, slightly convex, with marginal rows of fine punctures separated by three or four times their diameters, these punctures very slightly coarser or more noticeable over the apical declivity, apex of elytra distinctly alutaceous. Mesosternum with close, shallow, alutaceous punctures, each puncture bearing a very fine decumbent hair. Metasternum weakly concave at middle and finely punctate, the punctures separated by approximately three times their diameters, a few scattered punctures outward to sides. Posterior coxal plates finely alutaceous. Abdominal segments and pygidium finely alutaceous, very finely punctate, and clothed with extremely fine hairs. Anterior tibiae strongly tridentate, crenate above the teeth, spur strong, acuminate, arcuate downward, first tarsal segment much shorter than the second. Middle and hind femora shining, wih scattered moderately close fine punctures. Posterior tibiae with fringe of short equal spinules, first tarsal segment subequal in length to long spur and to the three following segments combined.

Holotype, USNM No. 53581, collected in Payne County, Oklahoma, April 11, 1924 by W. J. Brown. Forty-two paratypes: 38, Payne County, Oklahoma, April 8-17, 1924, W. J. Brown; 2, Norman, Oklahoma, April 3, 1933, V. A. Smith; 1, Wessington, South Dakota, June 20, 1939, "Pothole," H. C. Severin; and 1, South Dakota, June 17, 1935, R. Cooper.

The specimens range in length from 3.6 to 4.9 mm. and in width from 1.7 to 2.6 mm. The three frontal tubercles are well developed in many specimens. A few show a slight tendency toward two sizes of punctures at the sides of the pronotum but in general the pronotal punctures are quite uniform in size and distribution. All specimens have at least a small amount of alutaceous sculpture on the tips of the elytra. Only very rarely can even a trace of alutaceous sculpture be found on the elytral apex of *crassuloides*, a very similar and closely related species. On direct comparison, the pronotum is more convex with greater disparity in the sizes of punctures and the genae usually less arcuate and prominent in *crassuloides*.

Paratypes will be placed in the collections of the British Museum (Natural History), Canadian Department of Agriculture, the University of Oklahoma, South Dakota State College, the United States National Museum, and in the private collections of L. J. Bottimer, H. F. Howden and Mark Robinson. (Many of these specimens were distributed by Dr. W. J. Brown under the name *abusus* Fall.)

A BIOGRAPHICAL MEMOIR OF THE REV. JOHN HENRY KEEN

By MELVILLE H. HATCH

Students of the beetles of British Columbia are familiar with a short series of papers on the beetles occurring in the vicinity of Massett on the Queen Charlotte Islands and about Metakatka on the neighboring mainland by the Rev. J. H. Keen. Others in addition to myself have undoubtedly discovered that there is a complete dearth of published information about the Rev. Keen. Accordingly, the following biographical notes, which I owe to the kindness of a number of correspondents, will be especially acceptable.

John Henry Keen was born in England in 1851 or early in 1852. He was educated at the Church Missionary Society College in Islington in London, where he graduated in 1873. Two years later he was made a Deacon by the Bishop of London for the Colonies and left for Canada where he spent seven years as the Church Missionary Society missionary at Moose Fort, Ontario, in the Anglican Diocese of Moosonee, which then embraced a strip of land running up the eastern and western shores of Hudson Bay indefinitely to the north. Here Keen was ordained a priest by the Bishop of Moosonee in 1877. In 1882 he returned to England where he served as Curate of Spitalfields, near London, until 1889, and in the Church of St. John Evangelist in Islington (London) in 1889-1890.

In May 1890, the Rev. Keen arrived at Massett, British Columbia, on the north shore of Graham Island in the Queen Charlotte Archipelago, in the Diocese of Caledonia, where he served as missionary to the Haida Indians from 1890 to 1898. Here he made himself familiar with the Haida language, so that he translated into Haida the Gospels of St. Luke, St. John, and Acts in 1898 and the Prayer Book in 1899, and mimeographed "A Grammar of the Haida Language," which was published by the Society for Promoting Christian Knowledge in London in 1906.

Keen's eight years at Massett was the period of his most important entomological work. It is not known what his previous experience with insects had been, but the tradition of entomology as an avocation for English clergymen was well established. Such eminent British entomologists as William Kirby and W. W. Fowler, the latter the author of the then appearing *Coleoptera of the British Isles* (5 vol., 1888-1891), were clergymen, as was G. W. Taylor, at that time the leading entomologist in British Columbia.

Keen's first entomological paper was a list of *Some British Columbia Coleoptera* published in the Canadian Entomologist for December 1891 (vol. 23, p. 282). In July and August 1890 Keen had been at Inverness, an Indian village a little southeast of Prince Rupert, probably on Church business, and had collected a few beetles that he sent in to the British Museum at South Kensington. Forty-six species were listed, ten of them, however, identified only to genus.

With this as a start, Keen set to work on the beetles of the Massett area and, during the years 1891 to 1894 made a considerable collection. He got into touch with Mr. James Fletcher of Ottawa, Dominion Entomologist and the leading student of insects in Canada. To help with the identification of Keen's specimens, Mr. Fletcher enlisted the aid of Dr. John Hamilton of Allegheny, Pa., Dr. C. V. Riley and L. O. Howard of Washington, D. C.; Dr. George H. Horn of Philadelphia; Capt. T. L. Casey of New York City; Prof. H. F. Wickham of Iowa City, and Mons. A. Fauvel of Caen, France. Keen contributed the numerous Queen Charlotte Islands records for Hamilton's *Catalogue of the Coleoptera of Alaska* published in 1894

(Trans. Amer. Ent. Soc. 21, 1894, pp. 1-38), many of which represented the first published mention of the species for British Columbia. In the Canadian Entomologist for July and August 1895 (vol. 27, pp. 165-172, 217-220) he published a *List of Copeoptera Collected at Massett, Queen Charlotte Island, B. C.* This is a catalogue of some 241 species, frequently accompanied by habitat data, and contains the names of many species being recorded from British Columbia for the first time.

Keen's next paper was entitled *Three Interesting Staphylinidae from Queen Charlotte Islands,* published in the Canadian Entomologist for December 1897 (vol. 29, pp. 285-287). It is most noteworthy for its remarks on a beetle that Fauvel had suggested be called *Haida keeni,* named for the Indians with whom Keen was working and for Keen himself. Fauvel himself, however, had never gotten around to describe the species in print, so that Keen's interesting but taxonomically most inadequate remarks constitute the original description of both genus and species, and resulted in Keen being in the anomalous position of naming a species after himself! The species was not formally described until W. J. Brown did so in 1944 (Can. Ent. 76, pp. 5-6), but Keen remains its author. The same article by Keen contains an early notice of the intertidal habits of Liparocephalus.

Meanwhile, Keen was distributing his specimens in various directions. The collections of most of the men mentioned in a previous paragraph came to contain Queen Charlotte Island material. I have seen examples in the Canadian National Collection at Ottawa. Many of Casey's descriptions were based on Keen's material. *A Preliminary Catalogue of the Collections of Natural History and Ethnology in the Provincial Museum, Victoria, British Columbia,* published in 1898, lists (pp. 71-74) 141 species presented to the Museum by Keen. Moreover, in the same publication John Fannin acknowledges (p. 13) Keen's assistance in the preparation of "The Check List of British Columbia Birds," and an errata slip records his presentation of a specimen of an undescribed species of weasel.

Keen's services at Massett ended in 1898, when he received a year's furlough. At the end of the furlough, he was sent to Metlakatla, an Indian village a few miles northwest of Prince Rupert across the inlet, and here he served for fourteen years. His entomological interests continued, and 1905 saw the publication of a list of 50 species of *Beetles from Northern British Columbia* in the Canadian Entomologist (vol. 37, pp. 297-298), based on specimens named for him by Fletcher and Wickham. Keen left Metlakatka for England on July 17, 1913[1] "on furlough with a view to resignation."

In England after doing Christian Missionary Society deputation work for about a year, Keen became Curate at Trowbridge in Wiltshire. Thereafter the record falters. Presumably he retired from active service in the 1920's. He is noted as writing a history of the Diocese of Caledonia, where he served so long in British Columbia, in 1932. The British coleopterist, Roy A. Crowson of the University of Glasgow, writes me of having known Reverend Keen well during his last days in retirement at Tunbridge Wells, at which time he apparently still maintained an interest in insects, and finally, the copy of Keen's history of the Diocese of Caledonia in Bishop Watts'

---

[1]Easton, Proc. U. S. Nat. Mus. 104, 1955, p. 100 states that "The British Museum possess a single example (of *Meligethes nigrescens* Stephens) from Metlakatla, British Columbia (J. H. Keen, 1915)." Either this date is in error, or Keen served two years longer in Metlakatla than the records in Prince Rupert indicate.

possession at Prince Rupert bears the notation: ''Died at Tunbridge Wells, England, on April 3, 1950, at the age of 98 in full command of his faculties.'' A long life had come to a close.

For assistance in the preparation of the foregoing account I am indebted to Mr. G. Stace Smith of Creston, B. C.; to the Rev. John C. Goodfellow, to Mrs. P. F. P. Bird, Eileen M. James, and above all, to The Right Rev. H. G. Watts, Bishop of Caledonia, all of Prince Rupert, British Columbia.

DEATH NOTICE

It is with deep regret that we announce the death of M. Y. Marshall, M.D., on August 28, 1957. Dr. Marshall was well known for his work on the Malachiidae. His collection of 35,000 specimens has been willed to the University of Michigan.

R. H. Arnett, Jr.

THE NORTH AMERICAN STATUS OF MELIGETHES NIGRESCENS STEPH. (NITIDULIDAE)

By MELVILLE H. HATCH

Meligethes nigrescens Steph. was described from England in 1830. Under the name *picipes* it was redescribed from the vicinity of Berlin by Sturm in 1845. Though the synonymy of the two names has been recognized at least since 1861 (Waterhouse, Cat. of Brit. Col. 1858-1861, p. 38), Sturm's name has continued in use until a recent publication by Easton (Ent. Mo. Mog. 87, 1951, p. 283). Easton (Proc. U. S. Nat. Mus. 104, 1955, pp. 99-100) reports the species in the Old World as occurring throughout the British Isles and Europe and ranging to Madeira, the Canary Islands, North Africa, Cyprus, and the Caucasus; and it was described from central Siberia by J. Sahlberg in 1903 (Öfv. Finska Forh. XLV, 10, p. 18) under the name of *circularis*.

The American history of the species starts with a unique specimen collected by LeConte on the north shore of Lake Superior between 1848 and 1850 and cited as *obsoleta* nom. nud. (LeConte in Agassiz's Lake Superior 1850, p. 223). A second unique specimen was described in 1857 from "Oregon" under the name of *siminulum* by LeConte (Rep. of Explor. and Surv. Miss. to Pac. XII, pt. 3, pp. 15, 37), and twenty-two years later these were the only two American specimens known to Horn (Trans. Am. Ent. Soc. VII, 1879, p. 314). The third specimen of *nigrescens* to be recorded from North America is one recorded by Easton (l.c.) as taken by Keen at Metlakatka, B. C. in 1915 and now in the British Museum, and the fourth specimen from Hood River, Oregon in 1921 (Parsons *in litt.*). During the twenties the species began to show up in the northeastern United States: Pennsylvania 1923, New York and New Jersey 1925, Maryland and Massachusetts 1930, Connecticut 1940, Vermont 1949, Maine 1950, Ohio 1952 being the first dates recorded (Easton, Parsons, Frost *in litt.*). My earliest specimens were taken at Monroe, Ore. in 1930, Castle Rock and Vancouver, Wash. in 1932, Sheridan, Ore. in 1933, and a series from Cornelius near Hillsboro, Ore. in 1934, all these localities being west of the Cascade Mts.

By the late thirties, *Meligethes aenescens* had become of economic importance in northwestern Oregon where it was interfering with the seed production of several types of clover (Dickason, Coop. Econ. Ins. Rep. 3, 1953, p. 345, as *seminulum*). In 1943 Parsons (Bull. Mus. Comp. Zool. Harvard 92, pp. 255-256) noted the discontinuous distribution of *seminulum*, and it now appears that its distribution was even more discontinuous than he noted, since he writes me that his records from Manitoba and Alberta were probably founded on specimens of *canadensis* Easton. In 1948 (Peng-Fi and Larson, Jr. Econ. Ent. 42, 1949, p. 399, as *aeneus*) the species was abundant at North East, in extreme northwestern Pennsylvania, where it was interfering with the artificial pollination of muskmelon (*Cucumis melo* L.) flowers. In 1954 Dickason (Jr. Econ. Ent. 48, pp. 127-128) noted that the larvae of *seminulum* developed in a couple of introduced species of vetch (Vicia), the adults later transferring their attentions to the flowers of several introduced species of clover (Trifolium) and trefoil (*Lotus corniculatus* L.). He suggested that it was "a native insect becoming a pest because of a change in agricultural practices," to wit, the cultivation of hairy vetch (*Vicia villosa* Roth), which began on an extensive scale in the Willamette Valley (Oregon) around 1928. Dickason added, significantly, that a "native host plant has not been determined." Finally, Easton (l.c.) noted the identity of *nigrescens* Steph. and *seminulum* LeC.

It is the purpose of the present note to suggest that the peculiar history and present discontinuous distribution of *Meligethes nigrescens* in North America is explicable on the hypothesis that it is not indigenous to this continent but has been introduced from the Old World as a result of commerce.

Nigrescens is a species that, when it occurs, frequently occurs in abundance, and, the simplest sweeping technique suffices to collect it, so that its failure to be taken in the northeastern United States previous to 1923 and to be mentioned in the pre-1940 literature indicates the probable absence of the beetle from that area during most of that period. The spotty nature of the earlier western records, the absence of native host plants, the present discontinuous and apparently expanding distribution, and the frequent abundance in which it occurs are, I suggest, most probably accounted for on the assumption that the species was introduced—perhaps several times—in the early days of hairy vetch cultivation and is still in the process of extending its range.

Finally, the hypothesis that *Meligethes nigrescens* is introduced in North America is strengthened somewhat by the fact that, as Dr. Easton writes me, it is probably introduced in both Morocco, where it was first taken in 1914, and in Arabia.

I am indebted to Mr. C. F. Frost, Dr. Alan M. Easton, and Dr. Carl T. Parsons for much of the data presented herein.

NOTES ON THE HABITS OF *PLUSIOTIS GLORIOSA* LECONTE (Scarabaeidae)[1]

By FRANK N. YOUNG

The species of *Plusiotis* which now occur in the southwestern United States are obviously relicts of the rich Central American beetle fauna which must have invaded the now arid region repeatedly during the more favorable periods of the Pleistocene. With the gradual increase in aridity, during or at the end of the ice ages, many tropical forms must have died out or withdrew to the south. The survivors are the remnants which were able to adapt to more arid conditions or to survive the lower temperatures at high elevations in the mountains.

The U. S. species of *Plusiotis* are especially interesting because of their sharp segregation on different food plants. This diversification of larval and adult food habits probably preceded the isolation of the group in the western mountains, and in part explains the restriction of the species to definite zones on the mountains where they occur. For example, in the Huachucha Mountains of Arizona, three of the four known U. S. species occur in a small area. They are not indiscriminately mixed, however, because *P. lecontei* Horn feeds on pine at higher elevations while *P. beyeri* Skinner and *P. gloriosa* LeConte are restricted to oaks and junipers respectively at lower levels (see Cazier, 1951). During the summer of 1956, I had the opportunity of collecting and observing these interesting insects while working at the Southwestern Research Station of the American Museum of Natural History near Portal, Arizona.

My interest in *P. gloriosa* was aroused by the apparent contradiction between its brilliant green and silver coloration and current theories regarding insect coloration. Pinned against almost any background except fresh juniper leaves, this beetle is one of the most conspicuous insects imaginable. It is tempting to hypothesize that the colors are aposematic, a warning to would be predators of a dangerous nature or distastefulness; but, in fact, wing cases are found on the ground so frequently that one must assume that bats and perhaps birds are frequent predators. Mutilated specimens, obviously damaged by some predator, have also been found. The greater part of this predation must occur

---

[1]Contribution No. 634 from the Zoological Laboratories of Indiana University aided by a grant from the Graduate School. Sincere thanks are due to Dr. Mont A. Cazier of the American Museum of Natural History and to other members of the staff of the Southwestern Research Station for assistance and many kindnesses.

during the twilight period when the beetles are flying silhouetted against the sky, at which time no color would be effective either as a warning or for concealment.

After a few evenings of hunting *Plusiotis* with a headlight through the juniper groves of Cave Creek Canyon in the Chiricahua Mountains, I began to wonder if the colors were not actually concealing. They are certainly so when one searches with a light at night among the juniper leaves for not only does the green color match the background, but the disruptive silver stripes reflect the light in exactly the same manner as the little drops and streaks of resin on the leaves and branches.

The hypothesis of cryptic coloration, however, immediately hits an apparent snag. Most records of *Plusiotis* are of specimens attracted to light or caught at night feeding on juniper. If the species is strictly crepuscular and nocturnal concealing colors are quite useless no matter how well they may match the background, since no animals except man and perhaps some fishes of the abyssal ocean hunt with headlights. The former is too recent an intruder to have influenced the evolution of *Plusiotis,* and the latter are not very well adapted for hunting in juniper groves 4,000 to 6,000 feet above sea level.

But is *P. gloriosa* strictly crepuscular and nocturnal? Devices for the control of temperature, light, and humidity were not available, and this question cannot be answered positively by our observations in 1956; but there are indications that it is humidity and not light which influences the aboveground activities. The relative humidity generally rises with the drop in temperature in the evening in such dry regions as the southwest, and coincidentally the feeding and other activities of the adult beetles in large part correspond to the periods of darkness. If humidity conditions are suitable, however, the beetles remain aboveground throughout the day, and are thus exposed to conditions under which concealing coloration would be of importance. The following observations form the basis for this conclusion:

In 1956, the first *P. gloriosa* found at the Station was dug out of the soil in a grassy area about 50 feet from a large juniper tree on June 21. No significant amount of rain had fallen in the area for some time previous to this date. No others were found until June 27 when following a trace of rain in the afternoon one *gloriosa* came to light. On June 28, 0.42 inches of rain fell, but search on junipers that evening was negative and no *Plusiotis* came to light. On the evening of June 29, following a trace of rain, beetles were found on junipers although the temperature was 70°C. They were feeding 6 to 12′ above the ground and clung so tightly to the leaves that they had to be beaten off. Later in the summer it was noted that at higher temperatures they dropped off and flew very readily.

On June 30, a series of observations on the crepuscular activities of *P. gloriosa* was begun. A watch was kept for flying beetles from shortly after sunset until dark for several evenings. On June 30, after 0.02 inches of rain had fallen, the first *Plusiotis* was seen flying at 8:05 P.M. (Rocky Mountain Standard Time). Four others were seen before 8:40 after which no more were observed. The following evening the first beetle was seen at 7:57 P.M. and the last at 8:26, after which no more were seen flying but several were found on juniper. No further rain fell for several days, and no further flights of beetles were observed on three other evenings in early July, nor were any seen flying later in July. Individuals continued to come to light, however, and a number were found on juniper up until late July.

One of the beetles captured on June 30 was marked with a piece of colored thread and placed on juniper. Next day it was in the same position, and apparently had not moved. That evening it was still in the same place and was mistakenly tied down. On July 2, only the pronotum and the thread remained. When ensconced among the juniper leaves in the daytime, *P. gloriosa* is practically invisible unless it moves. None could be found on vegetation near the Station during the day, but Dr. Minter J. Westfall reported one found at 8:00 A.M., July 19, on juniper in the Galiuro Mountains. This was after a very heavy rain during the preceding night, and many other usually nocturnal beetles were still active in the area.

From July 18 to August 7, a series of observations was made on several *P. gloriosa* males and females in large jars with sand on the bottom and branches of juniper. The correlation of the aboveground activities with humidity was evident, even though exact records of the changes could not be made. The beetles were checked each day between 8:30 A.M. and 5:00 P.M. From July 18 to July 22, about half the beetles were observed at least once each day up in the juniper foliage while the others were burrowed into the sand or on its surface. On July 22, torrential rains fell. Next day 3 of 4 beetles were in the foliage all day, and on the following 3 days all four were in the foliage all day. On the 9th and 10th days two were up and two burrowed into the soil, while on the 11th day all four were in the sand or on its surface. On the 12th day, one of the females was dead, and the cages were then moistened heavily. During the next seven days, up until August 7, the beetles stayed in the foliage all day with one exception on August 3 when a female was found burrowed into the sand. Thus on 11 of the

20 days of observation all beetles were up in the foliage all day, part were up and part down on eight days, and all were down on only one day.

On August 3, three of the *P. gloriosa* were taken out into the sunlight to photograph. One of the males dropped from the juniper branch and took flight. It was last seen about 100 feet in the air headed toward Mexico. The remaining pair were quickly restrained from following.

To repeat, I conclude from these observations that adult *P. gloriosa* spend a considerable part of their time resting and feeding aboveground in the foliage of the junipers provided the humidity is high enough. The restriction of the aboveground activities to the twilight and night are probably more apparent than real in wet seasons due to the difficulty of finding the beetles among the juniper foliage in the daytime. If this is so, the brilliant green and silver coloration is camouflage combining color resemblance to the background and disruptive coloration and not merely a coincidence.

Many tropical rutelids are diurnal. In southern Florida, *Rutela formosa* (Burmeister), for example, feeds openly during the day on the blossoms of the royal poincianas during the wetter months and rests among them at night. It thus seems probable that the behavior of the tropical species of *Plusiotis* is similar to that of *gloriosa*. That is, they move up into the trees to feed under favorable humidity conditions without particular regard to light, and their brilliant colors may have resulted from natural selection rather than accident.

References

Cazier, Mont A. 1951. The genera *Chrysina* and *Plusiotis* of north central Mexico (Coleoptera: Scarabaeidae). *American Mus. Novitates* 1516: 1-8, illus.

STUDIES ON THE NORTH AMERICAN APION: THE *APION NODICORNE* GROUP (Curculionidae)[1]

By D. G. KISSINGER[2]

Six North American species belong to the *Apion nodicorne* group, which ranges from southern Virginia to Brazil. *A. delta* Buchanan was reared from *Croton glandulosus* L. (Euphorbiaceae) by Bissell (1940). *A. buchanani,* sp. n., has been collected on corn, orange foliage, and cotton. Chief characters of the group are the post-scutellar spot of pubescence, yellow legs, beak strongly expanded laterally over the antennal insertion, and the narrow frons which is not wider than the dorsal tip of the beak.

Other characters are: body moderately robust, not gibbose in outline; generally with dense post-scutellar spot, without transverse pattern of scales; femora and tibiae pale reddish-yellow; beak curved, moderately slender, attenuate beyond antennal insertion (especially in female), strongly, acutely expanded laterally at antennal insertion; antennae inserted behind basal third of beak, stout, 2nd segment about as long as 3rd, anterior dorsal margin of antennal scrobes sharply oblique; prothorax acutely expanded laterally at base; middle coxae separated by a complete lamina; femora not club shaped; 3rd tarsal segment strongly bilobed, 1st segment of fore tarsi longer than wide; claws toothed; male legs simple.

The dorsal margin of the antennal scrobes of many species of *Apion* gradually slants downward from the anterior margin of the scrobe to beneath the eyes. The dorsal margin of the antennal scrobe of the *A. nodicorne* group does not gradually slant downward, but anteriorly at the expanded region of the insertion it slants ventrally at about a 45° angle to the long axis of the beak, then abruptly it slants upward to near the anterior margin of the eye (fig. 3-7). This forms a more or less prominent angulation over the antennal insertion. The anterior portion of the dorsal margin of the antennal scrobe is thus said to be sharply oblique.

KEY TO NORTH AMERICAN SPECIES OF A. NODICORNE GROUP

1. Sides of prothorax converging in nearly a straight line from basal lateral expansion to apex (Figure 1); male beak in lateral view strongly curved in apical half (Figure 4); Tamaulipas .... **saginans**, sp. n.

---

[1]Scientific Art. No. A609 Contribution No. 2789 of the Maryland Agricultural Experiment Station, Department of Entomology.

[2]R. D. #4, Reading, Penna.

Sides of prothorax more or less constricted apically (Figure 2), not converging in a straight line; beak nearly straight in apical half 2

2. Frons with a longitudinal median carina (Figure 9); female beak not more than three-fourths longer than prothorax (Figure 7) 3
Frons with at most a feeble median carina, generally concave medially (Figure 8); female beak more than twice as long as prothorax (Figure 6); Texas, Tamaulipas, San Luis Potosi .... **buchanani**, sp. n.

3. Dorsal outline of head in lateral view abruptly sloped above posterior margin of eye (Figure 3) 4
Dorsal outline of head in lateral view not abruptly sloped above posterior margin of eye (Figure 7); median sulcus of prothorax extending from base to near apex; antennae black; Virginia to Mississippi .... **delta** Buch

4. Robust, elytra length to width as 5:4, dorsal pubescence (with exception of post-scutellar spot) white, very fine, very sparse (Figure 2); male beak stout, in lateral view length of beak to greatest width in front of middle of beak as 11: 2.5, ventral surface of beak nearly straight in front of antennal insertion, dorsal surface noticeably curved from base to tip of beak (Figure 5); Yucatan .... **expilator**, sp. n.
More slender, elytra length to width as 10: 7, dorsal pubescence coarser, more scale-like, denser; male beak moderately slender, in lateral view length of beak to greatest width in front of middle of beak not greater than 11: 2.0, apical third of beak more or less cylindrical (Figure 3) 5

5. Antennae black; median sulcus of prothorax extending to middle; sutural interval of elytra clothed with a confused row of scales about as coarse as those comprising the post-scutellar spot; Texas .... **fumitarse** Fall
Antennae yellow; median sulcus of prothorax extending from base to near apex; sutural interval of elytra (with exception of apical area) clothed with scales much finer than those comprising the post-scutellar spot; Mexico to Panama .... **nodicorne** Sharp

Apion saginans, new species

(Figures 1 and 4)

Described from a single specimen, holotype, male, Tampico, MEXICO, December 21, E. A. Schwarz Collector, U. S. N. M. Cat. No. 63427.

Length: 2.08 mm.; width: 1.12 mm.

Robust. Black; femora, tibiae, tarsi, and antennal club pale reddish-yellow, remainder of antennae and last tarsal segment and claws darker. Pubescence conspicuous, bicolored on dorsal surface, on most of dorsal surface scales are fine, yellowish, and moderately sparse, scales coarser and white on basal ridge connecting intervals 2 and 3 and forming a dense white post-scutellar spot commencing on sutural interval at distance behind scutellum equal to twice the length of the scutellum and extending a little less than one-third length of the elytra, sutural interval wider under the spot, scales on prothorax and elytra becoming whiter and coarser laterally, vestitures of meso- and metathorax dense, white, squamiform. Beak of male as long as head and prothorax combined; one-half longer than prothorax, distinctly curving from antennal insertion to tip; in lateral view tapering from antennal insertion to tip, anterior dorsal margin of antennal scrobes sharply oblique; in lateral view strongly, acutely dilated at antennal insertion, there equal to width of beak immediately distad of eyes, one-half wider than beak at tip, attenuating from dilation to apical third which is parallel sided; pubescent to middle, in dorsal view finely, superficially punctured, in lateral view with a deep sulcus above antennal insertion continuing to apical third and its trough is distinctly punctured, each puncture bearing a scale, a row of deep punctures extends below this from anterior portion of antennal scrobes to apical third, which is nearly impunctate. Antennae inserted at basal fourth of beak, at distance from eye twice as great as width of frons; first segment equals next two, second segment slightly longer than third, club 0.20 × 0.08 mm. Eyes moderately prominent; frons narrower than dorsal tip of beak, with a longitudinal median carina flanked on each side by a row of 7 punctures bearing yellow scales; in lateral view dorsal margin of head abruptly declivitous above posterior margin of eyes. Prothorax at base one-third wider than long, middle narrower than base, apex 0.63 as wide as base; sides beyond moderate basal lateral expansion evenly converging to very feebly constricted apex; in profile moderately arcuate; punctation moderately deep, 0.02-0.03 mm. in diameter, interspaces less than diameter of punctures, convex, alutaceous; basal fovea deep, narrow, extending about one-half length of prothorax. Elytra at humeri one-third wider than prothorax at base, 2.75 times as long as prothorax, length to width as 11:9; intervals nearly flat, 2 and 4 one-half wider than striae, with one row of scales, 3 and 5 twice as wide as striae with 2 rows of scales, sutural interval wider at post-scutellar spot of pubescence; striae deep, moderately wide. Scutellum subquadrate, 0.08 × 0.08 mm., with wide, median longitudinal impression. Front femur 3.65 times as long as wide. Claws with acute basal tooth.

Distinctive characters of this species are the robust form, the bicolored dorsal pubescence, the very dense post-scutellar white spot of pubescence, the nearly conical prothorax, the strongly curved beak, and the alternately narrow and wider elytral intervals 2 through 5.

Apion buchanani, new species

(*Figures 6 and 8*)

Length: 1.81 to 2.37 mm.; width: 0.85 to 1.12 mm.

Moderately robust. Black; antennae, femora, tibiae, and tarsi pale reddish yellow, claws darker. Pubescence on dorsal surface variable in color either white or with distinct yellowish tinge, conspicuous, fine, moderately dense; at base of intervals 2 and 3 and along sutural interval for one-fourth length of elytra distinctly squamiform; post-scutellar spot not well defined, commencing directly behind scutellum; scales on sutural interval at middle of elytra distinctly finer than those immediately behind scutellum. Beak of male shorter than head and prothorax, slightly more than two-fifths longer than prothorax, slightly curved; in lateral view stouter in basal third, narrowed somewhat to distal half which tapers slightly to the tip; in dorsal view moderately, acutely expanded at antennal insertion, there slightly wider than beak immediately distad of eyes, twice as wide as beak at tip, attenuating to tip; clothed with scales to apical sixth; dorsal surface with fine, shallow punctures; in lateral view sulcus extending to apical sixth, with a row of punctures below the sulcus extending from antennal insertion to apical sixth and bearing scales. Beak of female elongate, slender, two-sevenths longer than head and prothorax combined, more than twice as long as prothorax, moderately curved; compressed in apical third; in lateral view tapering slightly to the tip; in dorsal view somewhat expanded over antennal insertion, there not as wide as beak immediately in front of eyes, and two-fifths wider than beak at tip, tapering to distal third which is nearly parallel sided; noticeably pubescent in front of antennal insertion, with minute scales to near tip, punctures fine, sparse, somewhat elongate, in basal two-thirds arranged to form several irregular, fine, discontinuous, shallow sulci in front of antennal insertion, with a vague sulcus above antennal insertion. Antennae of male inserted slightly distad of basal fourth, at distance from eyes 2.5 times as great as width of frons; of female at basal two-ninths of the beak at distance from eyes three times as great as width of frons; first segment equals next two, second segment is slightly longer than third, club 0.21 $\times$ 0.08 mm. Eyes moderately prominent; frons in both sexes narrower than dorsal tip of beak; in lateral view dorsal margin of head is evenly convex from base of rostrum to posterior margin of eyes, not abruptly declivitous behind. Prothorax one-third wider at base than long, middle narrower than base, apex 0.59 as wide as base; sides beyond basal lateral expansion feebly converging to middle, then rounded to constricted apex; profile slightly arcuate; punctation moderately shallow, 0.02-0.03 mm. in diameter, interspaces less than diameter of punctures, alutaceous, narrow ones convex; basal fovea deep basally, narrow, extending about one-half length of prothorax. Elytra at humeri one-fourth wider than prothorax at base, 2.3 to 2.4 times as long as prothorax, length to width as 11: 8; intervals flat, one-half wider than striae, intervals 2 and 3 with two rows of scales, other intervals and 2nd and 3rd in apical fourth with one row of scales; striae deep, moderately coarse. Scutellum subquadrate, 0.06 $\times$ 0.06 mm., convex, not depressed medially. Front femur 3.3 times as long as wide. Claws with acute basal tooth.

Holotype: male, Brownsville, Tex., 21 IV 1945, on corn foliage, Harrison and Fraser, U. S. N. M. Cat. No. 63425. Allotype, female, Brownsville, Tex., November, 1925, McMillan Collector (USNM).[3] Twenty-eight paratypes: Brownsville, Tex., (one on pepper) 2 (AMNH), 2 (BMNH), 2 (DGK), 10 (USNM); Brownsville, Tex., 19 XI 1911, on pasture, S. Tex. Garden, 1 (INHS); Southmost, Cameron Co., Tex., 13 IV 1950, 2 (UK); Cameron Co., Tex., 1 (UK); MEXICO: Matamoros, 25 I 1950, on orange foliage, 2 (USNM); Tampico, December, 18-21, E. A. Schwarz, 5 (USNM); San Luis Potosi: Valles, 21 V 1937, K. L. Maechler, 1 (CIS).

The long, subcylindrical, evenly curved beak of the female is very distinctive. The form of the beaks of the females of *A. delta* Buch., *A. fumitarse* Fall, and *A. nodicorne* Shp. is similar (figure 7) and quite different from *A. buchanani.* In addition the frons is flat medially and not carinate longitudinally as is the case with all the other North American members of this group.

It gives me great pleasure to name this species in honor of Dr. L. L. Buchanan who recognized the species as new and had it separated as distinct.

Apion delta Buchanan

(*Figure 7*)

Apion delta Buchanan, 1922, Proc. Ent. Soc. Wash., 24: 83; Bissell, 1940 Jour. Econ. Ent., 33: 846.

---

[3]See Kissinger (1957) for explanation of abbreviations denoting institutions housing material.

This species is more similar to *A. nodicorne* Sharp of Mexico and Central America than it is to *A. fumitarse* Fall or *A. buchanani,* sp. n., from Texas and Northeastern Mexico. The post-scutellar spot is well defined as in *A. nodicorne* Sharp. The chief differences are the black antennae and feebly sloping dorsal margin of the head above the posterior margin of the eye which are characteristic of *A. delta* in contrast to the yellow antennae and abruptly declivitous dorsal margin of the head above the eyes which are characteristic of *A. nodicorne.*

Bissell (1940) records rearing this species from *Croton glandulosus* L. (Euphorbiaceae).

Known distribution:

Type locality: Southern Pines, North Carolina (USNM).

Virginia: Petersboro (USNM). North Carolina: Charlotte, Brunswick Co. (BDV DGK); Greensboro (USNM); Raleigh (USNM). South Carolina: Burton (USNM). Holly Hill (USNM); Manning (USNM); Ridgeland (USNM). Georgia: Flowery Branch, Hall Co. (BDV DGK); Zebulon (USNM). Florida: 4 mi. E. Apopka (DGK). Alabama: Tuscaloosa (BDV DGK). Mississippi: Gulfport (USNM).

Apion expilator, new species
(Figures 2 and 5)

Described from a single specimen, holotype, male Izamal, Yucatan, MEXICO, April, Townsend, U. S. N. M. Cat. No. 63426.

Length: 1.88 mm.; width: 1.00 mm.

Robust. Black; femora, tibiae, tarsi, and apical portion and club of antennae pale reddish yellow, basal portion of antennae and last tarsal segment and claws darker. Pubescence white, fine, sparse on dorsal surface, with a conspicuous post-scutellar spot of dense, squamiform vestiture commencing on sutural interval at distance from scutellum equal to length of scutellum and extending one-fifth length of elytra, sides of prothorax with sparse, coarse scales, sides of meso- and metathorax densely covered with coarse scales. Beak of male stout, shorter than head and prothorax combined, two-fifths longer than prothorax, dorsal margin rather strongly curved, ventral margin nearly straight; in lateral view tapering to tip, more strongly so in distal 3rd; in dorsal view strongly, acutely expanded at antennal insertion, there wider than beak immediately distad of eyes, twice as wide as beak at tip, attenuating to near tip, apical region more parallel sided, somewhat compressed in distal 3rd; clothed with scales to apical fifth, dorsal portion with fine but distinct punctures arranged in four rows, lateral portion with sulcus above antennal insertion present but not well defined, extending to about distal 3rd, a sulcus below this extending from antennal scrobe to apical fifth with punctures bearing scales. Antennae inserted slightly distad of basal fourth of beak, at distance from eyes twice as great as width of frons; first segment equals next two, second slightly longer than third, club 0.21 × 0.08 mm. Eyes moderately prominent; frons narrower than dorsal tip of beak; in lateral view dorsal margin of head abruptly declivitous above posterior margin of eye. Prothorax one-third wider at base than long, middle narrower than base, apex 0.64 as wide as base; sides beyond basal lateral expansion converging to slightly distad of middle, then rounding to distinctly constricted apex; profile moderately arcuate; punctation deep, 0.03 mm. in diameter, interspaces less than diameter of punctures, alutaceous, for most part about one-half as wide as punctures; basal fovea moderately deep, and narrow, extending a little more than one-third length of prothorax, not reaching middle of prothorax. Elytra at humeri one-third wider than prothorax at base, 2.4 times as long as prothorax, length to width as 9.5: 8; intervals flat, not twice as wide as striae, sutural interval noticeably wider at post-scutellar spot and 2nd interval noticeably narrower adjacent to this spot, intervals with one row of fine scales, interval 3 scales somewhat confused appearing in part as two rows; striae deep, moderately coarse. Scutellum subquadrate, 0.06 $\times$ 0.06 mm., with broad, shallow, median, longitudinal depression. Front femur four times as long as broad. Claws with acute basal tooth.

Distinctive characters of this species are the robust form, the very dense post-scutellar spot of white pubescence, and the stout beak which is curved on the dorsal margin and nearly straight on the ventral margin.

Apion fumitarse Fall

(*Figure 3*)

Apion fumitarse Fall, 1898, Tr. Am. Ent. Soc., 25: 162.

This species is close to *A. delta* Buchanan and *A. nodicorne* Sharp. From the former it differs by the abruptly sloped dorsal margin of the head above the posterior margin of the eye. From both it differs by having the scales on the sutural interval as coarse as those composing the post-scutellar spot.

E. L. Gilbert has collected this species on *Dalea multiflora*.

Known distribution:

Type locality: San Diego, Texas.

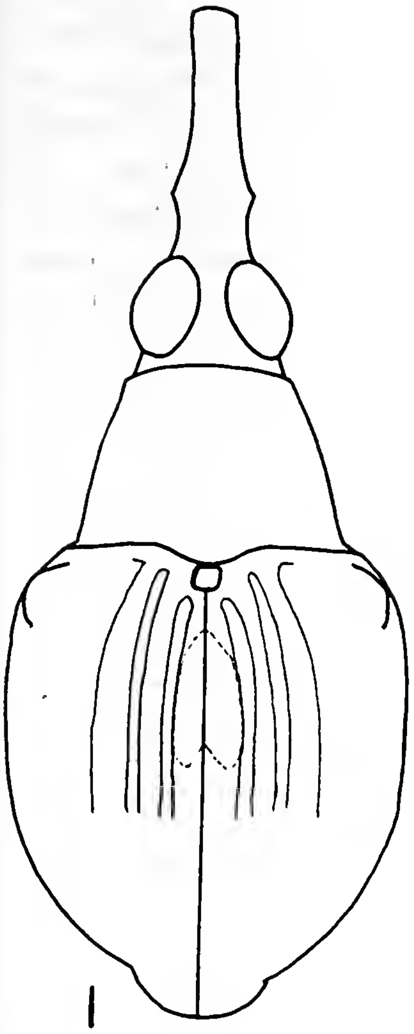
Texas: Aransas (CIS); Corpus Cristi (CU, ELS); Falfuria (UK); Mission (UK); Riviera (USNM); Sarita (UK).

Apion nodicorne Sharp

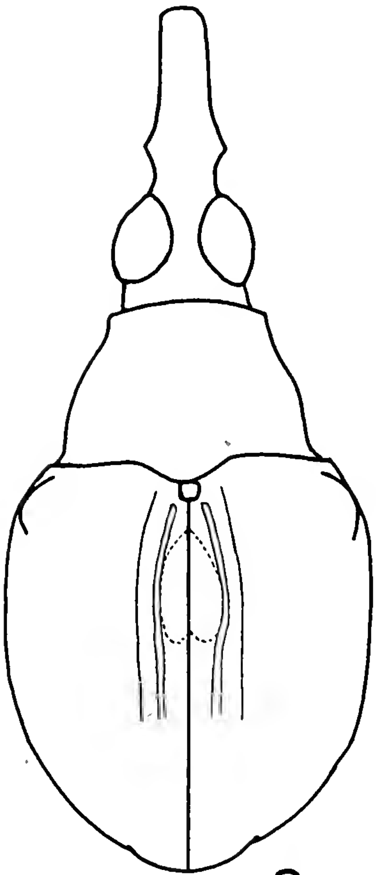
(*Figures 9 and 10*)

Apion nodicorne Sharp, 1890, Biologia Centrali-Americana, Coleoptera, vol. 4, pt. 3, p. 78, pl. 3, fig. 18, 18a.

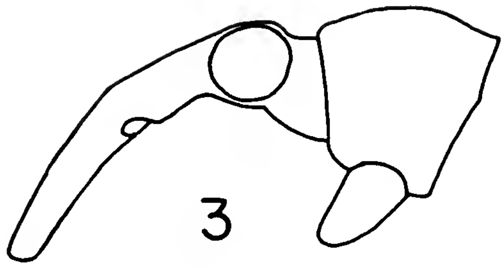
Known Distribution.—Described from MEXICO: Atoyac in Vera Cruz; GUATEMALA: San Geronimo; PANAMA: Bugaba (BMNH). MEXICO: Colima: Colima Vulcan (USNM). Guerrero: Acapulco (UK); 3 mi. S. Acajuizlotla (CAS). Nayarit: Tepic (CAS). Vera Cruz: Catemaco (DGK); Pasa del Toro (UM); Vera Cruz (UK). HONDURAS: Dept. Moraban Esc. pan. Zamorans, 2600′ roadside (UM); Teguicigalpa (CAS, AMNH). COSTA RICA: Hiquito, San Mateo (USNM).



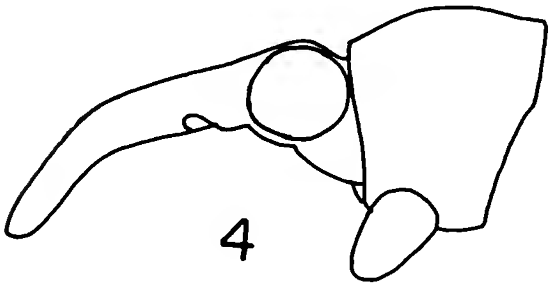
1



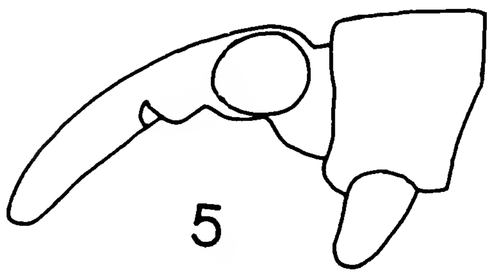
2



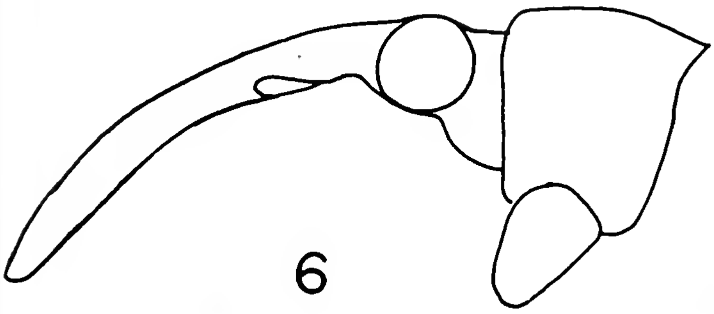
3



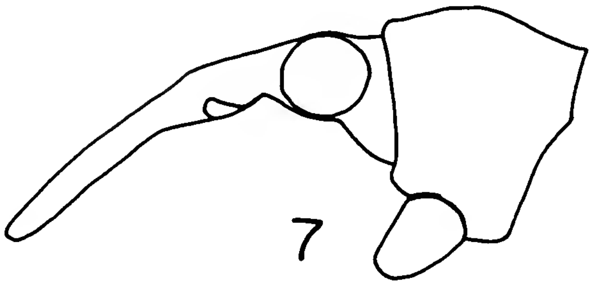
4



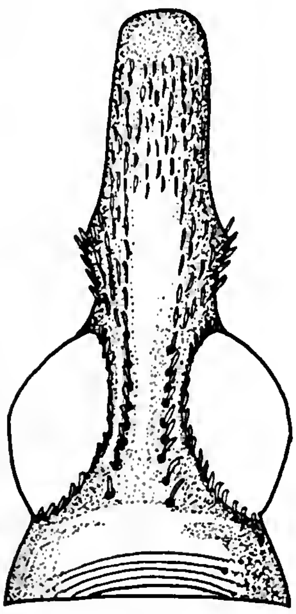
5



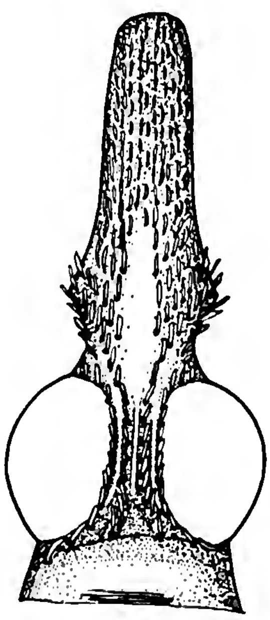
6



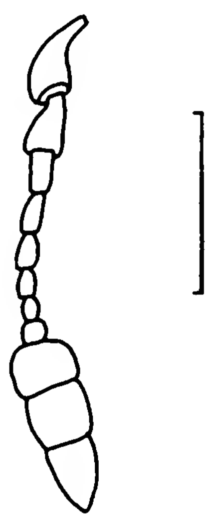
7



8



9



10

(See page 78 for captions)

FIGURE 1. Dorsal view of male *A. saginans*, sp. n. FIGURE 2. The same of male *A. expilator*, sp. n. FIGURE 3. Lateral view of head and prothorax of male *A. fumitarse* Fall. FIGURE 4. The same of male *A. saginans*, sp. n. FIGURE 5. The same of male *A. expilator*, sp. n. FIGURE 6. The same of female *A. buchanani*, sp. n. FIGURE 7. The same of the female *A. delta* Buchanan. FIGURE 8. Dorsal view of head of male *A. buchanani*, sp. n. FIGURE 9. The same of male *A. nodicorne* Sharp. FIGURE 10. Antennae of the female *A. nodicorne* Sharp. Note: Line equals 0.50 mm. in all figures except 8, 9, and 10 where it equals 0.25 mm.

REFERENCES CITED

BISSELL, T. L. 1940. Curculionidae, Bruchidae, Lepidoptera, and their parasites, infesting the seed pods of cowpea and various wild plants. Jour. Econ. Ent., 33: 844-847.

BUCHANAN, L. L. 1922. Notes on *Apion*, with descriptions of two new species (Coleoptera, Curculionidae). Proc. Ent. Soc. Wash., 24: 82-84.

FALL, H. C. 1898. Revision of the species of *Apion* of America north of Mexico. Trans. Am. Ent. Soc., 25: 105-184, pl. 2-5.

KISSINGER, D. G. 1957. Studies on North American *Apion* with descriptions of two new species (Coleoptera, Curculionidae). Coleopt. Bull. 11: 17-24.

SHARP, D. 1890-91. Biologia Centrali-Americana, Coleoptera, vol. 4, pt. 3, pp. 48-86, pl. 2-3.

DISTRIBUTION RECORDS FOR GRYPIDIUS LEECHI (Curculionidae)

With most of the type series of *Grypidius leechi* Cawthra before me, it may be well to give in full the data which Miss Cawthra summarized as "U.S.A.: Colorado, Wyoming. CANADA: Alberta, 10 ♀." in her recent paper (Description of a new species of *Grypidius* Schönherr (Col.: Curculionidae) with a key to the genus. Proc. R. ent. Soc. Lond., Series B, 26 (7/8): 127-130, 3 text figs.).

The holotype is from Kenosha Pass, COLORADO, vii.10.38, J. W. Green collector. Kenosha Pass is in Park Co., on U.S. Highway 285, between Webster and Jefferson. Mr. Green tells me that his collecting was done at the top of the pass, near the highway, i.e. at about 10,000 feet elevation.

Other specimens are from COLORADO: Ute Cr., near Fort Garland, 30.vi.'44 (Rv. B. Rotger, C. R.); Longs Pk. Inn, 9,000 ft., vii.14.1926 (E. C. Van Dyke). WYOMING: Jackson Hole, Gd. Tetons, 6.23.38 (E. C. Van Dyke). ALBERTA: Banff, vi.15.18 (Van Dyke collection).

G. leechi is the species which has passed in our collections as *brunnirostris* (Fabricius), in part. It is separated from both *brunnirostris* and *equiseti* (Fabricius) by the fact that all the elytral interstices are flat.—HUGH B. LEECH, *California Academy of Sciences, San Francisco.*

MIOCALLES AND MICROCRYPTORHYNCHUS
(Curculionidae: Cryptorhynchinae)

By Elwood C. Zimmerman

While making some comparative studies of the genera of Cryptorhynchinae in the British Museum (Natural History), in 1950, I found that the genus *Microcryptorhynchus* Lea was described earlier by Pascoe as *Miocalles.* (*Miocalles* is, fortunately, a much more convenient name than the cumbersome *Microcryptorhynchus*). Further, I have

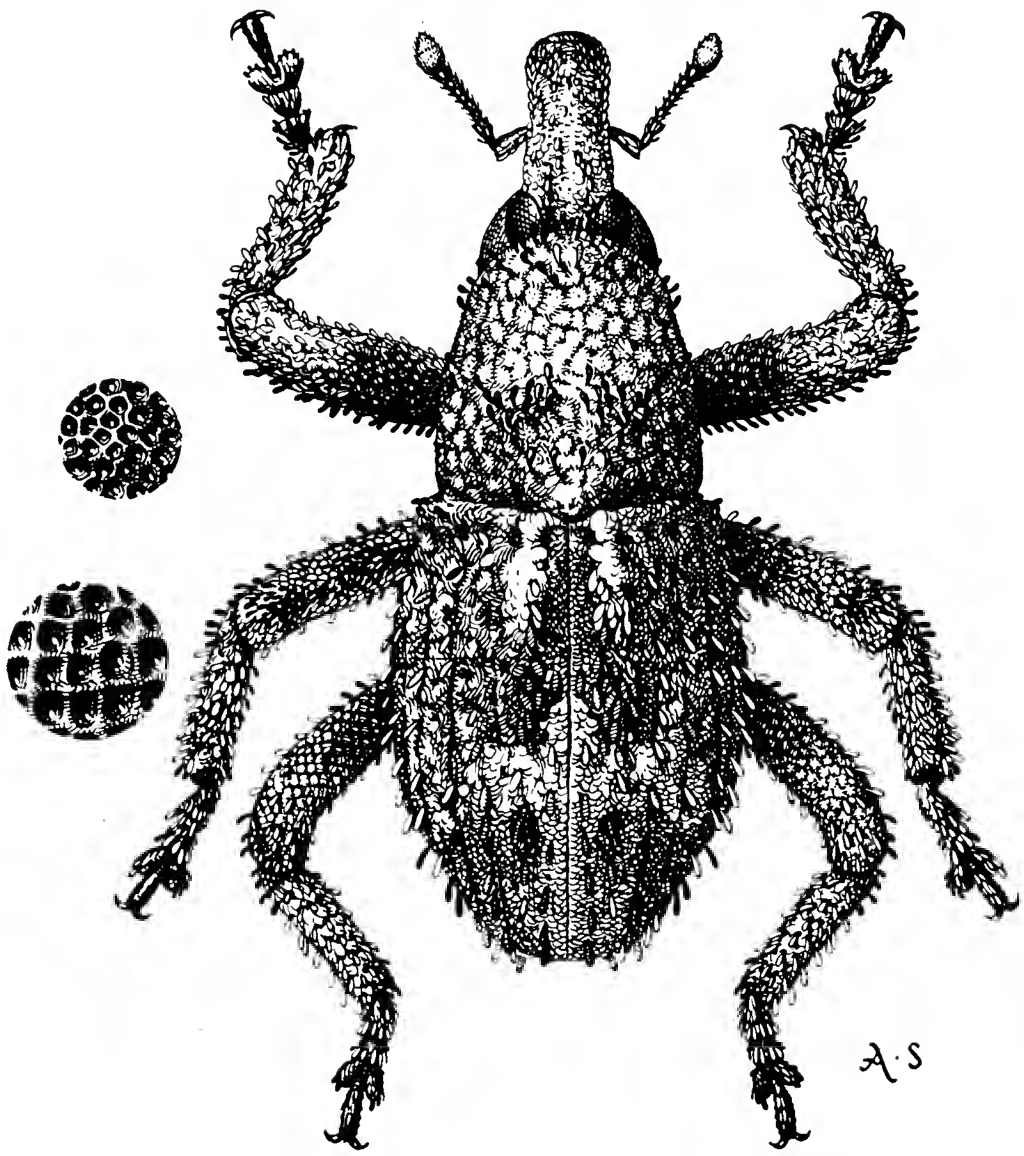


Figure 1—*Miocalles notatus* Pascoe. The holotype from Aru; length 3 mm., excluding head. The unci are developed on all tibiae, but they are obscured by the mid and hind tarsi on the drawing. (Drawn by Arthur Smith.)

found that certain species now resting under *Acalles* really belong to *Miocalles,* and the geographical distribution of the genus is wider than has been supposed. This paper is written to present this and other information, and it is considered worthwhile to publish at this time a list of the 114 described species.

I first became acquainted with these small Pacific island weevils more than 25 years ago while working on an extensive collection of Marquesan weevils (upon which, unfortunately, my studies have not yet been completed). Since then, I have collected many hundreds of specimens in various parts of the Pacific, and collections made by other workers have come to hand. My interest in the group and its distribution continues, and some day, when the pressure of other work becomes less demanding, I hope to complete my studies of the assembled, unreported collections.

Genus **MIOCALLES** Pascoe

Miocalles Pascoe, 1883:97. Type: *Miocalles notatus* Pascoe, 1883:97, the only originally included species.

Microcryptorhynchus Lea, 1908:194. Type: *Microcryptorhynchus pygmaeus* Lea, 1908:195, the only included species. Lea, 1912:455 (in key); 1912:489, key to three Australian species. Zimmerman, 1936:9; 1936:17, 1938:21; 1942:114. **New synonym.**

Microcryptorrhynchus Marshall, 1931:282-284 (altered spelling). Hustache, 1936:233.

Miocalles appears not to have been mentioned, outside of catalogs, since it was described, and it has remained monotypic. Hustache placed *Microcryptorhynchus* immediately after *Cryptorhynchus* in *Coleopterorum Catalogus* (1936:233), but that is in error. The genus is allied to the *Acalles* group of genera, but not the *Cryptorhynchus* series. *Miocalles,* however, was more appropriately placed by Hustache among the genera following *Acalles* in the *Catalogus.*

Miocalles is a large assemblage of small and very small weevils whose larvae bore in dead wood, dead twigs and dead ferns. The adults are most often to be found in association with dead twigs and branches and dead fern fronds, but I have found some species on living foliage. The genus is widely spread in the Pacific, and in southeastern Polynesia it constitutes a dominant feature of the insect faunas of the high islands. Today we are able to report that these little weevils are found from Aru and Mysol (islands near the western part of New Guinea), along the eastern part of Australia to Tasmania, in Micronesia (although most of the records are in my incompleted manuscript) from Palau to the Marianas to Wake Island on the north and the high islands of the Carolines on the south and east, and from the New Hebrides and New Caledonia through the high islands of Polynesia all the way out to the Marquesas and Henderson on the east and through the Australs to Rapa and Marotiri on the south. More than 40 species occur on the small island of Rapa alone, and the complex of species (undescribed) occurring in the Marquesas also is extraordinary. I have described 18 species from Tahiti, but that is only part of that fauna. Our collections contain a large number of undescribed species from the Marquesas, Samoa, Fiji, Micronesia and other islands. None have been reported from New Guinea and many of the adjacent islands where we may expect to find them when those areas are explored adequately. Peculiarly, the genus has never become established in Hawaii.

I mentioned New Zealand as one of the localities inhabited by the genus, but this information is new, and none of the weevils have heretofore been reported from New Zealand. Many years ago, I studied some examples of the genus from the Greymouth region of the South Island, but these have remained undetermined. I have since examined the New Zealand collections in the British Museum and have found that some of the so-called New Zealand *Acalles* really belong to *Miocalles*, and the new records are incorporated below.

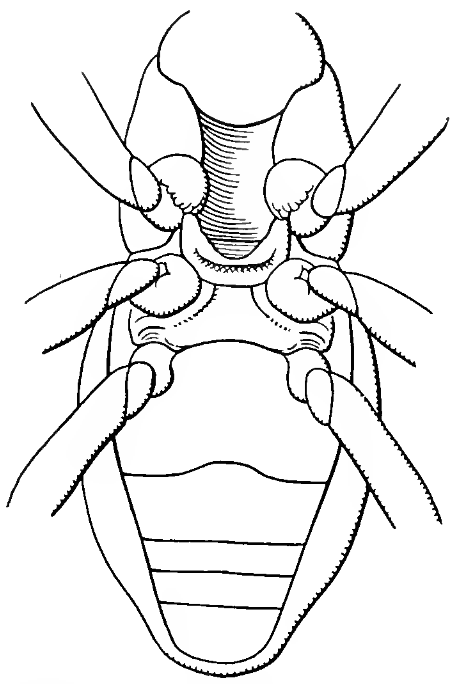


FIGURE 2—*Miocalles notatus* Pascoe. Sketch of the ventral side of Pascoe's second specimen, from Mysol. (Drawn by Arthur Smith.)

Corrections to *Coleopterorum Catalogus*

The "Junk Catalog" bristles with errors, and a few concerning the present problem are as follows:

p. 124, read *wilkesii* for *Wilkesi*.

p. 233, *Microcryptorhynchus* was originally spelled with one r before the h. It is out of place next to *Cryptorhynchus* and belongs in the Tylodina in the *Acalles* series.

———, under *orbiculus*, read p. 454 instead of p. 455.

———, under *oreas*, the locality is Lord Howe Island, not Marquesas.

———, under *planiceps*, the locality is Marquesas, not Tasmania.

p. 234, under *pygmaeus*, read p. 195 instead of p. 194, and the locality is King Island, Bass Straight, Australia, not Fiji, and Lea recorded a "var.?" from Mount Wellington, Tasmania.

———, under *rotundipennis*, the locality is Fiji, not Lord Howe Island.

Catalog of *Miocalles*

Herewith is a list of the described species as now recognized by me. Following the alphabetical list is an arrangement based upon geographical distribution.

Miocalles abditiceps (Zimmerman), new combination.
Microcryptorhynchus abditiceps Zimmerman, 1938:64, fig. 6,d; pl. 1, no. 27.
Austral Islands: Rapa. Hostplants: ferns, *Fitchia.*

Miocalles abnormis (Zimmerman), new combination.
Microcryptorhynchus abnormis Zimmerman, 1938:44, fig. 5,h-i; pl. 2, no. 5.
Austral Islands: Rapa. Hostplant: *Pteris* fern.

Miocalles ambiguus (Zimmerman), new combination.
Microcryptorhynchus ambiguus Zimmerman, 1936:33, fig. 4,i.
Society Islands: Tahiti. Hostplant: fern.

Miocalles analis (Marshall), new combination.
Microcryptorrhynchus analis Marshall, 1931:282, fig. 11,c. Zimmerman, 1941:169.
Samoa: Tutuila, Upolu. Hostplant: beaten from various shrubs.

Miocalles andersoni (Zimmerman), new combination.
Microcryptorhynchus andersoni Zimmerman, 1938:60, pl. 2, no. 7.
Austral Islands: Rapa. Hostplants: *eurya,* ferns, *Fitchia, Lautea.*

Miocalles angustatus (Zimmerman), new combination.
Microcryptorhynchus angustatus Zimmerman, 1936:28, fig. 1,f.
Society Islands: Tahiti. Hostplant: *Cyathea* fern.

Miocalles angustior (Lea), new combination.
Microcryptorhynchus angustior Lea, 1928:88.
Fiji: Viti Levu.

Miocalles ater (Zimmerman), new combination.
Microcryptorhynchus ater Zimmerman, 1938:35, pl. 1, no. 2.
Austral Islands: Rapa. Hostplants: *Bidens, Fitchia, Sclerotheca.*

Miocalles basipennis (Zimmerman), new combination.
Microcryptorhynchus basipennis Zimmerman, 1942:118, pl. 3,D.
Mariana Islands: Guam. Hostplant: *Pipturus.*

Miocalles bicolor (Zimmerman), new combination.
Microcryptorhynchus bicolor Zimmerman, 1938:36, fig. 5,g; pl. 1, no. 4.
Austral Islands: Rapa. Hostplant: *Cyathea* fern.

Miocalles brevis (Zimmerman), new combination.
Microcryptorhynchus brevis Zimmerman, 1936:39, fig. 4,l.
Society Islands: Tahiti. Hostplants: ferns, *Freycinetia,* shrubs.

Miocalles caledonicus (Lea), new combination.
Microcryptorhyncus caledonicus Lea, 1928:89, Zimmerman, 1942:88.
New Caledonia.

Miocalles carinatus (Zimmerman), new combination.
Microcryptorhynchus carinatus Zimmerman, 1938:42, pl. 2, no. 12.
Austral Islands: Rapa. Hostplant: beaten from dead branches.

Miocalles caudatus (Zimmerman), new combination.
Microcryptorhynchus caudatus Zimmerman, 1936:21, fig. 4,c.
Society Islands: Huahine. Hostplant: *Blechnum* fern.

Miocalles chaetectetoroides (Zimmerman), new combination.
Microcryptorhynchus chaetectetoroides Zimmerman, 1938:41, pl. 2, no. 3.
Austral Islands: Rapa. Hostplants: *Homolanthus,* ferns?, *Fitchia?*

Miocalles cheesmanae (Zimmerman), new combination.
Microcryptorhynchus cheesmanae Zimmerman, 1939:169, fig. 1,b.
New Hebrides: Erromanga.

Miocalles collenettei (Marshall), new combination.
Microcryptorhynchus collenettei Marshall, 1931:456.
Marquesas: Hivaoa.

Miocalles confinis (Zimmerman), new combination.
Microcryptorhynchus confinis Zimmerman, 1936:29, fig. 4,o.
Society Islands: Tahiti. Hostplant: fern.

Miocalles convexus (Zimmerman), new combination.
Microcryptorhynchus convexus Zimmerman, 1936:34, fig. 2,e.
Society Islands: Tahiti. Hostplants: fern, *Metrosideros.*

Miocalles cookei (Zimmerman), new combination.
Microcryptorhynchus cookei Zimmerman, 1936:10, figs. 1,b; 2,f.
Austral Islands: Raivavae. Hostplant: *Pteris* fern.

Miocalles crinitus (Zimmerman), new combination.
Microcryptorhynchus crinitus Zmimerman, 1938:33, pl. 2, no. 2.
Austral Islands: Rapa.

Miocalles curtus (Zimmerman), new combination.
Microcryptorhynchus curtus Zimmerman, 1938:34, pl. 1, no. 1.
Austral Islands: Rapa. Hostplants: *Bidens, Coprosma, Lautea.*

Miocalles curvus (Zimmerman), new combination.
Microcryptorhynchus curvus Zimmerman, 1938:68, fig. 6,b; pl. 2, no. 13.
Austral Islands: Rapa. Hostplant: fern.

Miocalles cylindricollis (Lea), new combination.
Microcryptorhynchus cylindricollis Lea, 1912:138.
Western Australia: Mt. Barker (north of Albany).

I have not seen this geographically isolated species. Its relationships should be examined with care.

Miocalles discretus (Zimmerman), new combination.
Microcryptorhynchus discretus Zimmerman, 1936:30, fig. 4,a.
Society Islands: Tahiti. Hostplant: probably *Blechnum* and possibly other ferns; occasionally found on other plants which are not hostplants.

Miocalles echinatus (Lea), new combination.
Microcryptorhynchus echinatus Lea, 1912:137.
Australia: New South Wales.

Miocalles evanescens (Lea), new combination.
Microcryptorhynchus evanescens Lea, 1928:83.
Australia: Yorke Island, Queensland.

Miocalles exilis (Zimmerman), new combination.
Microcryptorhynchus exilis Zimmerman, 1936:40, fig. 4,q.
Society Islands: Tahiti. Hostplant: fern.

Miocalles fasciatus (Zimmerman), new combination.
Microcryptorhynchus fasciatus Zimmerman, 1938:44, pl. 1, no. 10.
Austral Islands: Rapa. Hostplant: *Eurya.*

Miocalles fasciculatus (Lea), new combination.
Microcryptorhynchus fasciculatus Lea, 1928:86.
Lord Howe Island.

Miocalles fitchiae (Zimmerman), new combination.
Microcryptorhynchus fitchiae Zimmerman, 1938:40, pl. 1, no. 8.
Austral Islands: Rapa. Hostplants: *Fitchia, Piper?*

Miocalles fosbergi (Zimmerman), new combination.
Microcryptorhynchus fosbergi Zimmerman, 1936:26, figs. 1,d; 4,g.
Society Islands: Tahiti. Hostplant: *Cyathea* fern.

Miocalles foveaventris (Zimmerman), new combination.
Microcryptorhynchus foveaventris Zimmerman, 1938:63, pl. 1, no. 26.
Austral Islands: Rapa. Hostplant: *Asplenium nidus,* fern.

Miocalles fraudator (Zimmerman), new combination.
Microcryptorhynchus fraudator Zimmerman, 1936:37, fig. 4,f.
Society Islands: Tahiti. Hostplant: beaten from shrubs.

Miocalles freycinetiae (Zimmerman), new combination.
Microcryptorhynchus freycinetiae Zimmerman, 1936:40, fig. 4,s.
Society Islands: Tahiti. Hostplant: *Freycinetia.*

Miocalles fulgidus (Zimmerman), new combination.
Microcryptorhynchus fulgidus Zimmerman, 1936:36, figs. 1,e; 2,b.
Society Islands: Tahiti. Hostplant: fern.

Miocalles glaber (Zimmerman), new combination.
Microcryptorhynchus glaber Zimmerman, 1938:39, pl. 1, no. 7.
Austral Islands: Rapa. Hostplants: *Bidens, Fitchia, Lautea.*

Miocalles globus (Zimmerman), new combination.
Microcryptorhynchus globus Zimmerman, 1942:85, figs. 1, a.b.
New Caledonia.

Miocalles glomus (Marshall), new combination.
Microcryptorrhynchus glomus Marshall, 1931:284, fig. 11,a.
Samoa: Tutuila, Upolu.

Miocalles gracilis (Zimmerman), new combination.
Microcryptorhynchus gracilis Zimmerman, 1936:15, figs. 1,d; 2,d (not h as originally printed).
Austral Islands: Tubuai. Hostplant: fern.

Miocalles guamae (Zimmerman), new combination.
Microcryptorhynchus guamae Zimmerman, 1942:115, pl. 3, E; 1948:314.
Mariana Islands: Guam, Tinian, Saipan. Histplants: *Acacia confusa, Aglaia, Cestrus diurnum, Premna gaudichaudii.*

Miocalles hirtus (Zimmerman), new combination.
Microcryptorhynchus hirtus Zimmerman, 1936:14, fig. 2,h.
Austral Islands: Tubuai. Hostplant: fern.

Miocalles howensis (Lea), new combination.
Microcryptorhynchus howensis Lea, 1928:84.
Lord Howe Island.

Miocalles humeralis (Zimmerman), new combination.
Microcryptorhynchus humeralis Zimmerman, 1938:62, pl. 1, no. 25.
Austral Islands: Rapa. Hostplants: *Bidens, Coprosma, Lautea.*

Miocalles impressicollis (Zimmerman), new combination.
Microcryptorhynchus impressicollis Zimmerman, 1938:49, pl. 1, no. 14.
Austral Islands: Rapa. Hostplant: *Asplenium nidus* fern.
Miocalles impressus (Zimmerman), new combination.
Microcryptorhynchus impressus Zimmerman, 1938:32, fig. 5,b-d; pl. 2, no. 1.
Austral Islands: Rapa. Hostplants: *Bidens, Fitchia, Piper.*
Miocalles interruptus (Lea), new combination.
Microcryptorhynchus interrupta Lea, 1928:86.
Lord Howe Island.
Miocalles irregularis (Zimmerman), new combination.
Microcryptorhynchus irregularis Zimmerman, 1938:48, fig. 6,e; pl. 1, no. 13.
Austral Islands: Rapa. Hostplant: *Cyathea* fern.
Miocalles irroratus (Zimmerman), new combination.
Microcryptorhynchus irroratus Zimmerman, 1936:33, fig. 4,h.
Society Islands: Tahihi. Hostplant: fern.
Miocalles kondoi (Zimmerman), new combination.
Microcryptorhynchus kondoi Zimmerman, 1939:171, fig. 2,a.
Caroline Islands: Ponape.
Miocalles leviculus (Broun), new combination.
Acalles leviculus Broun, 1881:721.
New Zealand: Wellington.
Miocalles lucens (Zimmerman), new combination.
Microcryptorhynchus lucens Zimmerman, 1938:38, pl. 1, no. 6.
Austral Islands: Rapa. Hostplant: *Fitchia.*
Miocalles mangaoae (Zimmerman), new combination.
Microcryptorhynchus mangaoae Zimmerman, 1938:35, pl. 1, no. 3.
Austral Islands: Rapa. Hostplant: *Cyathea* fern.
Miocalles mangarevae (Zimmerman), new combination.
Microcryptorhyñchus mangarevae Zimmerman, 1936:4, fig. 1,a.
Mangareva Island. Hostplant: *Asplenium nidus* fern.
Miocalles minutus (Zimmerman), new combination.
Microcryptorhynchus minutus Zimmerman, 1936:19, fig. 4,k.
Society Islands: Raiatea. Hostplant: *Pandanus.*
Miocalles modicus (Zimmerman), new combination.
Microcryptorhynchus modicus Zimmerman, 1936:32, fig. 4,r.
Society Islands: Tahiti.
Miocalles montevagus (Zimmerman), new combination.
Microcryptorhynchus montevagus Zimmerman, 1936:35, fig. 2,d.
Society Islands: Tahiti. Hostplant: fern.
Miocalles morongotae (Zimmerman), new combination.
Microcryptorynchus morongotae Zimmerman, 1938:51, pl. 1, no. 16.
Austral Islands: Rapa. Hostplant: *Metrosideros.*
Miocalles niger (Zimmerman), new combination.
Microcryptorhynchus niger Zimmerman, 1938:46, pl 2, no. 9.
Austral Islands: Rapa. Hostplants: *Bidens, Fitchia.*
Miocalles nitidus (Zimmerman), new combination.
Microcryptorhynchus nitidus Zimmerman, 1938:51, pl. 1, no. 15.
Austral Islands: Rapa. Hostplants: *Acalypha, Asplenium nidus* fern.

Miocalles norfolcensis (Lea), new combination.
Microcryptorhynchus norfolcensis Lea, 1928:83.
Norfolk Island.

Miocalles notatus Pascoe (fig. 1, 2).
Miocalles notatus Pascoe, 1883:97.
Aru (holotype locality), Mysol (Misol) (islands off southwest and west New Guinea).

These two islands are a considerable distance apart, and I wonder if some error has been made in labeling one of the two known specimens.

Miocalles obesus (Zimmerman), new combination.
Microcryptorhynchus obesus Zimmerman, 1938:50, fig. 6,c; pl. 2, no. 10.
Austral Islands: Rapa. Hostplants: ferns, *Fitchia?, Piper?*

Miocalles orbiculus (Marshall), new combination.
Microcryptorrhynchus orbiculus Marshall, 1931:454.
Marquesas: Hivaoa.

Miocalles oreas (Lea), new combination.
Microcryptorhynchus oreas Lea, 1928:85.
Lord Howe Island.

Miocalles orientissimus (Zimmerman), new combination.
Microcryptorhynchus orientissimus Zimmerman, 1936:7, fig. 1,b.
Henderson Island. Hostplant: beaten from shrubs.

Miocalles orofenae (Zimmerman), new combination.
Microcryptorhynchus orofenae Zimmerman, 1936:41, fig. 4,e.
Society Islands: Tahiti. Hostplant: *Cyathea* fern.

Miocalles paenulatus (Zimmerman), new combination.
Microcryptorhynchus paenulatus Zimmerman, 1938:53, pl. 1, no. 19.
Austral Islands: Rapa. Hostplants: *Asplenium nidus*, ferns, ***Bidens, Cyathea,*** *Homolanthus, Metrosideros.*

Miocalles pallidus (Zimmerman), new combination.
Microcryptorhynchus pallidus Zimmerman, 1936:20, fig. 4,n.
Society Islands: Huahine. Hostplant: beaten from shrubs.

Miocalles parvus (Zimmerman), new combination.
Microcryptorhynchus parvus Zimmerman, 1936:17, fig. 1,c.
Austral Islands: Rurutu. Hostplant: *Dryopteris* fern.

Miocalles perpusillus (Pascoe), new combination.
Acalles perpusillus Pascoe, 1877:147. Broun, 1880:490.
New Zealand: Tairua.

Miocalles pervisus (Zimmerman), new combination.
Microcryptorhynchus pervisus Zimmerman, 1936:31, fig. 4,d.
Society Islands: Tahiti. Hostplant: fern.

Miocalles piciventris (Broun), new combination.
Acalles piciventris Broun, 1909:120.
Auckland Island (south of New Zealand).

Miocalles planatus (Zimmerman), new combination.
Microcryptorhynchus planatus Zimmerman, 1936:38, figs. 2,c; 4,b.
Society Islands: Tahiti. Hostplant: *Freycinetia.*

Miocalles planiceps (Marshall), new combination.
Microcryptorrhynchus planiceps Marshall, 1931:456.
Marquesas: Hivaoa.

Miocalles premnae (Zimmerman), new combination.
Microcryptorhynchus premnae Zimmerman, 1942:116, pl. 3,H.
Mariana Islands: Guam. Hostplant: *Premna gaudichaudii.*
Miocalles proximus (Zimmerman), new combination.
Microcryptorhynchus proximus Zimmerman, 1938:37, pl. 1, no. 5.
Austral Islands: Rapa. Hostplants: *Bidens, Cyathea, Fitchia, Sclerotheca.*
Miocalles punctipennis (Zimmerman), new combination.
Microcryptorhynchus punctipennis Zimmerman, 1938:66, fig. 6,g; pl. 1, no. 29.
Austral Islands: Rapa. Hostplants: ferns and shrubs.
Miocalles pusillus (Zimmerman), new combination.
Microcryptorhynchus pusillus Zimmerman, 1938:57, pl. 1, no. 21.
Austral Islands: Rapa. Hostplants: *Asplenium nidus* and shrubs.
Miocalles pygmaeus (Lea), new combination.
Microcryptorhynchus pygmaeus Lea, 1908:195.
Australia: King Island, Bass Straight. A variety ? from Mount Wellington, Tasmania.
Miocalles raivavaensis (Zimmerman), new combination.
Microcryptorhynchus raivavaensis Zimmerman, 1936:12, fig. 2,e.
Austral Islands: Raivavae. Hostplants: *Alyxia,* a species of Celastraceae, *Hernandia, Metrosideros, Mygoporum, Pteris* fern.
Miocalles reticulatus (Zimmerman), new combination.
Microcryptorhynchus reticulatus Zimmerman, 1938:47, pl. 1, no. 12.
Austral Islands: Rapa. Hostplant: *Eurya.*
Miocalles rotundipennis (Lea), new combination.
Microcryptorhynchus rotundipennis Lea, 1928:88.
Fiji: Viti Levu, Ovalau, Mokondronga.
Miocalles rubellus (Zimmerman), new combination.
Microcryptorhynchus rubellus Zimmerman, 1936:22, fig. 4,m
Society Islands: Huahine. Hostplants: shrubs.
Miocalles rufimanus (Lea), new combination.
Microcryptorhynchus rufimanus Lea, 1928:84.
Norfolk Island.
Miocalles rufirostris (Lea), new combination.
Microcryptorhynchus rufirostris Lea, 1928:85.
Lord Howe Island.
Miocalles rurutuensis (Zimmerman), new combination.
Microcryptorhynchus rurutuensis Zimmerman, 1936:16.
Austral Islands: Rurutu. Hostplant: *Dryopteris* fern.
Miocalles sancti-johni (Zimmerman), new combination.
Microcryptorhynchus sancti-johni Zimmerman, 1938:59, pl. 1, no. 23.
Austral Islands: Rapa. Hostplant: *Homolanthus.*
Miocalles setifer (Broun), new combination.
Acalles setifer Broun, 1886:867.
New Zealand: Waitakerei Range.
Miocalles setigerus Zimmerman, new name.
Microcryptorhynchus setifer Zimmerman, 1938:67, fig. 6,a; pl. 2, no. 14.
Austral Islands: Rapa. Hostplants: *Bidens, Coprosma, Cyathea, Eurya, Fitchia, Freycinetia, Lautea, Metrosideros, Veronica.*

The transfer of *setifer* Broun, 1886, from *Acalles,* creates a homonym of *setifer* Zimmerman, 1938, which thus must be renamed.

Miocalles setosus (Lea), new combination.

Microcryptorhynchus setosus Lea, 1928:87.

Norfolk Island.

Miocalles setulosus (Zimmerman), new combination.

Microcryptorhynchus setulosus Zimmerman, 1938:56, pl. 1, no. 20.

Austral Islands: Rapa. Hostplants: *Asplenium nidus* and *Cyathea* ferns, *Fitchia* (the true host is probably the *Asplenium*).

Miocalles silvestris (Zimmerman), new combination.

Microcryptorhynchus silvestris Zimmerman, 1938:58, pl. 1, no. 22.

Austral Islands: Rapa. Hostplant: *Bidens.*

Miocalles similis (Zimmerman), new combination.

Microcryptorhynchus similis Zimmerman, 1936:27.

Society Islands: Tahiti. Hostplants: ferns and shrubs.

Miocalles spathifer (Zimmerman), new combination.

Microcryptorhynchus spathifer Zimmerman, 1938:62, pl. 1, no. 24.

Austral Islands: Rapa. Hostplant: *Asplenium nidus* fern.

Miocalles spinifer (Zimmerman), new combination.

Microcryptorhynchus spinifer Zimmerman, 1942:117, pl. 3, F.

Mariana Islands: Guam.

Miocalles squamicollis (Zimmerman), new combination.

Microcryptorhynchus squamicollis Zimmerman, 1939:168, fig. 1,a.

New Hebrides: *Erromanga.*

Miocalles squamosus (Zimmerman), new combination.

Microcryptorhynchus squamosus Zimmerman, 1938:43, pl. 1, no. 9.

Austral Islands: Rapa.

Miocalles sternalis (Zimmerman), new combination.

Microcryptorhynchus sternalis Zimmerman, 1938:45, fig. 5,j; pl. 1, no. 11.

Austral Islands: Rapa. Hostplant: *Metrosideros.*

Miocalles subscutellatus (Marshall), new combination.

Microcryptorrhynchus subscutellatus Marshall, 1931:283, fig. 11,b.

Samoa: Upolu.

Miocalles superstes (Zimmerman), new combination.

Microcryptorhynchus superstes Zimmerman, 1936:3, fig. 1.

Austral Islands: Marotiri. Hostplant: probably *Bidens.*

Miocalles tahaae (Zimmerman), new combination.

Microcryptorhynchus tahaae Zimmerman, 1936:19.

Society Islands: Tahaa. Hostplants: shrubs.

Miocalles tenuis (Zimmerman), new combination.

Microcryptorhynchus tenuis Zimmerman, 1938:54, pl. 1, no. 18.

Austral Islands: Rapa. Hostplants: *Cyathea* fern, *Eurya, Fitchia, Freycinetia, Lautea.*

Miocalles testaceus (Zimmerman), new combination.

Microcryptorhynchus testaceus Zimmerman, 1936:14, fig. 2,a.

Austral Islands: Tubuai. Hostplant: fern.

Miocalles thoracicus (Zimmerman), new combination.

Microcryptorhynchus thoracicus Zimmerman, 1938:65, fig. 6,f; pl. 1, no. 28.

Austral Islands: Rapa. Hostplants: *Asplenium nidus* and perhaps other ferns, *Eurya?*

Miocalles trukae (Zimmerman), new combination.

Microcryptorhynchus trukae Zimmerman, 1939:172, fig. 2,b.

Caroline Islands: Truk.

Miocalles tubuaiensis (Zimmerman), new combination.

Microcryptorhynchus tubuaiensis Zimmerman, 1936:13, fig. 2,g.

Austral Islands: Tubuai. Hostplant: fern.

Miocalles tumidus (Zimmerman), new combination.

Microcryptorhynchus tumidus Zimmerman, 1938:60, pl. 2, no. 4.

Austral Islands: Rapa. Hostplant: *Asplenium nidus* fern.

Miocalles vagus (Zimmerman), new combination.

Microcryptorhynchus vagus Zimmerman, 1936:17, fig. 4,p.

Society Islands: Borabora, Huahine, Moorea, Tahiti. Hostplants: *Alyxia*, a species of Celastraceae.

Miocalles varians (Zimmerman), new combination.

Microcryptorhynchus varians Zimmerman, 1938:55, fig. 5,f; pl. 2, no. 6.

Austral Islands: Rapa. Hostplants: *Bidens, Cyathea* ferns, *Eurya, Fitchia, Metrosideros.*

Miocalles ventralis (Zimmerman), new combination.

Microcryptorhynchus ventralis Zimmerman, 1938:52, pl. 1, no. 17.

Austral Islands: Rapa. Hostplant: *Asplenium nidus* fern.

Miocalles vitiensis (Lea), new combination.

Microcryptorhynchus vitiensis Lea, 1928:89.

Fiji: Viti Levu, Ovalau, Taveuni.

Miocalles wilkesii (Perkins), new combination.

Acalles wilkesii Perkins, 1926:63.

Acalles Wilkesi, alteration of spelling by Hustache, 1936:124.

Microcryptorhynchus wilkesii (Perkins) Zimmerman, 1938:151.

Wake Island: Wilkes Islet. Hostplant: *Sida.*

Miocalles williamsi (Zimmerman), new combination.

Microcryptorhynchus williamsi Zimmerman, 1942:86, fig. 1,c,d.

New Caledonia.

GEOGRAPHICAL ARRANGEMENT OF THE SPECIES OF MIOCALLES

ARU

notatus Pascoe, Aru and Mysol.

CAROLINE

kondoi (Zimmerman), Ponape.
trukae (Zimmerman), Truk.

MARIANA

basipennis (Zimmerman), Guam.
guamae (Zimmerman), Guam, Tinian, Saipan.
premnae (Zimmerman), Guam.
spinifer (Zimmerman), Guam.

WAKE ISLAND

wilkesii (Perkins).

NEW HEBRIDES

cheesmanae (Zimmerman), Erromanga.
squamicollis (Zimmerman), Erromanga.

FIJI

angustior (Lea), Viti Levu.

rotundipennis (Lea), Viti Levu, Ovalau, Mokondronga.
vitiensis (Lea), Viti Levu, Ovalau, Taveuni.

SAMOA

anxiis (Marshall), Tutuila, Upolu.
glomus (Marshall), Tutuila, Upolu.
subscutellatus (Marshall), Upolu.

SOCIETY

ambiguus (Zimmerman), Tahiti.
angustatus (Zimmerman), Tahiti.
brevis (Zimmerman), Tahiti.
caudatus (Zimmerman), Huahine.
confinis (Zimmerman), Tahiti.
convexus (Zimmerman), Tahiti.
discretus (Zimmerman), Tahiti.
exilis (Zimmerman), Tahiti.
fosbergi (Zimmerman), Tahiti.
fraudator (Zimmerman), Tahiti.
freycinetiae (Zimmerman), Tahiti.
fulgidus (Zimmerman), Tahiti.
irroratus (Zimmerman), Tahiti.
minutus (Zimmerman), Raiatea.
modicus (Zimmerman), Tahiti.
montevagus (Zimmerman), Tahiti.
orofenae (Zimmerman), Tahiti.
pallidus (Zimmerman), Huahine.
pervisus (Zimmerman), Tahiti
planatus (Zimmerman), Tahiti.
rubellus (Zimmerman), Huahine.
similis (Zimmerman), Tahiti.
tahaae (Zimmerman), Tahaa.
vagus (Zimmerman), Borabora, Huahine, Moorea, Tahiti.

MARQUESAS

collenettei (Marshall), Hivaoa.
orbiculus (Marshall), Hivaoa.
planiceps (Marshall), Hivaoa.

AUSTRAL

abditiceps (Zimmerman), Rapa.
abnormis (Zimmerman), Rapa.
andersoni (Zimmerman), Rapa.
ater (Zimmerman), Rapa.
bicolor (Zimmerman), Rapa.
carinatus (Zimmerman), Rapa.
chaetectetoroides (Zimmerman), Rapa.
cookei (Zimmerman), Raivavae.
crinitus (Zimmerman), Rapa.
curtus (Zimmerman), Rapa.
curvus (Zimmerman), Rapa.
fasciatus (Zimmerman), Rapa.
fitchiae (Zimmerman), Rapa.
foveaventris (Zimmerman), Rapa.
glaber (Zimmerman), Rapa.
gracilis (Zimmerman), Tubuai.
hirtus (Zimmerman), Tubuai.
humeralis (Zimmerman), Rapa.
impressicollis (Zimmerman), Rapa.
impressus (Zimmerman), Rapa.
irregularis (Zimmerman), Rapa.
lucens (Zimmerman), Rapa.
mangaoae (Zimmerman), Rapa.
morongotae (Zimmerman), Rapa.
niger (Zimmerman), Rapa.
nitidus (Zimmerman), Rapa.
obesus (Zimmerman), Rapa.
paenulatus (Zimmerman), Rapa.
parvus (Zimmerman), Rurutu.
proximus (Zimmerman), Rapa.
punctipennis (Zimmerman), Rapa.
pusillus (Zimmerman), Rapa.
raivavaensis (Zimmerman), Raivavae.
reticulatus (Zimmerman), Rapa.
rurutuensis (Zimmerman), Rurutu.
sancti-johni (Zimmerman), Rapa.
setigerus (Zimmerman), Rapa.
setulosus (Zimmerman), Rapa.
silvestris (Zimmerman), Rapa.
spathifer (Zimmerman), Rapa.
squamosus (Zimmerman), Rapa.
sternalis (Zimmerman), Rapa.
superstes (Zimmerman), Marotiri.
tenuis (Zimmerman), Rapa.
testaceus (Zimmerman), Tubuai.
thoracicus (Zimmerman), Rapa.
tubuaiensis (Zimmerman), Tubuai.
tumidus (Zimmerman), Rapa.
varians (Zimmerman), Rapa.
ventralis (Zimmerman), Rapa.

MANGAREVA

mangarevae (Zimmerman), Mangareva.

HENDERSON ISLAND

orientissimus (Zimmerman).

AUSTRALIA

cylindricollis (Lea), West Australia.
echinatus (Lea), New South Wales.
evanescens (Lea), Queensland.
pygmaeus (Lea), King Island (Bass Strait), Tasmania?

NEW CALEDONIA

caledonicus (Lea).
globus (Zimmerman).
williamsi (Zimmerman).

NORFOLK ISLAND

norfolcensis (Lea).
rufimanus (Lea).
setosus (Lea).

LORD HOWE ISLAND

fasciculatus (Lea).
howensis (Lea).
interruptus (Lea).
oreas (Lea).
rufirostris (Lea).

NEW ZEALAND

leviculus (Broun).
perpusillus (Pascoe).
setifer (Broun).

AUCKLAND ISLAND

piciventris (Broun).

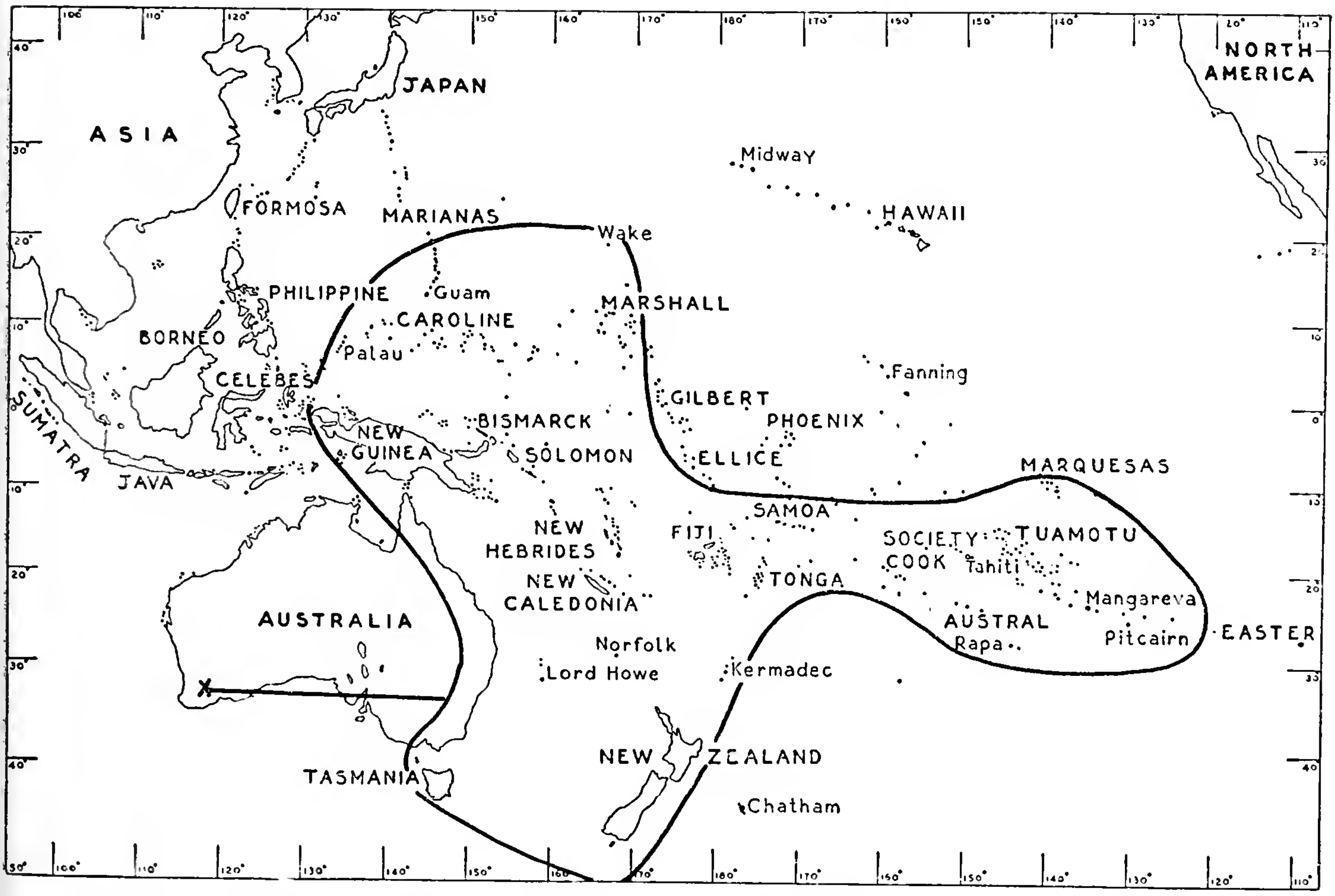


FIGURE 3—The area known to be occupied by *Miocalles*. No species has been recorded from many areas within these boundaries, however. For example, I have no records from the vast areas from New Guinea through the Solomons, but it is probable that many species occur there.

Bibliography

Broun, Thomas.

1880. Manual of the New Zealand Coleoptera. i-xix, 1-651. Colonial Mus. and Geological Survey Dept., Wellington.

———

1881. The same work, part II :i-viii, 653-744, xxi-xxiii.

———

1886. The same work, parts III and IV :i-xvii, 745-973.

———

1909. Descriptions of Coleoptera From the Subantarctic Islands of New Zealand; with Remarks on the Affinities of the Genera, etc. In, The Subantarctic Islands of New Zealand 1:78-123, pls. 3, 5.

Hustache, A.

1936. Cryptorrhynchinae, In W. Junk's Coleopterorum Catalogus, pars 151 :1-317.

Lea, A. M.

1908. The Coleoptera of King Island, Bass Strait. Proc. Royal Soc. Victoria (new series) 20 :143-207.

———

1912. Descriptions of Australian Curculionidae, With Notes on Previously described Species, part X. Trans. Royal Soc. South Australia 36 :76-139.

———

1913. Revision of the Australian Curculionidae Belonging to the Subfamily Cryptorhynchides, part XII. Proc. Linn. Soc. New South Wales 38 :451-489.

———

1928. Cryptorhynchides (Curculionidae) Mostly from Australia. Records South Australian Mus. 4 :49-90.

Marshall, G. A. K.

1931. On New Curculionidae from the Pacific Islands. Ann. Mag. Nat. Hist. (X)8 :447-456, figs. 1-5.

———

1931. Curculionidae, in Insects of Samoa 4(5) :249-346, figs. 1-31. British Mus. (Nat. Hist.)

Pascoe, F. P.

1877. Descriptions of New Genera and Species of New-Zealand Coleoptera.—Part IV. Ann. Mag. Nat. Hist (IV)19 :140-147.

———

1883. Descriptions of Some New Genera and Species of Curculionidae, Mostly Asiatic.—Part II. Ann. Mag. Nat. Hist. (V)12: 88-101.

Perkins, R. C. L.

1926. Coleoptera, Weevils, in Swezey and Bryan, Insects of Hawaii, Johnston Island and Wake Island. Bishop Mus. Bull. 31: 53-66.

Zimmerman, E. C.

1936. Cryptorrhynchinae of the Austral Islands. Bishop Mus. Occas. Papers 12(17):1-19, figs. 1-2.

———

1936. Cryptorrhynchinae of Henderson, Pitcairn, and Mangareva Islands. Bishop Mus. Occas. Papers 12(20):1-8, fig. 1.

———

1936. A Cryptorrhynchid from Marotiri. Bishop Mus. Occas. Papers 12(21):1-4, fig. 1.

———

1936. Cryptorhynchinae of the Society Islands. Bishop Mus. Occas. Papers 12(23):1-48, figs. 1-4.

———

1938. Cryptorhynchinae of Rapa. Bishop Mus. Bull. 151:1-75, figs. 1-5, pls. 1-2.

———

1938. The Status of Acalles wilkesii. Proc. Hawaiian Ent. Soc. 10(1):150-151.

———

1939. Four New Microcryptorhynchus from the New Hebrides and Caroline Islands. Bishop Mus. Occasional Papers 15 (15): 167-173, figs. 1-2.

———

1941. Report on a Collection of Samoan Coleoptera. Bishop Mus. Occas. Papers 16(7):159-176, fig. 1.

———

1942. Distribution and Origin of Some Eastern Oceanic Insects. American Naturalist 76:280-307, figs. 1-10.

———

1942. Curculionidae of Guam. Bishop Mus. Bull. 172:73-146, fig. 1, pls. 1-7.

———— 1942. New Caledonian Microcryptorhynchus. Bishop Mus. Occas. Papers 17(8):85-89, fig. 1.

———— 1948. Notes on Marianas Islands Curculionidae. Proc. Hawaiian Ent. Soc. 13(2):305-315, figs. 1-2.

———— 1948. Insects of Hawaii 1:1-206, figs. 1-52. Univ. Hawaii Press.

REVIEW OF THE POLISH SPECIES OF THE GENUS RHANTUS DEJEAN (Coleoptera: Dytiscidae)

[Prezeglad krajowych gatunków z rodzaju *Rhantus* DeJean (Coleoptera: Dystiscidae)]. By Kazimierz Galewski (in *Annales Zoologici* (Polaska Akademia Nauk), Vol. 16, No. 17 pp. 223-319, 10 maps, 13 plates. 1957).

This detailed morphological study of the 10 Polish species of *Rhantus* (=*Rantus*) should be useful to workers interested in the central European fauna. The many fine illustrations of structures used in taxonomy make the paper usable even for those who do not read Polish. The distribution of each species is illustrated by a map, and detailed keys for identification are included. The bibliography is extensive, but contains few references to recent works by eastern Europeans. Summaries in Russian and English are appended.

In addition to the morphological and taxonomic portions the ecology of each species is discussed. The author finds that the forms in general are eurytopic, but some show preference for definite types of aquatic situations. *Rhantus suturellus* (Harris)*, for example, prefers acid waters in wooded situations, while *R. bistriatus* (Bergstr.) (= *adspersus* Fabr.) frequents bodies of water in meadows, pastures, and other open areas. *R. incognitus* Sholz is definitely recorded from Europe for the first time. About 40 specimens have been collected since 1952 in the little river Hwezna in the National Park at Bialowieza, and another record is given for Kopanki near Kalusz in the Ukrainian S. S. R. One species, *R. consputus* (Sturm), formerly widely distributed appears to be dying out and has been found in recent years only in Lower Silesia. All but three of the Polish species of *Rhantus* have been found in forests under moss and in litter during the winter months indicating that they hiberate as adults.—Frank N. Young, *Indiana University*

*This is the continental European usage of this name which according to F. Balfour-Browne (*British Water Beetles*, Vol. II, Ray Society, London, 1950: 235-239) refers to *bistriatus* (Bergstr.) which name is used on the continent to refer to *adspersus* Fabr.

THE BEST METHOD FOR KILLING AND PRESERVING BEETLES

By CARL H. LINDROTH[1]

The importance of genital characters, especially of the male, in the taxonomy of Coleoptera is admitted by a steadily increasing number of specialists. After some training, the dissection, mounting and investigation of the genitalia as a rule involves no difficulty. However, the comparison of a series of genital slides may sometimes fail to provide a final decision as to the specific identity of the specimens, even in species possessing "good" genital characters. According to my experience of Carabid beetles this above all happens when these distinguishing features belong to the weakly sclerotized or otherwise mobile parts of the internal sac of penis. The final position of soft, membraneous organ structures in the dried insect is apparently highly dependent upon the methods of killing and preserving used before mounting the specimen.

The procedure generally followed among North American coleopterists seems to be killing in cyanide and preserving in strong alcohol (about 70 percent). The cyanide causes violent contraction of the muscles, the alcohol hardening of all soft tissues. By this the beetle is made highly unsuitable for dissection of the genitalia. It is most difficult to handle under a microscope, a certain amount of brute force, with the risk of breaking, being necessary to conquer the stiffness of legs and elytra. And what is worse, the extracted penis often shows changes which must be ascribed to the influence of the cyanid or the alcohol, such as shrinking, deformation or even total eversion of the internal sac.

Dr. J. Manson Valentine (Smiths. Misc. Coll. 103, nr. 6, 1942, pp. 1-16) has recommended *ethyl acetate* (acetic ether) as the ideal killing agent for beetles. This method is now generally accepted in Europe, though in a somewhat simpler way than described by Mr. Valentine. We use glass tubes with cork stoppers, charged to about one third with dry, clean, coarse sawdust of hardwood, preferably poplar. The sawdust should be sifted to rid it from the smallest, dusty particles. Immediately before use about ten drops of ethyl acetate is poured into the tube and further liquid may be added during the course of the day if rich collecting causes risk of evaporation; the sawdust, however, should be kept just moist, not wet. When collecting on a locality or in a certain habitat is finished, the tube is labeled and, after the moisture of the sawdust has been checked, *the sample is stored as it is.* Provided the stopper shuts tightly, the beetles remain fresh and soft for a year or more. Thus on a collecting trip no time needs to be wasted on technical work which can be entirely postponed to the following winter.

Genital slides made from specimens killed by ethyl acetate, which causes relaxation instead of contraction of all soft tissues, show perfect uniformity in the position of the internal sac of penis and are therefore ideal objects for comparative taxonomic analysis. Concerning other advantages emanating from this liquid as a killing (and storing) agent, the reader is referred to the exhaustive article by Mr. Valentine. By these lines, in the hope of making converts, I have only tried to advertise the method from a different point of view.

It may be relevant to give a supplementary note on the best method for studying the inverted internal sac of penis. Its structures are often concealed by connective and muscular tissues or by pigmentation of the penis wall. In that case the whole

---

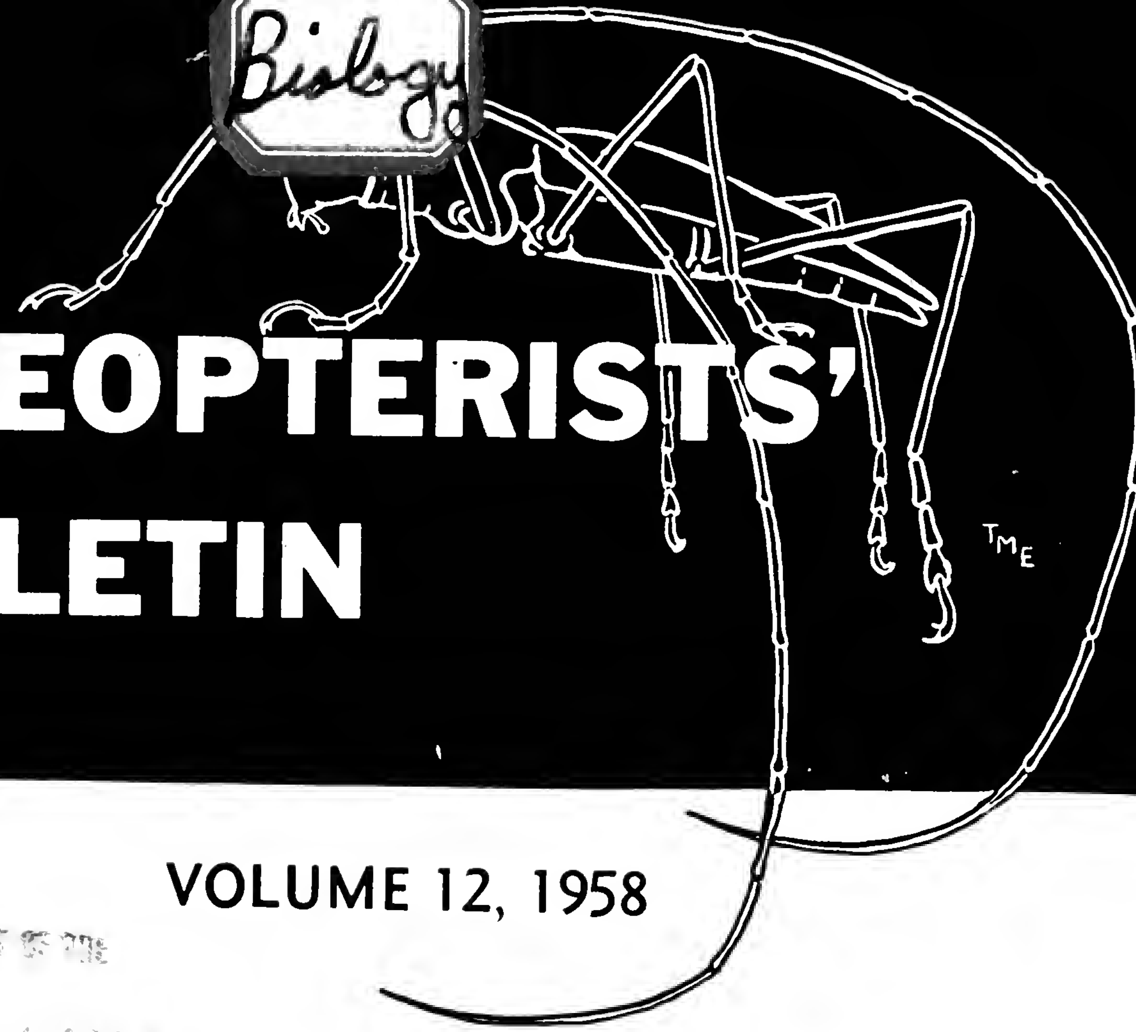
[1]Zoological Institute of the University, Lund, Sweden.

organ should be boiled for a minute or two in a 15 percent solution of potassium (KOH) and then carefully washed in water. Through absolute alcohol it is then removed into a drop of clove oil, which in one or two days makes the organ completely transparent and allows a detailed study even at high microscopical magnification. A direct removal from the clove oil into canada balsam provides a permanent slide suitable for immediate investigation at any time. Personally I prefer to wash out the clove oil in absolute alcohol after studying the object and then to glue it to a corner of the piece of cardboard on which the insect is mounted.

WARD'S TO MAIL COLEOPTERISTS' BULLETIN

Our readers will be interested to learn that beginning with this issue, the labor and cost of mailing the Coleopterists' Bulletin will be supplied by Ward's Natural Science Establishment, P. O. Box 24, Beechwood Station, Rochester 9, New York. We are very grateful for this service, and would like to mention that, as many of our readers know, this Establishment is an excellent source for all types of entomological equipment. If any reader wishes to write to Ward's for information, mentioning the Coleopterists' Bulletin, they will be glad to send him their complete catalog without charge.

EDITOR



THE COLEOPTERISTS' BULLETIN

VOLUME 12, 1958

COMPLETE VOLUME IN ONE ISSUE

TABLE OF CONTENTS

ARNETT, ROSS H., JR., A list of beftle families 65
BOOK NOTICE 58
BOUSEMAN, JOHN K., Notes on Illinois Nemognathinae (Meloidae) 47
DILLON, E. S. and DILLON, L. S., The Monochamini (Cerambycidae) of the Ethiopian faunistic region. V. The subtribe Acridocephalidi 49
EL-MOURSY, ALY ALY, A revision of the species of the subgenus *Plectralidus* (*Harpalus*, Harpalini, Carabidae) from North America 36
ENNS, WILBUR R., Distribution of two American species of *Cissites* (Meloidae) 61
GERBERG, E. J., Dermestid larvae damaging Kodachrom slides 42
HATCH, M. H., Dr. M. Y. Marshall 59

(*Continued on back cover*)

DEPARTMENT OF BIOLOGY
CATHOLIC UNIVERSITY OF AMERICA
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by the Department of Biology, Catholic University of America, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of that volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: Vol. 4, $5.00; Vol. 5, $4.50; Vol. 6 (4 nos. only published), $2.50; Vols. 7 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid.

Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

NOTICE: Beginning with volume 13, the Bulletin will be published by THE CATHOLIC UNIVERSITY OF AMERICA PRESS, Washington 17, D. C. All business matters should be addressed to the Coleopterists' Bulletin, at the Press.

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five copies of the issue containing the article will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. 'The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and in all cases, descriptions of new species must be illustrated. Descriptions of new species or genera must contain keys or be correlated with existing keys. Photographs, with or without text, suitable for printing on the front cover of each issue are desired.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XII | Complete Volume | 1958

Published quarterly beginning with March by the DEPARTMENT OF BIOLOGY, CATHOLIC UNIVERSITY OF AMERICA, Washington 17, D. C. Terms of subscription: $5.00 per year, both domestic and foreign, payable in advance. Back numbers are available.
The general policies of The Coleopterists' Bulletin are determined on the recommendation of the following Advisory Board: Dr. Ross H. Arnett, Jr., Department of Biology, Catholic University of America; Dr. Henry Dietrich, Professor of Entomology, Cornell University; Dr. J. Gordon Edwards, Professor of Entomology, San Jose State College; Dr. Eugene J. Gerberg, Insect Control and Research, Inc., Baltimore, Md.; Dr. Melville H. Hatch, Professor of Zoology, University of Washington, and Mr. George B. Vogt, Entomologist, U. S. Department of Agriculture. Edited by Ross H. Arnett, Jr.

STUDIES IN THE GENUS EPICAUTA OF THE NORTH AMERICAN CONTINENT (MELOIDAE) II. THE UNIFORMA-GROUP[1]

By FLOYD G. WERNER[2]

The Uniforma-Group is a part of the subgenus *Gnathospasta,* recently reviewed by the author.[3] The group can be defined as including all species of *Epicauta* which have the following combination of characters in the male: metatibiae with a comb on the inside of the apex; first antennal segment excavated externally near the apex to some degree and the second segment shorter than the third; protibiae with two apical spurs and protarsal segment I as long as segment II, not distorted. Female specimens show an indication of the excavation of the first antennal segment in most cases and have the second segment shorter than the third.

The group occupies a known range from eastern Arizona and eastern Colorado to the valley of the Rio Balsas of Mexico. The adults are apparently largely blossom feeders, though the records of adult feeding are scanty. In southern Mexico Convolvulaceae seem to be the preferred

---

[1]I—The Caviceps-Group. 1955, Bull. Brooklyn Ent. Soc. 50: 1-12.

[2]University of Arizona, Tucson.

[3]1954, Coleop. Bull. 8: 25-27. The following corrections should be made: *E. atricolor* Champion should be removed to the subgenus *Epicauta.* A paratype examined, probably a male but in too poor condition to determine exactly, lacks the metatibial comb and differs from the norm of the subgenus in shape of prothorax and form of antennae. *E. terminata* (Dugès) should be added to the Funesta-Group. The prothorax and antennae are normal for the subgenus. In a series of specimens collected by R. K. Selander at Mexcala, Guerrero, two males out of six have poorly developed metatibial combs. All other specimens examined have lacked this comb. *E. haroldi* (Haag) also appears to be assignable to *Gnathospasta.* A single female from Jutiapa, Guatemala in the Chicago Natural History Museum agrees well with Haag's description and fits best in *Gnathospasta* on form of antennae and prothorax. It probably belongs to the Funesta-Group, which tends to have heavier antennae than the Uniforma-Group.

plants; the two species most abundant in the United States prefer *Solanum*. The adults emerge in the summer but there are a few records extending into the fall. The members of the Funesta-Group appear to emerge later in the season, as far as the records go, and to have their main range south of the main range of the Uniforma-Group.

Females cannot be placed to species group, or even to the subgenus, with any degree of certainty except by association with males. A peculiar subcampanulate shape of the prothorax of most species, tapering antennae and the antennal characters mentioned above are of some use. But these characters are shared with the Funesta-Group, which differs most notably in that the males have a single spur on the protibiae.

Most male specimens have the metatibial comb well developed. It is somewhat unstable in *E. bipunctata,* at best poorly developed and sometimes absent. The teeth of the comb are characteristically flattened and arranged in a series more or less parallel to the axis of the tibia. In some cases the series is somewhat curved. That the teeth are modified setae is indicated by the condition in one specimen of *E. bipunctata,* in which one of the teeth in the middle of the comb is replaced by a normal seta.

Some of the species of the Uniforma-Group are highly variable in the pattern of color of the pubescence. The most variable are *bipunctata, stigmata* and *tenuemarginata*. Each of these varies from entirely cinereous to entirely black. *Niveolineata* varies somewhat, especially on head and pronotum, but has distinctive elytral markings. The rest of the known species are not known to vary in color pattern to any great degree but some of these species are represented by single specimens. *Melanochroa* and *leoni* are easily confused with entirely black specimens of the three highly variable species and occur in the same region.

In making identifications of samples from the area from Nayarit to Guerrero it is of great aid to handle series together. Entirely black or cinereous specimens can then be associated with more readily identifiable forms by direct comparison of structural characters. Large, entirely black females from Nayarit to Jalisco may be *melanochroa* or a black form of *croccicincta* (Dugès) in the Funesta-Group. The form of *bipunctata* with a black spot toward the apex of each elytron is very similar to *punctum* (Dugès) in the Funesta-Group. *Stigmata,* in its cinereous form, is very similar to *uniforma*. However, *uniforma* is always uniformly colored dorsally and *stigmata* has some of its variants in a series. By this criterion all known samples from Zacatecas and northward in Mexico and all from the United States belong to *uniforma* and all from Guanajuato southward to *stigmata*. The relationship between the two is certainly close and it is possible that the differences indicate races rather than species. Since there is a very distinct break in the *Epicauta* faunas between Zacatecas and the area from Nayarit across the southern part of the central plateau, it seems more appropriate to treat the two as distinct species.

The following key to species is designed for use with male specimens. Both sexes of the more striking species may fit equally well but care should be taken to avoid similar species in the Funesta-Group when an attempt is made to identify females.

1. Mandibles normal, evenly curved and overlapping at the tip; incisor area with distinct teeth 2
   Mandibles elongate, angled inward and backward at about the middle and meeting along the straight incisor surface, this portion lacking distinct teeth 12
2. Antennal segment I usually feebly excavated toward the apex on the outer edge, the excavation not flattened. Segment II without an opposing flattened surface, or, if slightly flattened, without a tuft of differentiated pubescence on this surface 3
   Antennal segment I elongate, strongly excavated externally toward the apex, the excavation flattened. Segment II strongly flattened on the opposing surface, with a tuft of short, fine pubescence on this surface 11
3. Pubescence cinereous dorsally, black on markings as follows: a pair of vittae on each elytron, connected squarely behind; two marks or all of pronotum and part or all of head .... **E. niveolineata** (Haag)
   Not so marked 4
4. Pubescence cinereous dorsally, black across base and apex of elytra, on two marks on the pronotum and on the head .... **E. tripartita** Champ.
   Not so marked 5
5. Pubescence normal, not elongate, on flexor surface of metafemora and metatibiae 6
   Pubescence elongate on flexor surface of metafemora and metatibiae 10
6. Pubescence cinereous to luteo-cinereous above, uniformly colored in a series or varying only in hue. There may be obscure brownish or black markings at the very base of the elytra in some specimens 7
   Pubescence color not uniformly cinereous to luteo-cinereous in a series. Pale specimens, if any, associated with other variously marked specimens in a series 9
7. Tibiae black-pubescent .... **E. nigritibialis** sp. n.
   Tibiae pale-pubescent, sometimes marked with brown or black but not entirely dark 8
8. Head subquadrate, not strikingly narrowed anteriorly. Smaller, stouter species, tending to be cinereous to brownish-cinereous in color of pubescence .... **E. uniforma** Werner
   Head narrowly triangular, the sides quite straight. Larger, narrower species, tending to be densely luteo-cinereous in color of pubescence. Elytra paler in ground color than rest of body .... **E. alpina** Werner
9. Pubescence cinereous with a black subapical spot on each elytron, less often cinereous from head onto base of elytra and black behind, all cinereous or all black. Metatibial comb poorly developed, apparently absent in some male specimens .... **E. bipunctata** sp. n.
   Pubescence in a series in some or all of the following patterns: cinereous to brownish-cinereous, the same with scattered black setae, black with scattered pale setae, similar but with obscurely paler margins and discal vittae on the elytra, or all black. Metatibial comb well developed .... **E. stigmata** (Dugès)
   (If pubescence all black in a series and part of males with long pubescence on flexor surface of metafemora .... **E. melanochroa** Wellm.)
10. Pubescence entirely black in a series. Antennal segment I feebly excavated. Some male specimens may have normal pubescence on the flexor surface of the metafemora. Large and slender .... **E. melanochroa** Wellm.
    Pubescence variable in a series, cinereous, black with narrow cinereous margins on the elytra or entirely black. Antennal segment I strongly excavated. Shorter and stouter .... **E. tenuemarginata** sp. n.

11. Head quadrate. Pronotum normal, straight across base and with surface even. Known specimens all black ---------- **E. leoni** Dugés
    Head broad and triangular. Pronotum excavated at base and with lateral elevations and depressions on the disc. The single known specimen is black.---- **E. triquetra** sp. n.
12. Pubescence black. Outer protibial spur normal---------- **E. selanderorum** sp. n.
    Pubescence brownish-cinerous or cinereous ---------- 13
13. Outer protibial spur stout, sticklike. Antennal segments VI-X gradually tapering ---------- **E. mimetica** (Horn.)
    (Antennal segments VI-X triangularly expanded---------- **E. labialis** (Dugès))

Epicauta niveolineata (Haag)

Lytta niveolineata Haag, 1880, Deutsche Ent. Zeits. 24: 46.
Epicauta niveolineata, Champion, 1892, Biol. Centrali Americana, Coleop. 4(2): 416, pl. 19, figs. 14, 15.

This is a very distinctively marked species and one that has already been well described and figured by Champion. Specimens from Champion's series have been examined and there appears to be no structural difference between specimens in which the head and pronotum are black-pubescent and others in which the head and pronotum have the pubescence cinereous with paired black marks.

The known range lies mostly in the state of Guerrero, the recorded specimens all coming from between Chilpancingo and Acapulco except for one specimen listed as from Jalapa (presumably in Vera Cruz) by Champion. The only record available other than Champion's is from 16 mi. S. of Chilpancingo, taken by C. Bolivar and H. R. Roberts, Sept. 14, 1940.

Epicauta tripartita Champ.

Epicauta tripartita Champion, 1892, *op. cit.*: 421, pl. 19, fig. 20. Vaurie, 1950, American Mus. Novitates 1477: 25.

This is another very distinctively marked species and it has also been described and figured by Champion. Little need be added. The metatibial comb is well developed in the male. Antennal proportions of a male from Tepic, Nayarit are as follows:[4] 150/46, 66/35, 112/40, 85/36, 85/34, 85/31, 83/29, 83/27, 77/27, 77/27, 98/25. The excavation of segment I is rather shallow but distinct.

Tripartita is rare in collections. Champion's series of three specimens came from Ventanas on the western border of Durango at about the middle and I have before me a single male collected by F. W. & F. G. Werner at Tepic, Nayarit, July 20-24, 1952. This specimen was sitting on an unidentified shrub and was apparently not feeding.

---

[4]Antennal proportions used throughout this paper are figured to a total length of 1000 units, as indicated in a previous paper (Psyche 60: 108). The numerators represent length of the segments, the denominators the maximum width on the same scale. The segments are listed from base to apex.

Epicauta nigritibialis sp. n.

This species is known from a single male, from Saltillo, Mexico, presumably in the state of Coahuila. It most resembles *E. alpina* Werner but differs most notably in having the head of normal shape and in having the tibiae black-pubescent. Holotype: ♂, ca. 16 mm. long with head deflexed, 3.82 mm. wide across base of elytra, moderately slender. Ground color of body black, of elytra brown. Pubescence appressed, dense enough largely to obscure the ground color, luteo-cinerous over most of the body, largely black on antennae, tarsi, tibiae, apical half of femora, trochanters, mouthparts and obscurely along the hind margin of the head.

Head almost evenly rounded behind eyes, 2.37 mm. long to clypeus, 2.62 mm. wide behind eyes, 2.62 across eyes. Surface densely covered with small but deep punctures that are ca. 0.04 mm. across and ca. 0.01 mm. apart; intervals punctulate. Median impressed line distinct near vertex. Between the eyes there is a narrow, slightly elevated smooth brown diamond that bears some punctulation. Antennal calluses small, with sparser punctures than rest of head and black pubescence. Eyes fairly narrow, oblique, 1.45 x 0.83 mm., separated by 1.48 mm. across the front. Mouth parts normal; last segment of maxillary palpi 0.66 x 0.32 mm. Antennae moderately slender, 7.29 mm. long. Segment I is moderately slender, feebly excavated externally near the apex; segment II is slender, not flattened; segments IV-XI are subparallel. Proportions: 151/54, 69/35, 108/40, 82/39, 84/38, 82/35, 84/35, 82/32, 73/30, 78/28, 104/26.

Pronotum moderately slender, 2.91 mm. long, 2.81 mm. wide, the sides roughly parallel for the basal 5/8, then converging gradually. Surface much as on head. Basal impressed line distinct; median impressed line distinct on middle of disc, augmented by a narrow smooth zone for a short distance. Elytra subparallel, 10.75 mm. long, ca. 3.82 mm. wide across base, ca. 4.24 at widest. The humeri and very tips have small markings of black pubescence. Underside largely pale-pubescent, except for black pubescence on the sixth abdominal sternite and a median black suffusion on the fifth, and the leg markings noted above. On the metafemora the black pubescence continues narrowly along the extensor surface to the base. The outer spur of the protibiae is slender, pointed; the inner is shorter, straight and pointed, not much more than half as long as the outer. The metatibial spurs are moderately broad, dished out, the outer slightly the broader, 0.38 x 0.16 mm.

Holotype: ♂, Saltillo (Coahuila?), E. Palmer, in the M.C.Z.

Epicauta uniforma Werner

Epicauta uniforma Werner, 1944, Psyche 50: 67; 1945, Bull. Mus. Comp. Zool. 95: 452. Dillon, 1952, American Midl. Nat. 48(2): 394.

Epicauta stigmata, Vaurie, 1950, *op. cit.*: 26, fig. 6 (in part).

As here restricted, *uniforma* is a species in which the color of the pubescence on the body varies very little. It is usually brownish-cinereous in color but varies from cinereous to almost luteo-cinereous. The legs are mostly pale pubescent, with a small amount of black at the tips of the femora and tibiae and on most of the tarsi. The antennae are also black-pubescent, with some pale setae on the first two segments. The first segment of the antennae of the male is moderately stout, only slightly excavated. Antennal proportions of a male from Elfrida, Cochise Co., Arizona: 137/49, 63/33, 99/36, 88/36, 88/38, 88/37, 85/36, 82/35, 77/33, 82/31, 110/27. In the female the first segment of the antennae is just perceptibly excavated. A sample of 30 specimens from the Sulphur Spring Valley, Cochise Co., Arizona, ranges from 7.5 to 12.5 mm. in length, with the mean length 10.1 mm.

Ranges from eastern Arizona to eastern Colorado (Lamar), south through West Texas to Durango and Fresnillo, Zacatecas. The Durango and Zacatecas records are listed by Vaurie, *loc. cit.*, as *stigmata*. One sample from 19 mi. S. Sombrerete, Zacatecas, 7000′, Sept. 5, 1952, R. K. Selander, should be added to Vaurie's Mexican records. Champion's record (*op. cit.*: 422) of *stigmata* from Saltillo, Coahuila may refer to this species or to *nigritibialis*. He makes no mention of the characteristics of the specimens on which his record is based. The species is abundant in the Sulphur Spring Valley, Cochise Co., Arizona from July to September, feeding mainly on *Solanum elaeagnifolium*. There are two records from this region of specimens feeding on *Kallstroemia* blossoms and one feeding on *Datura*. Dillon, *loc. cit.*, gives records of capture on string bean and alfalfa. All of the new specimens from Mexico reported by Vaurie were collected in August.

Epicauta alpina Werner

Epicauta alpina Werner, 1944, Psyche 50: 67; 1945, Bull. Mus. Comp. Zool. 95: 453. Dillon, 1952, *op. cit.*: 411.

This is a moderately slender species in which the pubescence is quite dense, almost obscuring the ground color, and usually bright luteocinerous to luteous. The elytra are somewhat paler in ground color than the body. The head is narrowly triangular and the mandibles are somewhat longer and more prominent than they are in *uniforma* or *nigritibialis*, the species most likely to be confused with it. The first segment of the antennae of the male is distinctly excavated externally toward the apex and there is a good trace of the excavation in the female. Antennal proportions of a male from McNeal, Cochise Co., Arizona: 168/42, 67/34, 90/39, 84/43, 90/42, 87/39, 84/39, 81/39, 76/39, 73/38, 101/34. The head of this specimen is 2.49 mm. long to tip of mandibles, 1.67 to clypeus, 1.86 mm. wide behind the eyes, 1.80 across the eyes, which are separated by 0.95 mm. across the front. In a male of *uniforma* from Elfrida, Arizona the head is 2.56 mm. long to tip of mandibles, 1.73

to clypeus, 2.02 mm. wide behind eyes, 1.99 across eyes and the eyes are separated by 1.14 mm. The head of *alpina* is narrower and more straight-sided, as is shown by a comparison of the width across the eyes and the separation of the eyes in these two specimens. A sample of 32 specimens from the Sulphur Spring Valley, Cochise Co., Arizona ranges from 10.0 to 13.0 mm. in length, with the mean length 11.5 mm.

Alpina is known only from the United States, from Alpine, Texas; Deming, New Mexico and the Sulphur Spring Valley, Cochise Co., Arizona. In Arizona it has been taken from July to September on *Solanum elaeagnifolium*, along with *uniforma*, and has been recorded once from *Kallstroemia* blossoms and once from "mallow." It is much less abundant than *uniforma* in Arizona and occurs in a more restricted area.

Epicauta bipunctata sp. n.

In what is probably its commonest color form this species looks like *E. punctum* (Dugès) in the Funesta-Group, cinereous with a single small black dot toward the apex of each eyltron. The males are readily distinguishable on group characters. *Bipunctata* has a much greater variability in color pattern than does *punctum*, as detailed below.

9-15 mm. long, ground color black, with decumbent pubescence in one of the following color patterns: "cinereous," moderately densely cinereous-pubescent, the general color influenced by the ground color, with black pubescence on the tarsi, tibiae except for some cinereous pubescence on anterior and posterior sides basally on meso- and metatibiae and anterior side of protibiae, and on extensor edge of apex of femora, extending basally in some specimens. If the cinereous area is extensive on the tibiae, there may be a few pale setae on tarsal segment I. The meso- and metafemora are almost glabrous posteriorly and the metafemora and metatrochanters also on the flexor surfaces. "Two-spotted," same as "cinereous" except that there is a black-pubescent spot on each elytron in the middle of the apical third. "Bicolored," like "cinereous" except elytra narrowly cinereous across base and narrowly and feebly along the sides to about the middle, black elsewhere. "Black," pubescence entirely black above and below. Metatibial comb of male poorly developed, in a curved series, often reduced and sometimes absent.

Holotype: ♂, length ca. 10 mm. with head deflexed. Color pattern "two-spotted." Head rounded, 1.89 mm. long to clypeus, 2.15 mm. wide behind eyes, 2.28 across eyes, widest just behind eyes and almost evenly rounded behind, with just a trace of tempora. Surface with normal punctures, ca. 0.03 mm. across and ca. 0.02 mm. apart, the intervals smooth and punctulate. Clypeus and labrum microreticulate. Antennal calluses small, glabrous, feebly microreticulate. Median impressed line fine but distinct down to the level of the eyes. Front with a rufous spot. Eyes moderately prominent, 1.12 x 0.73 mm., excavated above base of antennae and separated by 1.23 mm. across the front. Maxillary palpi slightly swollen and elongated, the last segment 0.73 x 0.30 mm. Antennae 5.23 mm. long, reaching to about the basal fourth of the elytra. Segments I-III have pale pubescence, which extends to beyond the middle of III. Segment I reaches ca. ½ across the eye and is almost straight-sided, with only a feeble trace of an outer apical excavation. Segments IV-X almost tubular, bulging very slightly toward the middle. Proportions: 145/72, 66/45, 121/46, 83/46, 88/48, 83/47, 85/46, 69/45, 83/45, 75/42, 100/42.

Pronotum feebly campanulate, 2.27 mm. long, 2.18 wide across base, the sides almost parallel for the basal 4/5. Surface almost as on head but partly feebly micro-reticulate, with a feeble impressed midline in the middle of the disc, supplemented by a narrow denuded line. Elytra 8.15 mm. long, 3.16 mm. wide across base, straight-sided but slightly broadened behind and separately rounded apically. Suture and four costulae extremely feebly elevated. There are a few black setae at the base, near the scutellum. Underside cinereous-pubescent except for black on the sides of the feebly truncate last abdominal sternite and as noted in the general description of color. Inner protibial spur slightly shorter than outer, not stouter and very feebly curved. First four segments of the protarsi slightly thickened, I 0.57 mm. long, 0.38 mm. thick, including a well-developed pad. Outer metatibial spur slightly broader than inner, pointed, slightly angled. Femora and tibiae not provided with longer setae. Tibiae somewhat flattened and moderately stout. Metatibial comb poorly developed, with several oblique teeth.

Allotype: ♀, differs very little from the male. Antennal segment I is slightly shorter and more slender (0.66 x 0.22 mm.) than in the male (0.76 x 0.28 mm.): maxillary palpi more slender (last segment 0.60 x 0.25 mm.) and the protarsal segments not swollen (segment I 0.55 x 0.30 mm., including a less well developed pad). The protibial spurs are just perceptibly more slender than in the male.

Variation: This species varies both in color and in the development of the male metatibial comb, which varies from a row of about eight short, oblique teeth to apparent absence. The most common condition is the presence merely of a few flattened seta-like structures. Distinguishing the sexes on the secondary sexual characters is not always easy. The males have the inner side of the apex of the metatibiae cut out next to the comb or where the comb should be. In the females the apex slopes evenly to the base of the inner spur. The black elytral spot of "two-spotted" individuals varies from a few setae to a spot about 0.90 mm. across in the series from Chilpancingo, to transverse and twice this width in one specimen from Guadalajara. The Chilpancingo series varies from 9 to 12 mm. in length (mean 10.8 mm.), the Mexcala series from 10.5 to 14 (mean 12.3) and the Guadalajara specimens from 12 to 15 (mean 14.1).

Holotype: ♂, Chilpancingo, Guerrero, Mexico, 4900′, August 11, 1952, F. W. & F. G. Werner, in blossoms of a Convolvulaceous vine, in the M.C.Z. Allotype: ♀, eutopotypical, in the M.C.Z. Paratypes: 40 ♂♂, 15 ♀♀ "two-spotted," 2 ♀♀ "cinereous," eutopotypical. 1 ♂ "two-spotted," 2 ♂♂ "black," 10 km. N. Acahuizotla, Guerrero, 3900′, Aug. 12, 1952, F. W. & F. G. Werner, in blossoms of a Convolvulaceous bush. 2 ♂♂, 4 ♀♀ "two-spotted," 1 ♂, 1 ♀ "bicolored," 8 ♂♂, 8 ♀♀ "black," Mexcala, Guerrero, 1600′, Aug. 30, 1952, R. K. Selander. 1 ♂ "two-spotted," Tepoztlan, Morelos, Aug. 20, 1956, R. R. Dreisbach. 1 ♀ "two-spotted," Hujintlan, Morelos, Aug. 22, 1956, R. & K. Dreisbach. 1 ♂ "two-spotted," Zapotlanejo, (Jalisco), 5500′, Aug. 20, 1954, R. R. Dreisbach. 4 ♂♂, 1 ♀ "two-spotted," 1 ♀ "cinereous," Guadalajara, (Jalisco), McConnell, Carn. Mus. Acc. 3913. 1 ♂ "two-spotted," same data but collected by Crawford. Paratypes deposited in the M.C.Z., Carnegie Museum, U. S. N. M., British Museum, Instituto de Biologia in Mexico City and in the collections of R. R. Dreisbach, R. B. Selander and the author.

On the basis of poorly developed metatibial combs in the males a series from Tepic, Nayarit, Oct. 8, 1948, A. C. Smith, in the U. S. N. M. is doubtfully associated with this species. These specimens were collected on beans. There are two black males, a black female, a much abraded but at least partly cinereous male and a female that is cinereous, like "two-spotted" but with the spots transverse, reaching from suture to margin of the elytra, as in *funesta* (Chev.). If this last specimen belongs to this species, the range of variation may be even greater than indicated by the series at hand.

Epicauta stigmata (Dugès)

Cantharis stigmata Dugès, 1870, La Naturaleza 1: 159, pl. 2, fig. 8, a 1-7. *Epicauta stigmata,* Dugès, 1889, An. Mus. Michoacano 2: 69 (in part). Champion, 1892, *op. cit.*: 422 (in part). Vaurie, 1950, *op. cit.*: 26, fig. 6 (in part).

This highly variable species has been much confused in collections. A single species seems to have been included in Dugès' original series but at least one other, *E. tenuemarginata,* was probably included in his redescription in 1889. Champion included a sample from Saltillo, Coahuila in his series and this sample most likely represents *nigritibialis* or, possibly, *uniforma.* Vaurie included some material now referred to as *uniforma.* Dugès' *intermedia* appears, from the description, to belong to the subgenus *Epicauta* in the group of species related to *cinerea* (Forst.), because of the mention that the anterior tarsi have the first segment dilated and that the prothorax has a distinct median impressed line. These characteristics, along with Vera Cruz as the locality of collection, indicate a member of the *cinerea* group of species.

As here redefined *stigmata* has the following variations in color pattern of the pubescence: "cinereous," entirely cinereous to brownish-cinereous above, with some darker markings on the legs, especially on the tarsi and the tips of the femora and tibiae; "salt-and-pepper," like cinereous but with scattered single black setae, from a few to almost half black; "subvittate," head and pronotum largely cinereous, with or without scattered black setae, elytra largely black but with scattered cinereous setae that are more concentrated on the margins and apex and on a median vitta of greater or lesser extent on each elytron; "pepper-and-salt," black with scattered cinereous setae, from a few to almost half; and "black," entirely black pubescent above and below. The ground color of all specimens examined is entirely black or very dark.

"Cinereous" specimens are very similar to paler specimens of *E. uni-*

forma and the "cinereous" form of *E. bipunctata.* "Black" specimens are most likely to be confused with small specimens of *E. melanochroa.* A ♂ specimen from Chavinda, Michoacan has the following measurements: Length ca. 10 mm. with head deflexed. Head 1.58 mm. long to clypeus, 1.96 mm. wide behind eyes and 2.03 across eyes. Eyes 1.01 x 0.63 mm., separated by 1.04 mm. across the front. Last segment of maxillary palpi 0.50 x 0.25 mm. Pronotum 1.78 mm. long, 1.90 wide. Elytra 7.92 mm. long, 2.65 mm. wide at base, 2.84 at widest. Antennae 5.40 mm. long. Proportions: 158/53, 70/41, 105/41, 88/42, 85/41, 83/41, 85/40, 77/36, 75/35, 73/35, 101/34. The first segment is rather stout, with a well indicated excavation externally near the apex.

In the available series of five or more specimens the following numbers of the different pubescence patterns occur: 9 mi. N. of Mazamitla, Jalisco (1 cin., 1 s.&p., 4 p.&s., 1 blk.); 10 km. E. Quiroga, Michoacan (2 cin., 1 s.&p., 2 subvit., 2 p.&s.); Chavinda, Michoacan (14 p.&s., 7 blk.); Patzcuaro, Michoacan (6 subvit., 11 p.&s.); Atlacomulco, Mexico (6 cin., 1 p.&s.); Toluca, Mexico (5 cin., 19 p.&s., 3 blk.); 10 km. W. Queretaro, Queretaro (35 cin., 1 subvit., 1 p.&s.); Puebla, Puebla (7 cin., 1 s.&p., 1 p.&s., 1 blk.). Pairs pinned in cop. were cin. ♂ & blk. ♀ from Toluca, p.&s. ♂ & cin. ♀; cin. ♂ & cin. ♀, Atlacomulco.

In the sample of 38 specimens from 10 km. W. of Queretaro the length varies from 7.0 to 10.5 mm., with head deflexed (mean 8.9); in 27 specimens from Toluca 10.0 to 13.0 (mean 11.0); in 21 from Chavinda, Michoacan 9.0 to 11.5 (mean 10.1) and in 17 from Patzcuaro, Michoacan 9.0 to 11.5 (mean 10.5). Two very large specimens from Zamora, Michoacan are 15 mm. long.

Specimens have been examined from the following localities: *Jalisco*: 9 mi. N. Mazamitla, 6300′, July 31, 1952, F. W. & F. G. Werner. 10 km. N. Tepatitlan, 6250′, July 17, 1952, F. W. & F. G. Werner. El Molino, July 10, 1956, R. & K. Dreisbach. Lagos de Moreno, 6300′, Aug 12, 1954, R. R. Dreisbach. Km. 538 betw. Jiquilpan & Chapala, 1260 m., Sept. 13, 1950, Ana Maria de Buen. *Guanajuato*: Leon, 5800′, Aug. 19, 1954, R. R. Dreisbach. 5 mi. N. Salamanca, 6000′, Aug. 19, 1954, R. R. Dreisbach. *Michoacan*: Jacona, July 15, 1956, R. & K. Dreisbach. Zamora, Aug 30, 1950, D. Enderlin. 10 km. E. (7600′) and 17 km. E. (6800′) of Quiroga, Aug. 3, 1952, F. W. & F. G. Werner. Patzcuaro, 6500′, Aug. 3, 1952, F. W. & F. G. Werner. Chavinda, 5600′, July 31, 1952, F. W. & F. G. Werner. *Mexico*: Toluca, Aug., 1951, H. Canales and July 12, 1955, R. B. & J. M. Selander. 20 mi. N. Toluca, 8500′, Aug. 17, 1954, R. R. Dreisbach. Atlacomulco, 8100′, Aug. 10, 1954 and 8500′, Aug. 18, 1954, R. R. Dreisbach. *D. F.*: Tlalpam, Sept. 3, 1903, W. L. Tower. *Queretaro*:

nr. Hac. Balvanera (10 km. W. Queretaro), July 13, 1955, R. B. & J. M. Selander. *Tlaxcala*: 4 mi. N. W. Huamantla, June 29, 1955, R. B. & J. M. Selander. *Puebla: Puebla*, Aug., 1903, W. L. Tower. *Morelos:* 8 km. E. Cuernavaca, 5500′, Aug. 11, 1952, F. W. & F. G. Werner. Tepoztlan, Aug. 20, 1956, R. & K. Dreisbach and Oct. 5, 1947, J. Alvarez.

Dugès, 1870, states that these beetles eat the blossoms of *Convolvulus variabilis* and occur in large numbers in Guanajuato in July. Samples from 9 mi. N. Mazamitla, Jalisco; Chavinda, Patzcuaro and 17 km. E. of Quiroga, Michoacan all were taken feeding on blossoms of a bushy Convolvulaceous plant. The sample from 10 km. W. of Queretaro was taken on *Ipomoea longifolia* and the one from 4 mi. N. W. of Huamantla, Tlaxcala on *Ipomoea stans*. Feeding records on non-Convolvulaceous plants are: on blossoms of *Solanum* at 10 km. E. of Quiroga and Patzcuaro, Michoacan; on *Argemone* at Toluca, Mexico and on blossoms of a Composite 8 km. W. of Cuernavaca, Morelos. No long series were taken except on Convolvulaceae.

Epicauta melanochroa Wellm.

Cantharis nigra Dugès, 1870, La Naturaleza 1: 161, pl. 2 fig. 7, b. 1-7.

Epicauta nigra, Dugès, 1889, An. Mus. Michoacano 2: 76 (not *Epicauta nigra* (Woodhouse), 1800, a synonym of *E. pensylvanica* (DeGeer).) Champion, 1892, *op. cit.*: 418.

Epicauta melanochroa Wellman, 1910, Deutsche Ent. Zeitschr., 1910: 24. (Substitute name for *nigra* Dugès nec Woodhouse).

This slender black species is one of the most abundant in the Uniforma-Group in the region from Jalisco through Michoacan. Once it is recognized it is quite distinctive and can be confused only with the black form of *E. croceicincta* (Dugès) in the Funesta-Group. The males are readily distinguishable on group characters but the females are very similar. The punctures on the head and pronotum are slightly different and can be used when known males are available for comparison.

The measurements of a ♂ from Chavinda, Michoacan are as follows: Length ca. 15 mm. with head deflexed. Head 2.24 mm. long to clypeus, 2.62 mm. wide behind eyes, 2.72 across eyes. Eyes 1.43 x 0.79 mm., separated by 1.42 mm. across the front. Last segment of maxillary palpi 0.73 x 0.38 mm. Pronotum 2.72 mm. long, 2.40 wide. Elytra 11.74 mm. long, 3.68 mm. wide across base, 3.82 at widest. Antennae 7.72 mm. long; proportions: 184/53, 57/37, 115/41, 84/41, 80/41, 82/38, 82/37, 80/33, 76/31, 74/29, 88/29. The first segment is moderately slender and somewhat flattened, distinctly excavated externally toward the apex but with the excavation shallow. The female has the antennae somewhat shorter.

Those of a ♀ ca. 15 mm. long with the head deflexed are 6.61 mm. long and have the first segment proportionately shorter and the last segment proportionately longer than in the male.

The general aspect of this species is that it is feebly shiny. The pubescence is moderately short and fine, appressed and barely affecting the appearance of the insect. The surface of the body is a little smoother than it is in *stigmata* and therefore *melanochroa* appears a bit shinier than that species. It is also more slender and almost always longer. A series of 46 specimens from Chavinda, Michoacan varies from 12.0 to 15.0 mm. long (mean 13.5). Most specimens examined are in this size range. However a sample of 6 specimens from Tepoztlan, Morelos varies from 11.0 to 12.0 mm. (mean 11.6).

The pubescence of the male metafemora varies in a series. When the long setae along the flexor surface are well developed, they form a fringe above and below a partially glabrous surface and may extend onto the flexor surface of the metatibiae. From this extreme they vary to being essentially normal, as in the female. In the available series with six or more males the variation of the metafemoral pubescence is as follows: Guadalajara, Jalisco (2 long, 1 intermediate, 6 short); 10 km. N. Tepatitlan, Jalisco (13 long, 2 interm., 2 short); 9 mi. N. Mazamitla, Jalisco (12 long, 4 interm., 3 short); 40 mi. N. E. Tamazula, Jalisco (15 long, 1 interm., 6 short); Chavinda, Michoacan (6 long, 7 interm., 7 short); 10 km. W. Queretaro, Queretaro (1 long, 5 interm., 5 short) and Tepoztlan, Morelos (2 interm., 4 short).

The specimens examined came from the following localities: *Nayarit*: Tepic, July 20-24, 1952, F. W. & F. G. Werner. *Jalisco*: El Molino, July 10, 1956, R. & K. Dreisbach. El Molinos, Aug. 11, 1951, C. H. Seevers. 10 km. N. Tepatitlan, 6250′, July 17, 1952, F. W. & F. G. Werner. Tepatitlan, 6200′, Aug. 20, 1954, R. R. Dreisbach. 9 mi. N. Mazamitla, 6300′, July 31, 1952, F. W. & F. G. Werner. 40 mi. N. E. Tamazula, 6000′, July 27, 1952, F. W. & F. G. Werner. Guadalajara, McConnell & Crawford, Carnegie Museum. Zapopam, Sept. 11, 1903, W. L. Tower. 11 m. N. Chapala, 1530 m., July 15, 1947, T. H. Hubbell. Lagos de Moreno, 6300′, Aug. 12, 1954, R. R. Dreisbach. *Michoacan*: 17 km. E. Quiroga, 6800′, Aug. 3, 1952, F. W. & F. G. Werner. Jacona, July 15, 1956, R. & K. Dreisbach. Chavinda, 5600′, July 31, 1952, F. W. & F. G. Werner. 11 km. W. Chupicuaro, 6700′, Aug. 2, 1952, F. W. & F. G. Werner. *Mexico*: Atlacomulco, 8500′, Aug. 18, 1954, R. R. Dreisbach. Teotihuacan, July 21, 1956, R. & K. Dreisbach. *D. F.*: Guadalupe, Aug. 31, 1906, W. L. Tower. Tlalpam, Sept. 3, 1903, W. L. Tower. *Queretaro*: nr. Hac. Balvanera, July 13, 1955, R. B. & B. K. Selander. *Morelos*: Tepoztlan, Aug. 20, 1956, R. & K. Dreisbach.

Dugès, 1870, mentions the occurrence of this species on "*Convolvulus*" in Michoacan from June to August. Specimens from 40 mi. N. E. of Tamazula, Jalisco and from 9 mi. N. Mazamitla, 17 km. E. Quiroga, 11 km. W. Chupicuaro and Chavinda, Michoacan were taken feeding on blossoms of a Convolvulaceous bush. The series from Hac. Balvanera, Queretaro was taken on *Ipomoea longifolia*. The only record from other than Convolvulaceae is a long series from 10 km. N. of Tepatitlan, Jalisco taken feeding in squash blossoms.

Epicauta tenuemarginata sp. n.

Epicauta stigmata, Dugès, 1889, An. Mus. Michoacano 2: 69, not 1870, La Naturaleza 1: 159 (in part).

This species occurs in the same blossoms with *E. stigmata,* at least in Michoacan, and Dugès appears to have confused it with that species in his 1889 summary. It is amply distinct in many ways. The antennae, especially in the male, are much different and the presence of long setae on the metafemora of the males is an additional difference. The variation in this species is fairly great as regards the color pattern of the pubescence, though with a different pattern of variation than in *stigmata.* The ground color is black, the pubescence moderately sparse, in the following color patterns: "Margined," black dorsally, cinereous on margins of head, margins and midline of pronotum, scutellum and margins of the elytra, the suture very narrowly. (There is a trace of a cinereous line on the elytra just median to the humeri and extending back to about the midle of the elytra, and varying from single pale setae to a feebly marked stripe, in 13 of 28 margined specimens.) Ventrally this color form is cinereous except black medially on several abdominal sternites, on tips of femora, outer edges of tibiae and part of tarsi. "Cinereous," cinereous dorsally, with a feeble black marking on the humeri, from a small spot to a short, narrow stripe, in 8 out of 9 specimens. (Also with a black spot near the scutellum in one well-marked specimen.) Underside cinereous except for the black leg markings noted above, the black on the metatibiae tending to be reduced to a small apical zone. "Black," entirely black-pubescent.

Holotype: ♂, "margined." Length ca. 10 mm. with head deflexed. Head 1.61 mm. long to clypeus, 1.96 mm. wide behind eyes, 2.12 across eyes, subquadrate, with the tempora well marked. The disc is somewhat flattened, with shallow but well marked crateriform punctures, ca. 0.04 mm. across and separated by 0.02 mm., the surface between them microreticulate and finely punctulate. Median impressed line feeble, down to the level of the middle of the eyes, augmented by a narrow smooth zone behind the eyes. Antennal calluses small, puncture-less but microreticulate. Front with a small rufous spot. Pubescence subdecumbent, not conspicuous where black. Eyes prominent, transverse, 0.98 x 0.73 mm., excavated above base of antennae, separated by 1.14 mm. across the front. Maxillary palpi moderate in size, the last segment 0.51 x 0.24 mm. Antennae 5.07 mm. long, reaching about basal 2/5 of the elytra, moderately slender. Segments I and II have suberect pubescence. Segment I reaches 4/5 across the eye and is slightly angled on the outer surface at about the apical 2/5, the surface beyond the angulation slightly less densely punctured and pubescent than the rest of the surface. Segment II is straight along the opposing surface but is barely discernibly flattened. Segments IV-X bulge slightly on the outer face. Proportions: 163/56, 69/41, 113/44, 82/44, 78/42, 82/41, 82/40, 78/40, 78/38, 75/38, 100/38.

Pronotum quadrate, the sides almost straight to 1/5 from apex, then converging abruptly; disc somewhat flattened. Length 1.64, width 1.77 mm. Surface almost as on head but the punctures slightly larger and the intervals more strongly microreticulate. Median impressed line fine but distinct on the disc before the middle, extended as a median impression behind. The pubescence along the midline is partly directed backward. Elytra densely and deeply microreticulate, moderately densely punctured but the punctures not crateriform. Length 7.33 mm., width across base 2.87 mm., the sides straight but gradually wider behind; apices individually rounded. The suture is strongly elevated and there are three feeble costulae, one from near the scutellum, one from the dorsal side and one from the ventral side of the humeri. Pubescence of underside mostly longer than above. Last abdominal sternite truncate, feebly excavated apically. Inner spur of protibiae noticeably shorter than outer, tapered to a point and very slightly curved. Flexor surfaces of meso- and metafemora and trochanters, metatibiae and base of mesotibiae with some long pubescence. The metafemora have the long setae margining a semi-glabrous, slightly flattened flexor surface that bears some short setae. The metatibial spurs are subequal, moderately slender, the outer slightly angled at about the middle. Comb of metatibiae strong, of about 10 perpendicular teeth, which become gradually longer apically.

Allotype: ♀, "margined." Differs from the ♂ in having a shorter and unmodified first antennal segment, with just a suggestion of the subapical excavation, normal pubescence on the legs and the inner protibial spur almost as long as the outer and equally slender. The last segment of the maxillary palpi is slightly shorter and broader, 0.47 x 0.28 mm. The last abdominal sternite is subtruncate apically but the margin is not excavated. Antennal proportions: 146/63, 63/42, 111/49, 83/49, 83/49, 83/46, 83/45, 76/44, 83/42, 76/42, 111/42.

Variation: The principal variation in the series at hand is in the color pattern of the pubescence as listed above. The size varies only slightly in the available specimens, from 9.0 to 11.0 mm. (mean 10.0).

Holotype: ♂, Patzcuaro, Michoacan, Mexico, 6500′, Aug. 3, 1952, F. W. & F. G. Werner, in the M. C. Z. Allotype: ♀ eutopotypical, in the M. C. Z. Paratypes: 11 ♂♂, 3 ♀♀, "margined," eutopotypical. 7 ♂♂, 4 ♀♀, "margined," 3 ♂♂, 4 ♀♀, "cinereous," 17 km. E. Quiroga, Michoacan, 6800′, Aug. 3, 1952, F. W. & F. G. Werner. 1 ♂, "margined," 96 km. S. W. Guadalajara, Jalisco, 5500′, July 25, 1952, F. W. & F. G. Werner. 1♂, "cinereous," 9 mi. N. Mazamitla, Jalisco, 6300′, July 31, 1952, F. W. & F. G. Werner. 1 ♂, "margined," Guadalajara, Jalisco, McConnell, Carnegie Mus. Acc. 3913. 1 ♂, "black," El Molino, Jalisco, July 10, 1956, R. & K. Dreisbach. Deposited in the M. C. Z., Carnegie Museum, U. S. N. M., British Museum, Instituto de Biologia and the collections of R. R. Dreisbach, R. B. Selander and the author.

The specimens from Patzcuaro and 17 km. E. Quiroga, Michoacan and from 9 mi. N. Mazamitla and 96 km. S. W. Guadalajara, Jalisco were all taken eating blossoms of a Convolvulaceous bush. A "margined" male and "cinereous" female were taken in cop. 17 km. E. of Quiroga.

Epicauta leoni Dugès

Epicauta Leoni Dugès, 1889, An. Mus. Michoacano 2: 74. Champion, 1892, *op. cit.*: 420.

This is a very distinctive little species and one that is apparently quite rare. Two specimens in the Instituto de Biologia in Mexico City are probably from Dugès' series. When these were examined in 1948 the first specimen bore pin labels "Morelia," "761 D-2006" and "♀." This specimen was in poor condition. The second specimen was a male which was labelled "3006" and was entirely black-pubescent. In 1952 both these specimens were labelled "Morelia." The male was compared in 1952 with the specimen used as the basis for the description below.

♂, Chapingo, Mexico, Mexico, Aug. 3, 1950, C. F. Dowling. Length ca. 9.5 mm. with head deflexed. Head and pronotum with large, crateriform punctures. Length of head 1.55 mm. to clypeus, 1.86 mm. wide behind eyes, 1.89 mm. across eyes. Tempora prominent and disc somewhat flattened. Eyes 0.95 x 0.63 mm., separated by 1.07 mm. across the front. Last segment of maxillary palpi 0.51 x 0.27 mm. Pronotum 1.61 mm. long, 1.77 mm. wide. Elytra 7.78 mm. long, 2.81 mm. wide across base and almost parallel. Antennae 5.53 mm. long; proportions: 180/57, 69/39, 91/45, 74/43, 80/41, 80/40, 80/40, 80/37, 77/35, 74/34, 114/34. The characteristics of the first two segments are given in the key to species. They are more extreme than they are in *tenuemarginata*, the species mos like *leoni*. All known specimens of *leoni* are entirely black but only four specimens can now be accounted for. Dugès does not mention how many specimens he had in his original series.

Epicauta triquetra sp. n.

This is a very distinctive species and comes from an area in Mexico quite different from that in which most of the species in this group are found. The single known specimen is entirely black.

Holotype: ♂. Moderately stout, entirely black and black-pubescent. Head broad, triangular; mouth parts normal; first antennal segment elongate, deeply excavated and the second segment flattened on the opposing surface. Length ca. 17 mm. with the head deflexed. Pubescence fine, short, subdecumbent, inconspicuous. Head triangular, 2.72 mm. long to clypeus, 3.63 mm. wide at the tempora, 3.32 mm. across eyes. Base truncate, feebly notched at the middle; tempora fairly abruptly rounded.

Surface densely punctured, the punctures ca. 0.05 mm. across, distinct, the bottoms somewhat flattened; intervals narrow, ca. 0.01 mm., punctulate and feebly microreticulate. Midline impressed and smooth down to the level of the eyes. Front with an elongate rufous spot that is puncture-free but microreticulate. Antennal calluses almost puncture-free, microreticulate, fairly large and only feebly elevated. Eyes not very prominent, fairly narrow, oblique, 1.58 x 0.98 mm., separated by 1.67 mm. across the front. Fronto-clypeal suture deep; clypeus bulging transversely along the middle. Labrum broadly but shallowly excavated apically. Mouth parts apparently normal; last segment of maxillary palpi 0.66 x 0.33 mm. Antennae 6.9 mm. long, the first segment moderately stout, reaching well beyond the eye and deeply excavated from the middle to the apex, appearing angulate at the middle of the outer margin. The excavation is deep and flat-bottomed, microreticulate and with a few scattered punctures bearing setae. Segment II flattened and slightly excavated on the opposing surface, with flattened surface similar to that on segment I but with a patch of suberect setae near the hind margin of the flattening. Segments IV-VI are somewhat swollen, the following segments gradually less so. Proportions: 228/64, 78/41, 96/47, 69/50, 69/50, 73/50, 78/43, 78/43, 73/40, 69/38, 89/37. Segment I is 73 thick on the same scale and segment II 57, thickness being calculated anteroposteriorly with the antennae straight out to the side.

Pronotum broad, 2.33 mm. long, 3.18 mm. wide, the base shallow and evenly excavated, the sides roughly parallel on the basal 2/3, then converging at a 30° angle. Surface much like that of head. Basal impressed line fine; median impressed line fine and marked only on the middle of the disc, where it is in a puncture-free area about 0.14 mm. wide and 0.32 mm. long. The disc has a bump on each side just above the lateral angulations, with a distinct depression behind each bump. Elytra subparallel, 12.32 mm. long, 4.48 mm. wide across base, ca. 4.95 at the widest. Suture slightly elevated and traces of costulae present. Anterior legs not modified. Both protibial spurs spiniform, the inner short, the apex reaching to about the basal third of the outer. Metafemora with a sparse fringe of long setae along their flexor margins. Metatibial spurs moderately slender, the outer slightly the wider, 0.22 x 0.06 mm., both angled and dished out.

Holotype: ♂, 5 mi. E. C(iudad) del Maiz, (San Luis Potosi), Mex(ico), 4700', 8-25-54, R. R. Dreisbach, in the M. C. Z.

Epicauta selanderorum sp. n.

This species might at first impression appear to be the same as *E. labialis* (Dugès). No specimens of the latter are on hand for study but Dugès mentions (An. Mus. Michoacano 2: 52) that segments 6 to 10 of the antennae of the male are "en triangulo alargado", a condition that could not fit the present species. He also mentions that part of his specimens had a trace of gray pubescence, even though they were greatly abraded.

Entirely black except for a small rufous spot on the front of the head; pubescence black, decumbent, fine, moderately sparse. Labrum deeply excised; mandibles angled backward and inward near the middle; first antennal segment of male deeply excavated: Holotype: ♂. Length, with head deflexed, ca. 13 mm. Head, including mandibles, forming a triangle, with the tempora rounded, 1.93 mm. long to clypeus, 2.62

mm. wide behind eyes and 2.54 mm. across eyes. Eyes narrow, 0.53 x 0.25 mm., separated by 0.55 mm. across the front, excavated opposite the base of the antennae. Surface of head moderately punctured, the punctures small but distinct, ca. 0.02 mm. apart, the intervals finely but distinctly microreticulate. Median impressed line fine but distinct down to the level of the eyes; rufous spot mostly puncture-free. Antennal calluses with a few punctures, microreticulate. Fronto-clypeal suture well-marked, semicircular, the front well elevated above the base of the clypeus. Clypeus truncate, more deeply punctured and microreticulate than the head. Labrum deeply excised, about 0.35 mm. long at the middle, 0.73 at the longest, the sides bulging and the excision U-shaped. Width 0.95 mm., of the excision ca. 0.35 mm. The middle, at the base of the excision, is densely punctured, with dense, thickened, golden setae ca. 0.16 mm. long. Underside of lobes provided with similar setae, projecting beyond the tips of the lobes and with shorter setae projecting into the excision. Mandibles ca. 1.61 mm. long, angled inward and backward at about the middle. The apices are blunt and meet rather than overlap. A lamella, feebly divided into denticles, is visible on each beyond the labrum. The segments of the labial palpi appear to be longer than normal; segment I is 0.41 mm. long and slender, II 0.41 mm. and angled on the inner margin. The tip of the mentum and the galeae have brushes of short, golden pubescence. Maxillary palpi apparently normal, the last segment 0.54 x 0.30 mm. Antennae 7.86 mm. long, slender and tapering. Segment I is deeply emarginate, the juncture of the emargination with the side forming an angle. Segment II is flattened and slightly concave on the opposing surface, with a patch of short, fine, erect pubescence near the hind margin of the flattened surface. Segments III-V are slightly thickened medially and VI-XI are almost parallel-sided. Proportions: 151/58, 67/32, 99/38, 75/38, 83/34, 83/33, 83/29, 83/28, 83/28, 83/25, 107/24. Segment II is thicker than wide, 36 on the same scale.

Pronotum subquadrate, the sides roughly parallel for the basal ⅔, then converging. Length 2.02 mm., width 2.15 mm.; surface similar to head; median impressed line distinct on the middle of the disc; there is a pair of elongate glabrous areas at about the middle, near the sides. Elytra subparallel, 9.33 mm. long, 3.16 mm. wide across base. Protibiae somewhat broadened and flattened, slightly bowed, 1.67 x 0.47 mm. at the broadest. Outer spur sticklike, slightly curved, 0.44 mm. long; inner shorter, 0.32 mm., pointed and slightly curved, set well back from the base of the outer. First segment of protarsi normal. Metatibial spurs subequal, pointed, the outer just perceptibly broader. Metatibial comb well developed, of ca. 12 long, transverse teeth, in a series that arches toward the base.

Holotype: ♂, 16 mi. S.E. of Lagos de Moreno, Jalisco, Mexico, 6700′, Sept. 4, 1952, R. K. Selander. Made available for study by R. B. Selander and deposited in the M.C.Z.

Epicauta mimetica (Horn)

Gnathospasta mimetica Horn, 1875, Trans. American Ent. Soc. 5: 154. Champion, 1892, *loc. cit.*: 403. Wellman, 1910, Canadian Ent. 42: 393.
Epicauta mimetica, Werner, 1945, Bull. Mus. Comp. Zool. 95: 453. Dillon, 1952, American Midl. Nat. 48(2): 416.

This species has apparently been collected only in Texas. The reference to Arizona as the type locality and as additional reference from the Riley collection, in Werner, *op. cit.*: 454, is in error. Horn states the type locality to be "Texas, Belfrage No. 609." Five specimens are in the U.S.N.M. Four of these are labelled "Tex." and "Collection C. V. Riley." One of these bears in addition a buff label, "Gnathospasta mimetica Horn." Another bears a small yellow label, "8692." The fifth specimen appears to be from the same series, with the same kind of printed "Tex." label but is labelled "Coll. Hubbard & Schwarz." The exact locality of the original collection is not known. Geiser,[5] p. 235, mentions that Belfrage made one trip to West Texas and it seems most likely that the specimens were collected on this trip, since the only subsequent collection appears to have been made by D. J. & J. N. Knull in the Davis Mts., Texas, Sept. 20, 1938. Some of the Riley specimens have a purple encrustation on the head, strongly reminiscent of that found on specimens that have fed on the blossoms of Convolvulaceae.

Redescribed from specimens in the collection of C. V. Riley, in the U.S.N.M. ♂: Length ca. 12 mm. with head deflexed. Head subquadrate, broad, 1.89 mm. long to clypeus, 2.43 mm. wide behind eyes, 2.40 across eyes. Surface moderately densely punctured, the intervals feebly microreticulate. Median impressed line distinct to level of eyes, ending in a rufous spot. Pubescence moderately dense but only partly obscuring the ground color, decumbent. Antennal calluses shiny, feebly microreticulate, barely raised, fairly large. Fronto-clypeal suture deep, arched. Labrum 0.76 mm. long, 1.07 mm. wide, with a broad, U-shaped excision to within 0.32 mm. of the base. Margins of excision with stiff pubescence. Mandibles large, 1.42 mm. long, meeting before the labrum in a straight line for about 0.38 mm. The figure of the head given by Horn is out of proportion, particularly behind the eyes. When the mandibles are included, the head is subtriangular. Eyes narrow, 1.26 x 0.51 mm., oblique, excavated and separated by 1.23 mm. across the front. Both the maxillary and the labial palpi are fairly large and slender. The last segment of the maxillary palpi is 0.57 x 0.25 mm. and of the labial palpi 0.47 x 0.18 mm. What appears to be the galeae forms a pair of bluntly pointed structures behind the mandibles, these filling the gap left by the gap behind the apex of the mandibles and the labral excision. Antennae 7.20 mm. long, moderately slender. Segment I moderately slender, with a flattened subapical emargination on the outer edge and bearing a few pale setae; pubescence barely sparser in the emargination than elsewhere. Segment II slightly flattened on the opposing surface and with a feeble patch of short, suberect setae near the posterior margin of the flattening. Segments IV-VI are slightly obliquely truncate apically and segments III-XI are just barely flattened. Proportions: 136/48, 61/39, 105/35, 83/39, 83/37, 83/35, 83/35, 83/31, 83/27, 79/26, 118/26. Pronotum broader than long, 1.71 mm. long, 2.05 mm. wide, widest at 2/5 from the apex, where the sides are subangulate, the sides straight and converging slightly from there to the base. Median impressed line distinct only on the middle of the disc. Basal impressed line distinct. Surface and pubescence similar to that on head but the microreticulation more distinct. Elytra subparallel, 9.84 mm. long, 2.78 mm. wide across base, ca. 3.16 mm. at widest.

---

[5]Geiser, S. W., 1948, Naturalists of the Frontier. 2nd ed., 296 pp. University Press in Dallas.

Outer protibial spur thick, blunt at tip, ca. 0.32 x 0.07 mm.; inner shorter, more slender and more curved. Metatibial spurs fairly broad, the outer the broader. Metatibial comb well developed, of about 12 transverse teeth in a straight line. Tips of meso- and metafemora dark pubescent, as well as the very tip of the meso- and metatibiae and the apical tarsal segments. Metacoxae and femora flattened behind, with sparse, short pubescence on the flattening. Metasternum with a large, shallow excavation, this and the middle of the abdominal sternites bearing darker, sparser pubescence, permitting the ground color to show through. Last abdominal sternite black, truncate, very feebly excavated apically.

♀: Inner protibial spur slender, almost as long as the outer. Metasternum not excavated and it and the abdomen uniformly pale pubescent. Last abdominal sternite black, rounded apically. Antennae shorter, more slender than in the male, with segment I proportionately shorter and with just an indication of an excavation; II slender and not modified. The mouth parts appear to be close to identical with those of the male. Legs not modified.

One male in the U.S.N.M. series has the metasternal excavation more feeble, with sparse pale pubescence, and the abdominal sternites with slightly thinned pale pubescence so that the ground color barely shows through.

Epicauta labialis (Dugès)

Cantharis labialis Dugès, 1881, La Naturaleza 5: 145, fig. 9, 9 a-d.
Macrobasis labialis, Dugès, 1889, An. Mus. Michoacano 2: 51.
Epicauta labialis, Champion, 1892, *op. cit.*: 395.
Gnathospasta labialis, Champion, 1892, *op. cit.*: 403.

Dugès described this species from Penjamo, Guanajuato, from specimens that had been collected for medicinal purposes. The species most certainly resembles *E. mimetica* but Dugès' mention of antennal segments 6 to 10 being "en triangulo alargado" makes it difficult to compare his species with *mimetica,* as it does also with *selanderorum.* Because of the very similar modification of the mouth parts, it seems most likely that *labialis* belongs in this group. It has apparently not been collected since its original discovery. There are no specimens of it in the collection of the Instituto de Biología or in the Museo de Historia Natural of the Universidad de Michoacan, which preserves a few specimens of Meloidae that may have been derived from the Dugès collection. Champion mentions two males and one female, which must now be in the British Museum.

PROTECTIVE COLORATION IN *THINOPINUS PICTUS*

During the night of May 23, 1957 Henry Dybas and I collected about 70 specimens of this nocturnal, large, intertidal Staphylinid on the beaches at the Hambug Mountain State Park in Curry county, Oregon. The interesting feature of this catch was the fact that every specimen belonged to the relatively scarcer, melanic phase in which dark body color is very dominant over the usual, yellow, pale coloration. The surface of the beach in this locality is made up of black and dark volcanic sands. On the other hand, the pale, yellow form lives on light colored, white or yellow beaches and what is interesting here is the very rigid restriction of each form to the appropriate type of beach background.

This association is not at all fortuitous, as I had an occasion to observe. Five years earlier, I collected in the very same spot with Vince E. Roth also at night in May and again, we have found only the melanic phase beetles running about—and we captured then about 30 of them. On the other hand, immense series of *T. pictus* which over the period of years I collected on the light colored Oregon beaches in Florence, Pistol River, Brookings, Winchester Bay, Cape Arago, Charleston, Siskyou Outlet and others were invariably of the light colored phase.

The question then arises, of what selective value is association of these two phases with the two different backgrounds? And especially so for the melanic phase. The beetles are nocturnal. They spend the day buried in sand in the intertidal zone or under the debris and they do come out after dusk to prey on the beach hopping Amphipods as I had occasion to observe. Of what advantage under such circumstances is the melanic phase on the dark beach? It is not hard to see how melanic form could readily develop in an apterous beetle with very restricted habitat and range. But just what factors operate here is surely a matter of speculation.—Borys Malkin, University of Minnesota, Minneapolis, Minn.

FOUR NEW LAMPYRID FIREFLIES

By FRANK A. McDERMOTT[1]

Phaenolis mexicana n. sp.

Among the lampyrids in the collection of Cornell University is a specimen of an apparently undescribed species of *Phaenolis* from Mexico, collected by Dr. H. E. Evans. The general outline of the insect and some features of the elytral structure do not quite agree with Gorham's generic description, somewhat approaching *Lamprocera,* but the peculiar bilobed apical abdominal segment requires placing it in *Phaenolis.* Gorham described several species of *Phaenolis* from Mexico and Central America, all distinctly different from the present one, as is also Pic's *P. atripes.* No species of *Lamprocera* appears to have been reported from Mexico. The terminal abdominal segment and the aedeagus as far as visible, resemble those of other species of *Phaenolis. Polyclasis* (*Calyptocephalus*) is ruled out by the antennal structure and that of the last ventral segment, and by the shape of the pronotum.

A description of the new species is given below, and the type specimen is being deposited in the collection of Cornell University. I thank Dr. H. E. Evans and Dr. Henry Dietrich for the privilege of examining and describing this species. Sr. Federico Islas S., of the Instituto de Biologia, Mexico City, kindly checked their collection for similar specimens, and for their cooperation I also thank Dr. J. C. Pallister, American Museum of Natural History, Dr. P. J. Darlington, Jr., Museum of Comparative Zoology, Dr. T. J. Spilman, U. S. National Museum, and Dr. C. M. F. von Hayek, British Museum (Natural History).

Holotype.—Male; Cornell University Type No. 3199.

Type locality "Gilberto Comancho", east of Huauchinango, Puebla, Mexico. Collected by Dr. H. E. Evans, June 18, 1951.

DESCRIPTION OF THE SPECIES.—Dimensions, 12.6 mm. long by 4.75 mm. broad.

Pronotum 2.6 mm. long by 4.15 mm. broad; very short, and widest at basal fifth, just forward of the 90° posterior angles; median brown and yellow rectangular area 2.0 x 1.9 mm. in basal three-fourths, with median longitudinal narrow channel; double row of large punctures at basal margin; apical edge reflexed; laterally broadly expanded and baso-laterally concave; yellow; entire surface densely punctate.

Scutellum and mesonotal plates brown.

Elytra 10.0 mm. long by 2.4 mm. broad; parallel for basal two-thirds, narrowing in lateral margins in apical third; explanate margins beginning at bases and becoming evanescent at about apical two-fifths, about ¼ elytral width at widest point, about basal fourth; coarsely and densely tuberculate or rugose; black (brown by

[1]Wilmington, Delaware.

transmitted light); 3 very indistinct costae; vestiture dense, short, dark brown. Wings appear black, but are translucent, have a very fine network structure, and a very short, black villosity.

Head small; frons black, 1.4 mm. across eyes, *ca.* 0.5 mm. between eyes; eyes not approximate ventrally; epistome projects downward between the antennal sockets, widening distally and exposing pale labrum below the emarginate apex; at the lower end of this triangular portion are the maxillary and labial palpi, both small and brown; terminal article of the maxillary palpus conoidal; mandibles—or at least what appear to be the mandibles in the absence of any other equivalent structure—project obliquely forward and downward, only very slightly curved, meeting at tips.

Antennae black, short, hardly longer than pronotum; articles 1 and 2 somewhat glistening, 2 very short, transverse; 3 to 10 biramous, each with two nearly equal, long, flat, narrowly elliptical rami; 11 longer than rami, remiform; sockets large and very close together—frons only 0.1 mm. wide between the edges; black vestiture, particularly on the edges of the rami and the 11th article.

Thorax ventrally dark brown; thoracic spiracles on short oblique tubes just posterior to the forecoxae.

Tergites to 6th dark brown; 7 laterally and 8 almost entirely yellow; latter sinuately trilobed and translucent; at least 3 to 7 have pronounced pointed lateral lobes.

Ventral segments 2 to 6 dark brown; 7 very short, broadly emarginate, medially yellow (luminous?); 8 pale yellow with a long subrectangular convex portion from the base, apically bilobed, covering the partly extruded genitalia. Abdominal spiracles are on the ventral surface near the antero-lateral corners of the segments.

Legs dark brown; claws simple; tibial spurs not distinguishable.

Aedeagus; the visible portion is a narrow, fusiform structure 1.4 mm. long by 0.28 mm. wide at middle, hollow, with a long opening apparently on the dorsal side; adjacent to this is a narrow tube bearing a hemispherical white tip.

Female unknown.

Paratype; in the collection of the U. S. National Museum there is a specimen of this species collected in Estado de Veracruz, Mexico, by R. Hanovic, June 26, 1897; this specimen was sent to E. Olivier in 1911 and returned without identification.

No key has been published for the 21 described species of *Phaenolis*; the following tentative key is arbitrary, being based mainly on coloration as given in the original descriptions.

A key to the species of *Phaenolis*.

Elytra unicolorous or nearly so:
- I. Elytra black:
  - a. Pronotum orange:
    - i. Pronotum short, semilunate, apically rounded; 11.0 mm. (Brazil) **riparia** E. Oliv.
    - ii. Pronotum short, angles right; elytra with small orange humeral spots; 7.0 mm. (Brazil) **scapulata** E. Oliv.
  - b. Pronotum yellow:
    - i. Pronotum short and broad, not angulate apically; yellow with brown and yellow rectangular basal spot; 12.6 x 4.75 mm. (Mexico) **mexicana** n. sp.
    - ii. Pronotum short, apically angulate; with rose discal spot; 9.5 x 3.5 mm. (Brazil) **sternalis**

c. Pronotum testaceous:
 i. Pronotal margin and discal vitta piceous; 10.0 mm. (Brazil) **atripennis** Pic
2. Elytra mainly brown, fuscous, or testaceous:
 a. Elytra brown:
 i. Pronotum apically angulate, pale yellow with narrow brown margin and large quadrate black spot reaching base; elytra with pale margins in basal half; 10.0 mm. (Peru) **infausta** E. Oliv.
 b. Elytra fuscous:
 i. Pronotum apically sinuate; orange with apical rectangular black spot; 14.0 mm. (Ecuador) **defecta** E. Oliv.
 c. Elytra testaceous:
 i. Pronotum apically angulate, testaceous, disk black; elytra parallel; 11.0 mm. (Ecuador) **abdita** E. Oliv.
3. Elytra yellow or orange:
 a. Elytra ochraceous yellow:
 i. Pronotum acuminate apically, ochraceous yellow; 12.7 mm. (Guatemala) **ochracea** Gorh.
 b. Elytra orange:
 i. Pronotum apically attenuate, orange with median black vitta; elytra with small apical black spots; 10.0 mm. (Brazil) **vittaticollis** Pic

Elytra markedly bicolored:
1. Elytra basally black:
 a. i. Apical half of elytra and last antennal articles reddish; pronotum black; 11.0 mm. (Ecuador) **apicipennis** E. Oliv.
2. Elytra apically black:
 a. Elytra basally orange:
 i. Elytra dilated at humeri and apically narrowed; pronotum orange; legs black; 15.0 mm. (Mexico) **atripes** Pic
 ii. Pronotum and bases of femora orange; 16.0 mm. (Colombia) **bicoloripes** Pic
 b. Elytra basally ochraceous:
 i. Apical third of elytra smokey black; pronotum dull ochraceous; 12.5-15.0 mm. (Central America) **laciniata** Gorh.
 ii. Basal third of elytra ochraceous; pronotum orange-yellow, disk red; 10.5-12.7 mm. (Mexico and Central America) **ustulata** Gorh.
 c. Elytra basally testaceous:
 i. Basal half of elytra pale testaceous; pronotum black, transverse, basally constricted; 15.0 mm. (Mexico) **nigricollis** Gorh.
 ii. Basal half of elytra pale testaceous, darker near scutellum; pronotum margined testaceous; 9.5 mm. (Brazil) **stipulicornis** Mots.
3. Elytra with black spots:
 a. Elytra mainly reddish or rufous:
 i. Elytra rufous, apices largely black; form narrow; 9.0 mm. (Peru) **olivieri** Pic
 ii. Elytra reddish with large black apical spots; pronotum transverse, disk red; 12.5 mm. (Brazil) **gorhami** E. Oliv.
 b. Elytra mainly reddish-yellow or testaceous:
 i. Elytra reddish-yellow with prolonged triangular apical black spot; 8.0 x 4.0 mm. (Brazil) **mimica** E. Oliv.
 ii. Elytra testaceous, with short black mark at bases, broadly black apically; pronotum testaceous, medially and laterally piceous; 10.0 mm. (Brazil) **basalis** Pic

Photinus sanctae-luciae n. sp.

It is rather odd that no species of *Photinus* has been described from the island of St. Lucia, although species are reported from the nearby islands of Martinique and St. Vincent. As usual, the island conditions in the Lesser Antilles have resulted in local speciation, with the restriction of a species to a single island in the chain, or to two or three adjacent islands. *Aspisoma insperata* E. Oliv. has been reported from St. Vincent, Grenada, Grenadines, and St. Lucia, and seems to be the only lampyrid so far reported from the latter island.

In the lampyrid collection of Cornell University there are three male specimens of a rather distinctive *Photinus,* which is described below as *Photinus sanctae-luciae.* The somewhat striking feature of this species to the unaided eye is the pair of white spots on the pronotum, which I have not noted in any other species of *Photinus.* The type and two paratypes are being deposited in the collection of Cornell University.

Holotype.—Male; Cornell University Type No. 3318.

Type locality Castries, Island of St. Lucia, Lesser Antilles. Collected by Dr. J. C. Bradley, September 10-22, 1919.

Description of the species.—Dimensions, 12.7 mm. long by 4.1 mm. broad.

Pronotum 2.68 mm. long by 3.7 mm. broad; almost semicircular in anterior ¾, slightly prolonged at apex, and widest at basal 4th, narrowing somewhat to the slightly obtuse posterior angles; base very slightly sinuate, raised in median half; apical 3d densely and coarsely punctate, flat lateral borders rather less so, disk obscurely punctulate, but smooth except for longitudinal depression or wide sulcus in basal half; single row of large punctures at margin. Extreme lateral and apical margins narrowly translucent yellow. Subrectangular brown spot, narrowed basally, in basal ⅔, the brown pigmentation extending irregularly along base to the flat borders, and slightly so forward of the white spots; thence, much diluted, to apex. On each side of the brown area is an opake ivory-white spot, the lateral edges of each being prolonged narrowly posteriorly across the ends of the basal extension of the brown area. Flat lateral areas translucent dark yellow. Short, fine, pale, appressed pubescence.

Scutellum yellow, apex rounded. Mesonotal plates dull brown.

Elytra 10.0 mm. long by 2.05 mm. broad; parallel in basal ⅔, then tapering mainly in the lateral margins; apices separately rounded. Very narrow explanate margins, becoming evanescent at apical 3d. Scattered large punctures interspersed with a denser very fine punctulation, best seen at bases. Color light yellowish brown, darkened basally, and in two specimens indefinitely so in apical 4th. Short, dense, pale pubescence. No distinct borders, sutural or lateral, but margins may be paler.

Head; Frons angularly depressed between eyes; brown with yellow margins at eyes; interocular margins very slightly divergent upwards. Width across eyes 2.1 mm.; between eyes 0.76 mm. Eyes rather large. Clypeus short, dark yellow; labrum semicircular, dark yellow. Mandibles rather stout, evenly tapered, brown; *ca.* 0.6 mm. across in closed position. Maxillary palpi dark brown to black; terminal article of the usual conoidal outline. Labial palpi very small, terminal article asymmetrically crescentic.

Antennae brown, hairy, somewhat compressed, 6.25 mm. long.

Venter mostly yellow and brownish yellow; apical edges of abdominal segments darker, and much of the surface of 2nd to 5th ventral segments cream-colored. Segments 6 and 7 luminous, 2.0 and 1.5 times as long as 5th, respectively; 8th very small and short, mostly transparent; 6, 7, and 8 medially emarginate; 9 ogival, yellow. Tergites all yellow except pygidium, which is transparent, semicircular, nicked at apex.

Legs dark yellow, tending to darken distally; very small spurs on meso- and post-tibiae; claws simple, bases broadened.

Female unknown.

The holotype and two paratypes are very similar, ranging in length from 11.75 to 12.9 mm., and in breadth from 4.1 to 4.35 mm.; the pronota are 1.2 to 1.5 times as broad as long, and the antennae about one-half the dorsal length.

In Leng and Mutchler's key to the Antillean species of *Photinus,* this species would apparently be placed in their *xanthophotis* group, but as so many of the species called *Photinus* in this key are *Diphotus,* a more definite location cannot be assigned.

Photinus bidenticauda n. sp.

The specimen to which the above designation is applied was collected at Veracruz, Mexico, in September, 1955, by Dr. N. L. H. Krauss, of Honolulu, who kindly sent me an interesting collection of Mexican lampyrids. The remarkable feature of this insect, which otherwise appears as a small, rather pale *Photinus* resembling many other species of that genus, is the structure of the pygidium, which bears two dark brown triangular projections, apices ventrad, which nearly rest against the apical margin of the 8th ventral segment. The only clue to a previous description was given to me by Sr. Federico Islas S., of the Instituto de Biologia, Mexico City, who kindly compared the description of this specimen with those in their collection and found a similar one labeled *Photinus phosphoreus* Deyrolle. No corresponding description by Deyrolle has so far been found, nor any description of a species with this structure. It seems unlikely that a describer would overlook such a pronounced peculiarity. Deyrolle's name would be preoccupied by *P. phosphoreus* Linné, 1767, a Brazilian species apparently considerably larger than this specimen. A detailed description of the specimen is given below; it is being deposited in the collection of Cornell University. No additional specimens are known.

Holotype.—Male; Type No. 3317, Cornell University.

Type locality, Veracruz, Mexico. Collected by Dr. N. L. H. Krauss in September, 1955.

Description of the species.—Dimensions, 6.0 mm. long by 1.9 mm. broad.

Pronotum 1.27 mm. long by 1.7 mm. broad; semi-elliptical from apex to basal 5th, then slightly constricted; basal edge a smooth curve; posterior angles fairly acute but not produced or salient; disk rose red with a narrow longitudinal median black vitta which expands to a brown area over the eyes. Remainder of surface pale yellow, densely punctulate, and somewhat translucent in front.

Scutellum basally yellow, apical half brown. Mesonotal plates pinkish.

Elytra 4.7 mm. long by 0.95 mm. wide; parallel; narrow explanate margins becoming evanescent at apical 5th. Ground color light brown, translucent, but appearing dark brown over wings. Relatively wide lateral and narrower sutural borders yellow, occupying *ca.* ⅓ of width. One somewhat oblique costa on each, not attaining either base or apex.

Head; Frons dark brown, very concave; width across eyes 1.3 mm.; between eyes 0.5 mm. Eyes relatively large; intraocular margins practically parallel. Mandibles very small, 0.28 mm. across in closed position. Maxillary palpi dark brown; terminal article of the usual conoidal outline. Labial palpi light brown, terminal securiform.

Antennae brown, somewhat compressed, hairy; 3.0 mm. long.

Prosternum pink; meso- and metasterna brown.

Tergites to 7th dark brown, not lobed; pygidium hexagonal as seen from above, semi-translucent. Two nearly black triangular projections extend downward from the ventral surface of the pygidium, sloping somewhat forward against the apical edge of sternite 8, and apex of pygidium is slightly deflexed against the apex of the 9th abdominal segment.

Abdominal segments 2 to 5 brown, the latter medially pale; 6 and 7 luminous, about twice as long as 5th; 8 mostly brownish yellow, basally paler, and as wide across the apical edge as the base of the 7th, narrowing to base, apical margin deeply emarginate, thickened along edges, and medially channeled; apparently luminous inside of the thickened margins. 9th segment dark yellow, sides nearly parallel to rounded apex.

Legs light yellowish brown; coxae of posterior pair project rather further than usual, largely hiding segment 2; tibial spurs, if present, indistinguishable; pads on 4th tarsal article very small; claws simple.

Female unknown.

The aedeagus was not extracted because of the danger of destroying the peculiar structure of the abdominal apex. No key covering the neotropical continental species of *Photinus* is available.

Lucidota bicellonycha n. sp.

There are many instances among the Lampyridae in which two species belonging in quite different genera so closely resemble each other in color and form as to require minute examination to separate them. This has been remarked by LeConte, Gorham, and E. Olivier, and extends even to resemblances between lampyrids and lycids. A remarkable case of this kind has recently come to my attention while studying the lampyrids in the collection of Cornell University. Three specimens were set aside as being *Bicellonycha* (*Photuris*) *mexicana* Gorham. One of these was only about ⅔ the length of the others, but superficially very similar. It had the same distribution of color, the same relatively long, nearly cylindrical antennae, the bifid claws, and the long median point on the 8th ventral segment, as *B. mexicana*. But the abdomen had only traces of a pair of rudimentary luminous organs on the 8th segment, the entire abdominal appearance being that usually associated with *Lucidota* s. l. Unlike *B. mexicana* the elytra were broadly but shortly explanate in the basal third; the frons was white, and the mouth parts very prognathous, with large, stout mandibles. The aedeagus was quite unlike that of *Photuris,* showing some resemblance to that of *Lucidota atra.*

No description of such a species has been found, and it is therefore being described below as *Lucidota bicellonycha* n. sp. The genus *Lucidota* is undoubtedly composit and should be broken up into consistent genera, and until this is done the proper allocation of this species cannot be determined.

Holotype.—Type No. 3301, Cornell University. Male.

Type locality Oaxaca, Mexico. Collected by G. Lassmann, July 13, 1928.

Description of the species.—Dimensions, 8.9 mm. long by 4.0 mm. broad.

Pronotum 2.2 mm. long by 3.3 mm. broad; parabolic outline; posterior angles project back of the middle of the base, hence basal margin is sinuate; median longitudinal black vitta 0.9 mm. wide in basal two thirds, with well-defined straight sides, and extended along base nearly to humeri. (This vitta is usually triangular in *B. mexicana.*) Subtriangular pink area on each side of the black vitta. Remainder of surface transparent, rather coarsely but not densely punctate, even on black vitta. Scant yellow vestiture. Deep narrow pits adjacent to base at ends of basal extension of black vitta and nearly reaching bases of angles.

Scutellum rather narrow, black. Mesonotal plates black.

Elytra 6.75 mm. long by 2.0 mm. briad; black by reflected light, brown by transmitted light. (Elytra opake in *B. mexicana.*) Distinctly elliptical outline, widest at about midlength. Explanate margins fairly wide at base, tapering rapidly and becoming evanescent at apical third. Densely tuberculo-rugose. Short brown vestiture. One costa visible, but indistinct. Apices taper laterally and suturally. No pale borders or vittae.

Head; Frons ivory-white, occiput brown, slightly depressed; width across eyes 1.6 mm.; between eyes just above antennal sockets, 0.66 mm. Eyes rather small and do not project beyond pronotum. Mouth parts decidedly prognathous; mandibles thick, sickle-shaped, 0.58 mm. across in close position. Maxillary palpi brown, terminal article conoidal, flattened on upper side, and with a sharp, flat, apical projection. Labial palpi brown, asymmetrically securiform. Clypeus apparently connate; apical edge nearly straight, with minute median denticle. Scattered reddish-brown hairs, some long, on mouth parts.

Antennae brown on upper surface, lighter below; slightly compressed, not dentate or serrate; 2nd article *ca.* ⅔ as long as 3d; 3 to 8 subconical, bases inserted somewhat eccentrically in apex of preceding article. 4.1 mm. long, nearly ½ body length.

Sides of prothorax pink; meso- and meta-segments dark brown.

Ventral abdominal segments 2 to 7 reddish brown; 8 narrower than 7, with narrow, hairy, median triangular projection *ca.* 0.6 mm. long, and indefinite pink areas laterally and medially. No distinct evidence of luminous organs. 9th, genital, segment, small, brown, ogival, convex, covering aedeagus. Dorsal segments not lobed, but 6th has small postero-lateral points. Abdominal spiracles not visible on venter.

Legs rather long, reddish to dark brown; profemora compressed, others not so; 2 strong tibial spurs on middle and posterior legs. Claws fairly large; all bifid.

Aedeagus; This organ broke up on attempt to extract it, but the main portions were recovered. The median lobe, 1.65 mm. long, is flattened, tapering, and somewhat curved upwardly, apparently tubular with a narrow elliptical opening at the apex; attached to the base and reaching about to midlength is a strap-like projection. The median lobe is surrounded by a thin hyaline membrane not reaching the apex. The lateral lobes, 1.8 mm. long, are subrectangular in general outline, but have a short projection near the base on the dorsal edge, and are prolonged forward in a narrow point, curved inward and upward.

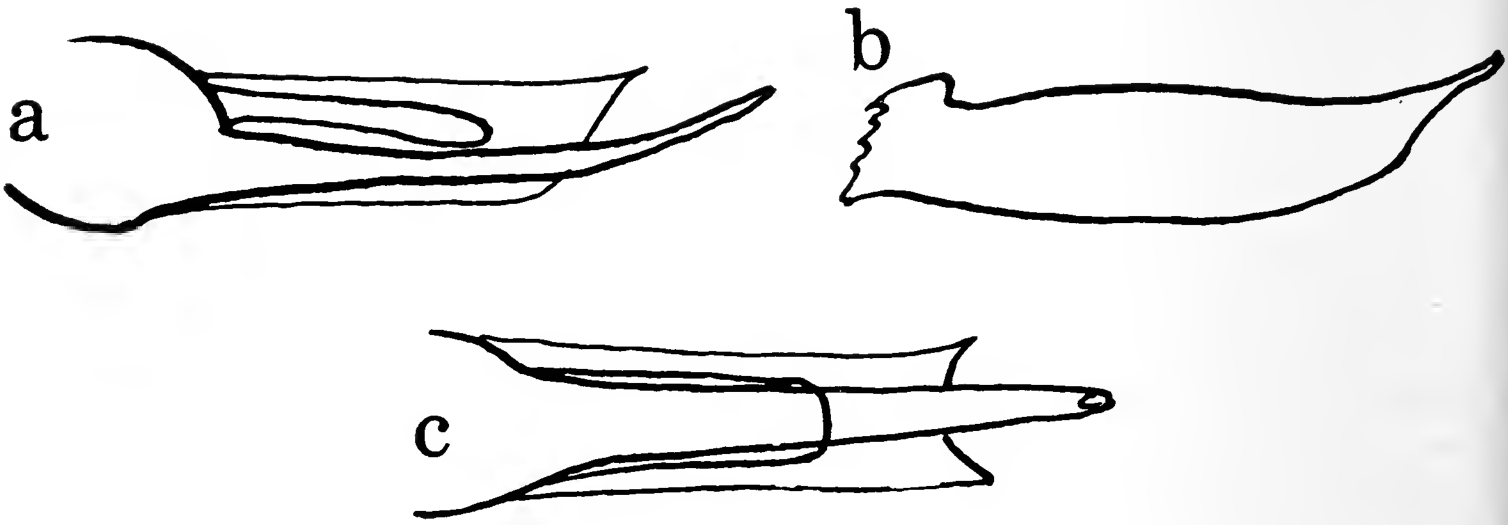


FIGURE 1. Relative size and arrangement of the aedeagus of *Lucidota bicellonycha*. Actual total length about 2.0 mm. A. Lateral view with lateral lobes removed. B. A lateral lobe. C. Dorsal view.

One male paratype in the collection of the Rockefeller Foundation, Mexico, D. F., collected by Wm. W. Gibson, 3 km. north of Tamazulysan, Oaxaca, May 9, 1957. Generally similar to holotype but somewhat longer and proportionately narrower, 10 x 3.25 mm.; mouth parts less prognathous.

BIBLIOGRAPHY

BLACKWELDER, R. E. Checklist of the Coleopterous Insects of Mexico, etc.; Bull. 185, U. S. National Museum, Part 3, 1945.

GORHAM, H. S. Transactions, Entomological Society of London, 1880, p. 11; Biologia Centrali-Americana, Coleoptera, Vol. III, Pt. 2. pp. 32; 249.

MOTSCHULSKY, V. Etudes Entomologiques, 1853, p. 9.

LENG, C. W., and A. J. MUTCHLER. The Lycidae, Lampyridae, and Cantharidae (Telephoridae) of the West Indies. Bulletin, American Museum of Natural History, 1922, Vol. XLVI, Art. VII, p. 456.

OLIVIER, E. Annales, Societe entomologique, France, 1885, p. 144; Bulletin, Societe entomologique, France, 1885, p. 142; Revue scientifique du Bourbonnaise, 1907, p. 175; ibid., 1911, p. 47; Genera Insectorum, Fasc, 53, 1907, p. 10; Deutsch Entomol. Zeitschr., 1909, p. 669.

PIC, M. Malacodermes exotiques; L'Echange, hors texte, #418, 1924, p. 4; #437, 1929, p. 71; #469, 1937, p. 142.

NOTES ON LAMPROSOMATINAE (Chrysomelidae)

by F. Monrós[1]

The present subfamily must be spelled Lamprosomatinae, not Lamprosominae. The name derives from the greek words *lampros* (brilliant- and *soma* (body); the subfamily ending -inae must be added to the genitive *somatos*.

Neochlamysini *new tribe*

Type genus: *Neochlamys* Jacoby

Scutellum large, triangular and equilateral. Elytral punctures not regularly arranged. Anal border of last abdominal segment without modifications. Eyes entire. Claws simple and free.

The present tribe, restricted to South Africa, includes the genera *Neochlamys* and *Pseudolychnophaes*, which I consider the more primitive within the subfamily Lamprosomatinae.

The tribe *Sphaerocharini* with the only Neotropical genus *Sphaerocharis* differs from *Neochlamysini* by the fused and bifid claws, and the deeply notched eyes. It represents an independent evolutionary trend, not connected with *Neochlamysini.*

Neochlamys strigicollis Jacoby

The species was doubtfully recorded from Barzil. I have examined one specimen in the British Muselm collection, which agrees completely with the type in the Bowditch collection (Museum of Comparative Zoology, Harvard); it bears the following locality label: South Africa, Cape Province, Mossel Bay, Oct. 1921, R. E. Turner leg.

Xenoomorphus Monrós

Four species of this interesting ethiopic genus are here described as new.

Xenoomorphus draconianus new species (fig. 1)

South Africa, Natal, Van Reenen, Drankensberg, 1-22/1/1927, R. E. Turner leg., 1 holotype in British Museum.

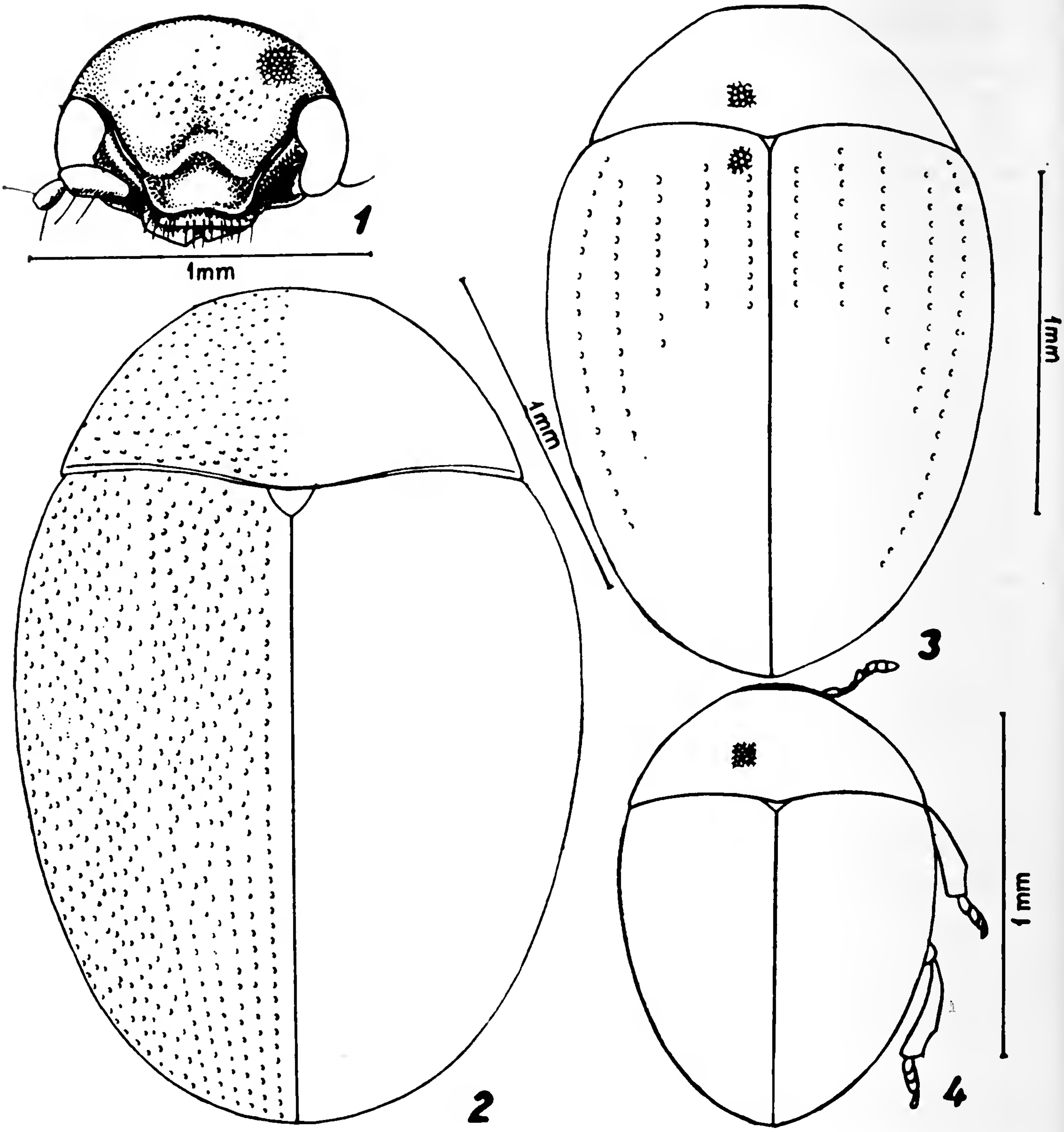
2.1 mm long; 1.6 mm broad at base of elytra.

Elongate oval. Pitch black, unicolorous. Antennae yellow, darkened towards tip. Ventral surface with long yellowish pilosity.

Head with a shallow triangular excavation between eyes, separated from the depressed clypeus by a transverse ridge. Internal border of eyes with a narrow but rather deep sulcus. Anterior margin of clypeus roundly emarginate. Surface of head delicately reticulate, interocular area with sparse small punctures.

---

[1]Universidad Nacional de Tucumán, Argentina. Dr. Monrós died May 3, 1958.



Explanation to figures

1.—Head of *Xenoomorphus draconianus* n. sp., holotype. The reticulation indicated on top of right eye. 2.—*X. gingindhlovuanus* n. sp., dorsal aspect of holotype. 3.—*Oomorphus* (*Histerogaster*) *caledonicus* n. sp., dorsal aspect of holotype, with reticulation indicated on pronotum and scutellar region of left elytron. 4.—*O.* (*H.*) *microbius* n. sp., dorsal aspect of holotype with reticulation indicated on pronotum only.

Pronotum and elytra with small and sparse punctures, irregularly arranged.

This species approaches *X. bicornutus* because of its excavated head; it can be distinguished easily by the lacking conical projections on the clypeus.

Xenoomorphus cavifrons new species

Mozambique, Zambesi, Brandshaw leg. in coll. Fry, 1 holotype in British Museum, 1 paratype in coll. Monrós, ex British Museum.

2 mm long: 1.2 mm broad at base of elytra.

Shape and color as foregoing.

Head with a relatively deep subcircular excavation before eyes, separated from clypeus by a sharp ridge which is depressed medially.

Remaining characters as prededing species, from which it differs also by the shorter and sparser ventral pubescence.

Xenoomorphus gingindhlovuanus new species (fig. 2)

South Africa, S. Zululand, Gingindhlovu, V/1926, R. E. Turner leg.; holotype and 5 paratypes in British Museum; 5 paratypes in coll. Monrós, ex British Museum.

1.7 x 1.2 mm to 2.2 x 1.4 mm.

Shape elongate, oval. Color pitch black ventrally, as well as on antennae and legs; dorsal surface with greenish reflections.

Head regularly and moderately convex, without impressions. Surface covered with small punctures.

Punctures of pronotum identical with those of head. Elytra with irregular punctuation, rather dense and deep and tending to form rows on apical region.

X. gingindhlovuanus differs from the known species of this genus by the absence of cephalic impressions, the black antennae and the small but distinct punctuation of head and pronotum, which is larger on the elytra and tends to be regularly arranged on its apical portion.

Xenoomorphus innominatus new species

South Africa, Cape Province, George, 27/VI-1/VII/1920, R. E. Turner leg., 1 holotype in British Museum; Cape Province, Ceres, XI/1925, 1 paratype R. E. Turner leg. in coll. Monrós, ex British Museum.

1.8 x 1 mm.

Shortly oval, convex. Color uniformly pitch black.

Similar to preceding, but somewhat shorter and more convex, head reticulated and without punctures. Pronotum and elytra with irregular small punctures, rather dense and similar on both regions.

Ernoporus Brèthes

This genus was described as *Eumolpinae; Oyarzuna* Bechyne described in the same subfamily but belonging to the *Lamprosomatinae* is a synonym. I have examined the type of *Ernoporus porteri* Brethès in the Brèthes collection (Buenos Aires) and specimens of *Oyarzuna splendida* (Philippi) belonging to the Museum G. Frey (Tutzing) and identified by Bechyne; they are completely identical. The correct name of the species is:

Ernoporus splendidus (Philippi) new combination
Oomorphus Curtis

Five new species are here described, belonging to the subgenus *Histerogaster* Monrós.

Oomorphus (Histerogaster) caledonicus new species (fig. 3)

New Caledonia: Rhoo, Houadou River, 7/XI/1914 P. D. Montague leg., holotype, 1 paratype in Brit. Mus.; 2 paratypes in coll. Monrós, ex British Museum—Bâ Bay, 12/VII/1914, P. D. Montague leg. 1 paratype in British Museum.

1.6 x 0.9 mm to 1.9 x 1.0 mm.

Oval, convex, shining. Color of ventral surface and legs pitch black; dorsally with greenish reflections. more or less darkened. Antennae yellow, darkened towards apex.

Head with eyes kidney-shaped, their facets coarse. Interocular space somewhat swollen, clypeus decliveous. Surface lacking sutures or depressions. Antennae relatively long and slender, of normal structure. Head surface minutely reticulate, reticulation visible under high power only (50 x).

Pronotum with similar reticulation.

Elytral punctures arranged in rows but very superficial so that it is difficult to observe them on the disc; reticulation as on pronotum.

Intercoxal prosternum subquadrate, its posterior angles rounded; podal excavations deep; claws divaricate.

Oomorphus (Histerogaster) microbius new species (fig. 4)

New Caledonia, Mt. St. Arago 14/VII/1914, P. D. Montgue leg. 1 holotype in British Muesum—Gondé, 12/XI/1914, P. D. Montague leg. 1 paratype in coll. Monrós, ex Brit. Mus.

1.2 x 0.8 mm.

Similar to foregoing but smaller and uniformly black. Antennae yellow, darkened toward apex. Elytra without punctures and without visible reticulation.

Oomorphus (Histerogaster) alvarengai new species

Brasil, Piauí, Terezina, 18/VIII/1953, 1 holotype coll. Alvarenga; 2 paratypes in coll. Monrós, ex M. Alvarenga.

2.1 x 1.4 mm.

Elongate oval, unicolorous pitch black; hairs golden yellow, abundant on legs and ventral surface. Wings present and normal.

Surface of head smooth, delicately reticulate. Pronotum with a minute reticulation. Elytra more strongly shining than rest of dorsal surface; punctures regular and moderately deep. Tibiae carinate on external border.

This small species differs from the others of the subgenus mainly by the elytra being more brilliant than the pronotum.

Oomorphus (Histerogaster) amazonicus new species

Brasil, Amazonas, Tefé, 1 holotype in coll. Monrós.

2. x 1.5 mm.

Differs from the preceding by the more elongate shape and the densely punctured pronotum.

Head as in *O. alvarengai.* Pronotum with relatively dense and deep, uniformly distributed but not regularly arranged punctuation. Elytra as in *alvarengai.*

Oomorphus (Histerogaster) goiasensis new species

Brasil, Goias, Jatai, 1 holotype in coll. Monrós.

2.5 x 1.4 mm.

Elongate oval, very slightly larger and more robust than preceding species. Black, dorsal surface with dark olivaceous reflections, slightly more intense on head.

Head minutely reticulate, smooth; clypeus with a deep rounded emargination. Pronotum minutely reticulate, moderately shining. Elytra with normal punctures and olivaceous reflections more conspicuous towards sides and apex.

The olivaceous head and the minutely reticulate pronotum distinguish this species from its allies.

Lamprosomoides new genus

Type of genus: *L. monticola* new species

General shape as in *Oomorphus,* but claws as in *Lamprosoma.*

Of small size. Antennae longer than intercoxal prosternum, their shape as in *Ormorphus* and relatives, viz. segment VIII narrower than adjoining ones. Last tarsal segment surpassing more than half the length of the lobes of III. Eyes angularly and deeply notched on inner border; interocular area smooth. Claws appendiculate and divergent, as in *Lamprosoma.*

Lamprosomoides monticola new species

Colombia, Alto de las Cruces, 2,200 m. holotype in coll. Monrós.

2 x 1.5 mm.

Shortly oval, compact and convex. Color pitch black; basal segment of antennae, head, dorsal surface, and ventral surface of legs (except tarsi) golden greenish, not very shining on head due to a minute reticulation.

Interocular area smooth; clypeus with a regular and not very deep rounded emargination. Surface delicately reticulate and with sparse and not very deep punctures.

Pronotum with moderately dense and deep punctures, irregularly but uniformly arranged.

Elytra with regular rows of punctures, which are difficult to observe owing to the presence of accesory punctures, almost identical in size and density, irregularly distributed over the whole surface.

This species resembles several green species of *Lamprosoma* on account of its shining green color, the general shape and the structure of the claws, but it differs from them by the small shape and the different structure of the antennae.

ON SOME WATER BEETLES FROM OREGON HOT SPRINGS

by BORYS MALKIN[1]

In the course of 1957 field trip with Henry Dybas of the Chicago Natural History Museum we collected in two of Oregon's hot springs. At Harney Lake Hot Springs located near Harney Lake in Oregon in a county of the same name we collected on May 28 several specimens of 3 species, namely; *Laccophilus atristernalis* Crotch, *Enochrus obtusiusculus* Mots., and *Hydrotus impressopunctatus* (Sch), swimming cheerfully along the shore of the hot springs in the temperature as high as 52.2° Centigrade. But this seemed to have been the limit of their tolerance and no beetles could be found in the water of the higher temperature, which in spots reached as much as 65 degrees. On May 29 we collected at the Alvord Desert Hot Springs in the same county and here we found numerous *Enochrus conjunctus* Horn., active in the shallow eddies of the springs at the temperature of 47.0 degrees of Centigrade.

These records are of considerable interest because they much exceed the temperatures in which living beetles had been reported. Of all these species, only *E. conjunctus* had been reported in the literature from the hot springs, ranging from 28.2 at Cleveland, Ohio to 40.8 at Cortez, Nevada. (Brues 1932: 266). Brues also said that none of the known American beetles are found in the temperature of over 46.0 degrees of centigrade. He reported thus *Philydrus hamiltoni,* Horn from 45.5 and *Paracymnus subcupreus,* Say from 45.7 from Hot Springs NE. of Bear Lake, Idaho, in which incidentally I also collected the said *Paracymnus* in 1952 in identical temperature. Brues mentions the highest temperature for living and active beetles being 47.5-48.0 degrees. The species he mentions for this is *Laccophilus gracilis* (*Thermarum*) which although regularly found in the water of 28.0 C. may stand much higher temperature.

Of others, Schwartz reported *Helochares normatus* (Lec) and *Hydroscapha natans* Lec. from the hot springs in Arizona in which the temperature ranged between 43.0-44.0 degrees (Schwartz 1914: 163-8).

The evidence from the Oregon hot springs suggests that the upper limits of temperature tolerance is quite higher than had been supposed.

It may also be worth mentioning that the *L. atristernalis* is quite rare

[1]University of Minnesota. Minneapolis, Minnesota.

in Oregon and that both Hydrophilids are California species and thus the above records are first for Oregon.

Literature Cited

Brues, C. T. 1932. Proc. American Acad. Arts. Sci. 67:266.
Schwartz, E. A. 1914. Proc. Ent. Soc. Washington. 16:163-168.

A REVISION OF THE SPECIES OF THE SUBGENUS *PLECTRALIDUS (HARPALUS,* HARPALINI, CARABIDAE) FROM NORTH AMERICA

by ALY ALY EL-MOURSY[1]

Casey (1914) presented a key for the identification of the species of the subgenus *Plectralidus* (genus *Harpalus*) in which he described four new species namely: *caudalis, collucens, acomanus,* and *rectangulus* in addition to the two species *erraticus* and *retractus* previously described by Say (1825) and Le Conte (1863) respectively. A study of Casey's descriptions revealed that the characters utilized for separating the species are vague and can hardly be applied. He gave his descriptions from few specimens and combined the range of measurements of both sexes. He based his key on male and female characters although it appears that he had only two male specimens of the species *collucens* and one male specimen of the species *rectangulus.*

As more than 300 specimens of *Plectralidus* were available here, it was suggested by Dr. G. E. Ball that a revision of this group be undertaken in order to evaluate the validity of these species on the grounds of more precise and distinct characters.

Specimens were available from various localities in North America. The characters of both sexes were studied, the male genitalia were dissected and the most distinctive features defined. The total body length of the insect was taken as the sum of the length of the head (linear distance from the base of mandible to the posterior margin of the eyes), the length of the prothorax and the length of the elytron. As the measurements taken were not found useful as a diagnostic character, only the maximum and minimum length of both sexes of each species are included in the text.

I am greatly indebted to Dr. G. E. Ball for his invaluable guidance, criticism and advice during the progress of the work; without his help the present study could not have been accomplished. A large number of the specimens was collected by him. I also wish to extend my thanks to Dr. G. W. Byers, Department of Entomology, University of Kansas and to Mr. T. J. Spilman, United States National Museum, for the loan of material. Mr. Spilman also gave valuable help by examining the type specimens and reporting on them to me. I wish to express my gratitude to Professor B. Hocking for reading and criticising the manuscript.

[1]Department of Entomology, University of Alberta, Edmonton, Alberta, Canada.

Subgenus **Plectralidus** Casey, 1914

Plectralidus Casey, 1914: 72.-. Leng 1920: 70.— Csiki, 1932: 1186.
TYPE SPECIES: *Harpalus erraticus* Say, 1825 (Designated here).

The diagnostic characters of the subgenus *Plectralidus* are as follows: Body is elongate and variable in size. Colour varies from pale brown to deep black. Elytral apices are sometimes conspicuously spiniform in the female. The internal sac of the male genitalia has a pointed spine at its dorsal end.

A careful examination of the specimens of *Plectralidus* showed that they could be arranged in two groups which I consider to be specifically distinct. From a study of the literature it appears that one of these groups may be referred to *erraticus* Say and the other to *retractus* Le Conte.

1. **Harpalus erraticus** Say, 1825

The colour of both sexes varies from dark brown almost black to pale brown, the majority of specimens being light brown. In the pale specimens, which are probably teneral, the pronotum is lighter in colour than the elytra.

The length of the largest male is 15.0 mm., that of the smallest male is 13.0 mm. The largest female measures 15.5 mm. and the smallest 11.0 mm.

The basal angles of the prothorax are obtuse and narrowly rounded (Fig. 1). The outer angles of the elytral apices are spiniform in the female (Fig. 2) and obtuse in the male (Fig. 3).

The median lobe of the male genitalia ends in a vertical triangular, constricted plate, the basal part of which is more or less pointed and the upper end flat and slightly curved (Fig. 4).

This species occurs in the north and east of North America (Fig. 8) as follows: 1) 186 specimens from the following localities have been examined in the present study:

A. The United States of America:

COLORADO (3 males and 2 females)—"Colorado." Las Animas County: Cockedale. Weld County: La Salle.

CONNECTICUT (2 males)—New Haven County: New Haven City.

ILLINOIS (2 males and 4 females) — Cook County: Chicago, Palos Park.

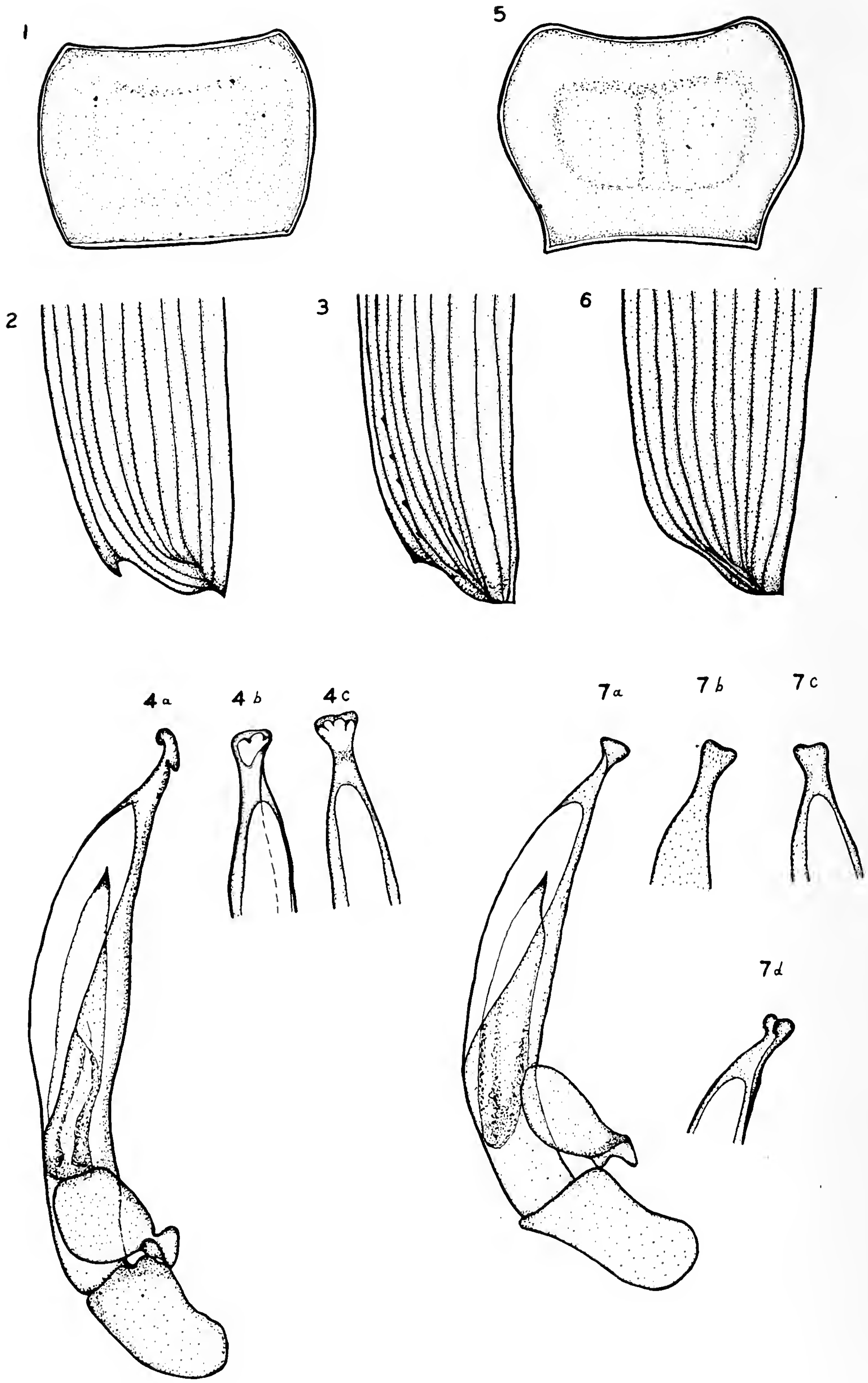
IOWA (4 males and 1 female)—Buchanan County: Independence. Johnson County: Iowa City.

KANSAS (10 males and 8 females) — "Kansas." Douglas County: "Douglas County"; Lawrence. "Reno County". "Riley County". Sedgwick County: Mount Hope. Sumner County: Wellington.

MASSACHUSETTS (2 males and 3 females)—"Massachusetts".

MICHIGAN (11 males and 11 females)—Cheboygan County: Douglas lake. Kent County: Grand Rapids. Mason County: Manistee. Wayne County: Detroit.

MINNESOTA (10 males and 6 females)—Cass County: North of Cass Lake. Lake County: Ely.



(*Caption on page* 39)

FIGURE 1. *H. erraticus*, prothorax, 8x. FIGURE 2. *H. erraticus*, posterior part of female elytron, 8x. FIGURE 3. *H. erraticus*, posterior part of male elytron, 8x. FIGURE 4. *H. erraticus*, male genitalia: a. lateral view; b. dorsal view; c. ventral view, 15x. FIGURE 5. *H. retractus*, prothorax 8x. FIGURE 6. *H. retractus*, posterior part of elytron, 8x. FIGURE 7. *H. retractus*, male genitalia: a. lateral view; b. dorsal viey; c. ventral view; d. lateroventral view, 15x.

←

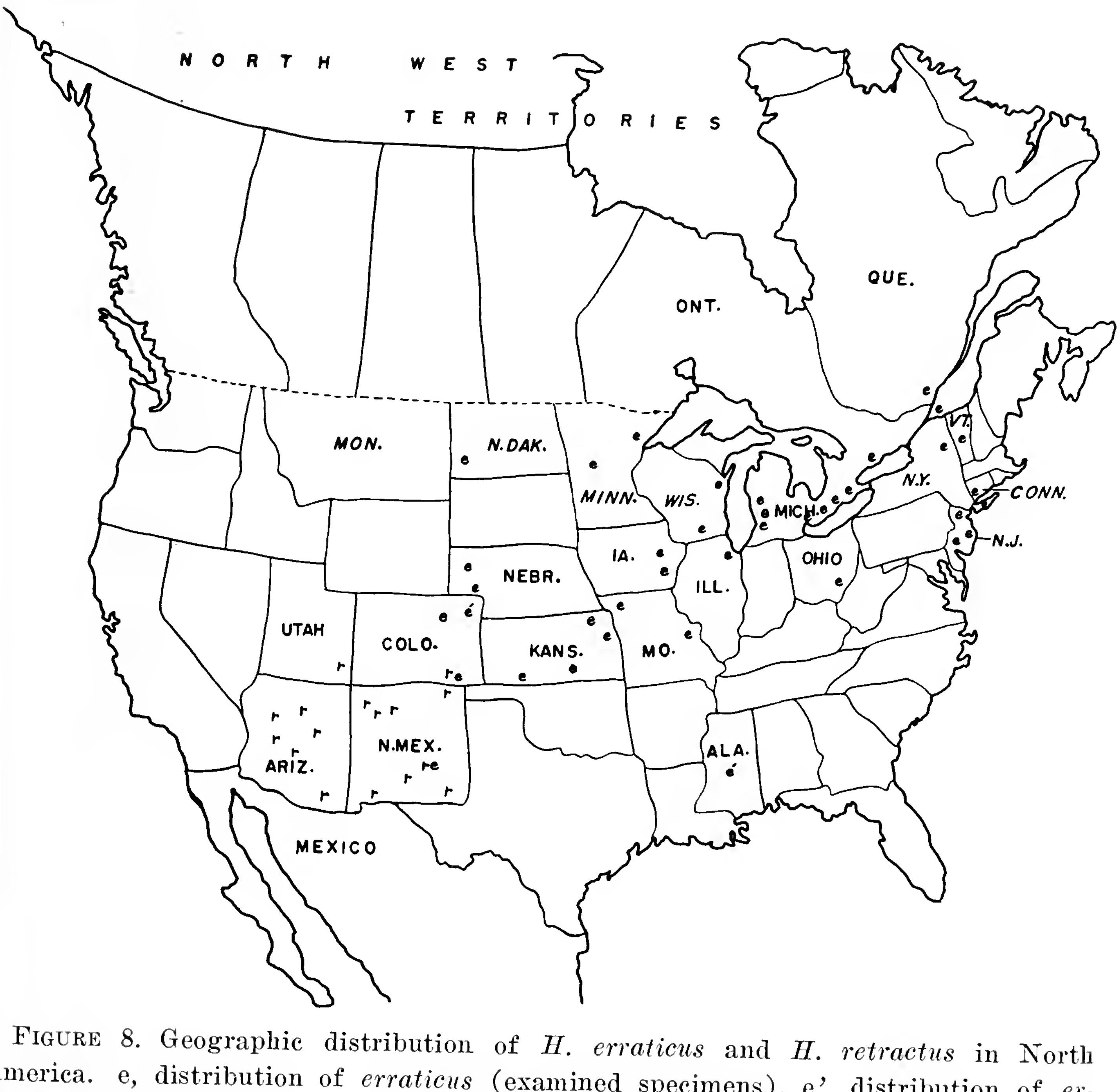


FIGURE 8. Geographic distribution of *H. erraticus* and *H. retractus* in North America. e, distribution of *erraticus* (examined specimens). e', distribution of *erraticus* as cited in the literature. r, distribution of *retractus* (examined specimens).

MISSOURI (8 males and 6 females)—"Clay County". De Kalb County: Maysville. St. Louis County: St. Louis City.
MONTANA (3 males and 3 females)—Dawson County: Glendive.
NEBRASKA (4 males and 1 female)—"Nebraska". Box Butte County: Alliance. Garden County: 8 miles northeast of Oshkosh.
NEW JERSEY (8 males and 3 females)—Bergen County: Emerson. Monmouth County: Freehold. Ocean County: Lakewood.
NEW MEXICO (one male)—Lincoln County: Ft. Stanton.

NEW YORK (9 males and 11 females)—"New York." Essex County: Elizabethtown. "Franklin County." New York County: Long Island; New York City.

NORTH DAKOTA (2 males and 4 females)—Billings County· Medora.

OHIO (one female)—"Perry County."

VERMONT (one male and one female)—Washington County: Montpelier.

WISCONSIN (2 males and 7 females)—"Wisconsin". Brown County: Green Bay. Dane County: Madison. Sheboygan County: Sheboygan.

B. Canada:

NORTH WEST TERRITORIES (one male) — "North West Territories."

ONTARIO (5 male and 9 females)—Carleton County: Ottawa. Northumberland County: Coburg. "Prince Edward County." York County: Toronto.

QUEBEC (10 males and 7 females) — Richelieu County: Lanoraie. Southern Quebec, Junction Routes 52 and 13.

2) Specimens cited in the literature but not examined in the present study:

ALABAMA—Shelby County (Löding, 1945).

COLORADO—(Haubold, 1951)

RHODE ISLAND to INDIANA (Casey, 1914).

2. **Harpalus retractus** Le Conte, 1863

The colour of both sexes is about the same as in *erraticus,* but the majority of *retractus* specimens are dark in colour.

The length of the largest male is 13.0 mm. and of the smallest male 12.0 mm.; that of the largest female is 14.0 mm. and of the smallest female 12.0 mm.

The basal angles of the prothorax are more or less sharply marked and subprominent (Fig. 5). The outer prominences of the elytral apices are very obtuse in both sexes (Fig. 6), however most females have more widely truncated elytral apices and the extreme apices more sharply pointed than those of the males.

The apical portion of the median lobe of the male genitalia is enlarged and not constricted. It has a median longitudinal furrow and shows two lateral knobs when seen from a ventrolateral view (Fig. 7).

This species occurs in the southwestern part of North America: 1) 126 specimens from the following localities have been examined in the present study:

ARIZONA (43 males and 19 females)—"Arizona". "Apache County" Coconino County: Flagstaff; Williams; Mormon Lake; Walnut. Holbrook. Phoenix. Prescott. St. Michiels (sic!).

COLORADO (4 males and 6 females)—"Colorado". "Chaffee County". "Custer County". Las Animas County: Trinidad.

NEW MEXICO (27 males and 26 females)—Bernalillo County: Albuquerque. Colfax County: "Colfax County"; Koehler. Lincoln County: Ft. Stanton. McKinley County: Coolidge; Pinedale. Otero County: Santa Fe Canyon. "Torrance County". Ft. Defiance.

UTAH (One female)—Monticello.

2) As cited in the literature this species was recorded from:

MEXICO—(Blackwelder, 1944).

NEW MEXICO and ARIZONA—(Casey, 1914).

Discussion

From this study it appears that the species *erraticus* is distributed in the northern and eastern part of North America while *retractus* is confined to the southwestern part of the continent. The two species are thus largely allopatric, being sympatric only in Colorado. One specimen of *erraticus* was recorded, however, from New Mexico.

Examination of the type specimens of Casey revealed that the characters of *caudalis* are the same as those of *erraticus* and that there is no sharp differentiation between *rectangulus, collucens, acomanus* and *retractus*.

Based on the evidences from morphology and geographical distribution it may be concluded that the poorly defined new species introduced by Casey (1914) and collected from the same geographical range as the specimens dealt with in the present study, namely *caudalis* (Northern New York to Missouri and Nebraska), *collucens* (New Mexico), *acomanus* (New Mexico) and *rectangulus* (Arizona), are in fact synonyms of the two species of *Harpalus* previously described. Thus *caudalis* is a synonym of *erraticus* Say, while *collucens, acomanus* and rectangu-*lus* are synonyms of *retractus* Le Conte.

References Cited

Blackwelder, R. E. (1944). Checklist of the coleopterous insects of Mexico, Central America, the West Indies and South America, Part I. Smith. Inst., United States N.M. Bull. 185, pp. 1-188.

Casey, T. L. (1914). Memoirs of the Coleoptera (Harpalinae). V. pp. 45-305.

Csicki, E. (1932). Coleopterorum Catalogus: Harpalinae VI. pp. 1023-1278.

HAUBOLD, V. L. (1951). Distribution of the Carabidae (Coleoptera) of Boulder County, Colorado. American Midland Nat. 45(3): 683-710.
LE CONTE, J. (1863). List of Coleoptera of North America. Smith. Misc. Coll. Vol. VI, 146, pp. 1-78.
LENG, C. W. (1920). Catalogue of the Coleoptera of America North of Mexico. pp. 1-470.
LÖDING, H. P. (1945). Catalogue of the Beetles of Alabama, Geological Survey of Alabama, Monograph II, pp. 1-172.
SAY, T. (1825). Descriptions of Carabici and Hydrocan. Trans. American Philos. Soc. II. pp. 1-109.

DERMESTID LARVAE DAMAGING KODACHROME SLIDES

Kodachrome slides (35 mm.) in cardboard mounts, stored in metal slide boxes (8" x 15") were found to have developed a number of irregular clear spots. Microscopic examination of the slides revealed feeding marks of a mandibulate insect. These feeding marks occurred most frequently at the edges of the slides, close to the cardboard mount. Larvae of a dermestid beetle, *Trogoderma ornatum* (Say) were found feeding on the emulsion of the film. The main ingredients of the emulsion are gelatin and dyes. Hinton (1945) records the larvae feeding on eggs of spiders, insect and plant museum specimens, grains, seeds and nuts, skins, furs, feathers, and woolens.

In order to control these insects, the insides of the boxes were treated with a 2% Chlordane solution. Fumigants were considered but the Eastman Kodak Company did not feel that a fumigant containing carbon tetrachloride and ethylene dibromide would be safe. They suggested that carbon tetrachloride alone would not affect the emulsion. Placing a slide in a home freezer was suggested but rejected because of condensation when the slides are returned to room temperature. —E. J. GERBERG, PH.D., *Insect Control and Research, Inc., Baltimore 7, Maryland.*

NEW DISTRIBUTION RECORDS OF NORTH AMERICAN TROX (Coleoptera: Scarabaeidae)

By PATRICIA VAURIE[1]

Since the publication of "A Revision of the Genus *Trox* in North America" (Vaurie, 1955, Bull. Amer. Mus. Nat. Hist.), and "Two New Species of *Trox* from Florida," (Howden and Vaurie, 1957, Amer. Mus. Novit.), I have studied material from additional collections which has added new locality records to the distribution of 21 of the 45 species in North America (from Canada to Nicaragua). The names are listed in the order of the 1955 revision.

THE **scaber** GROUP

Trox aequalis Say. In Mexico this species is not so common as in the United States. It was reported previously (11 specimens) from the states of Coahuila, Chihuahua, and Durango, and has now been taken at a light trap in Monterrey, Nuevo Leon, in May, 1958, by Jean Mathieu.

Trox striatus Melsheimer. Illinois is added to the range of this small, shining species (New Jersey, Pennsylvania, Arkansas) with 25 specimens examined from that state.

Trox laticollis LeConte. Two new states are added to the known distribution (Massachusetts, New York, Pennsylvania, Iowa, Arkansas) of this unusual species. They are New Jersey (a male examined from Riverton, May, 1931), and Indiana (Tippecanoe Co., April), the latter reported by N. M. Downie in his "Records of Indiana Coleoptera. I" (Proc. Indiana Acad. Sci. for 1956, 66:122).

Trox atrox LeConte. A specimen seen from Denison, Iowa (June, 1949, collected by C. and P. Vaurie) adds this state to the range.

THE **terrestris** GROUP

Trox spinulosus. T. s. spinulosus Robinson. No specimens of this subspecies had been examined by me from Arkansas although two had been seen from the adjacent states of Louisiana and Oklahoma, and the range of the species is the east central area of the United States. A male and female from the southwestern part of the state (Washington Co.) have now been examined. *T. spinulosus dentibius* Robinson. This subspecies occurs in Nuevo Leon as well as in other states of Mexico, as shown by four specimens from Campo Apodaca, 19 kms. northeast of Monterrey, taken in April and May, 1958, by Jean Mathieu, at a light

[1]Research Associate, American Museum of Natural History, N. Y.

trap. This form occurs also in the southeastern United States.

Trox frontera Vaurie. L. J. Bottimer reports (*in litt.*) that he has seen two more males from the type locality (Dimmit Co., Texas), bringing the known number of specimens to eight.

The **tuberculatus** Group

Trox sonorae LeConte. Two extensions of range are reported here for this widespread and abundant species. One is based on a specimen from Alameda, California (from the Illinois Natural History Survey Division collection), and the other on a male examined from Monterrey, Nuevo Leon, Mexico; the latter constitutes the most eastern record in Mexico although the species has been taken in eastern Texas. The only other record west of Arizona is one specimen from southern California at San Diego.

Trox robinsoni Vaurie. An additional state record for this species of the central states is Illinois (a female from Algonquin and a male from La Salle examined). Two of the paratypes were taken even farther east and north in Michigan.

Trox tuberculatus De Geer. A new record for this species is established by a male examined from Lincoln, Nebraska, in the collection of C. A. Frost. This locality fills in the gap between Iowa and Wyoming in the westward extension of this eastern species.

Trox floridanus Howden and Vaurie. A series from Cedar Keys on the west coast of northern Florida (examined in the collection of Robert Woodruff) establishes a fourth locality in Florida for this species which is not known outside of Florida. In the distributional map of *tuberculatus* (Vaurie, *loc. cit.*, p. 55), the dots in the peninsular part of Florida represent *floridanus,* not *tuberculatus.*

Trox plicatus Robinson. Of the many Mexican states in which this species occurs, two not previously mentioned are the state of Mexico (five specimens examined from Chapingo, at a light trap, in May, June, July, and September), and Morelos (Cuernavaca, July, 1952, one specimen examined). The species occurs also in the southwestern United states.

Trox variolatus Melsheimer. Iowa is added to the other states west of the Mississippi River (Kansas, Oklahoma, Missouri, Louisiana, Texas) in which this eastern form has been recorded (the specimen examined is from Ames).

The **unistriatus** Group

Trox sordidus LeConte. Recorded previously from nearby Ohio, Indiana, and Iowa, as well as from other states, this species has now been examined from Illinois (from the Illinois Natural History Survey Division).

Trox capillaris Say. Four specimens from Putnam County, Illinois, show that the species occurs in that state. It is most common in the northeastern states.

Trox unistriatus Beauvois. Only three specimens of this predominantly northern species had been examined from Florida, Texas, and Louisiana in the south, but I have now seen a specimen from Washington County in southwestern Arkansas.

The **suberosus** Group

Trox tytus Robinson. This interesting species that inhabits the nests of barn owls was known previously from but five widely separated places (in Pennsylvania, Georgia, Oklahoma, Arizona, and Cuba). It is now known to occur also in western Virginia (a specimen examined from Buena Vista on June 19, 1953, collected by F. W. Stehr, in the collection of Robert Woodruff).

Trox rubricans Robinson. A new Mexican record for this uncommon species, which ranges sparingly from southern Texas to Nicaragua, is from the state of Nayarit on the west coast (San Blas, a female collected by R. B. and J. M. Selander in June, 1955). The type is from Sinaloa to the north, but the other specimens recorded from Mexico come from the eastern coast.

Trox carinatus Loomis. Because only 12 specimens of this species have been seen, it might be of interest to report two more, although they come from states already included in the range of the species. One specimen is from Hidalgo County, New Mexico, northeast of Rodeo, in July, and one from Douglas, Arizona, in September, in the collection of Bernard Benesh.

Trox tomentosus Robinson. Two additional specimens from the type locality, Nayarit, Mexico, have been examined (Jesus Maria in the central western part of the state near northern Jalisco, July, 1955). This brings to seven the total of known specimens, the others being from Sonora, Sinaloa, and Oaxaca.

Trox monachus Herbst and *Trox fuliginosus* Robinson. These two species, which are sympatric in Texas only, cannot always be distinguished unless a male is available. A specimen of *monachus* from a fourth locality in eastern Texas comes from Cherokee County (a dissected male taken by R. E. Maxwell in April, 1939). The other species, which accurs in Mexico in Veracruz and Yucatan, and in Guatemala, as well as in Texas, has now been seen from an intervening area in northeastern Mexico (a specimen examined from Victoria, Tamaulipas, May, 1941, collected by R. and J. Potts). Bottimer (*in litt.*) reports a specimen also from the state of Coahuila.

Trox scabrosus Beauvois. This eastern species was reported previously from as far west as Nebraska, Kansas, and Oklahoma, but I have now seen a specimen from Baco County, Colorado, June, 1939.

Trox tesselatus LaConte. The state of Morelos, Mexico, is added to the distribution of this species in other states of Mexico (Baja California, Sonora, Sinaloa, Guerrero) as shown by a male taken in June, 1957, in Amacuzac by W. W. Gibson. The species occurs also in the southwestern United States.

Trox umbonatus LeConte. A specimen from a second locality in the northeastern Mexican state of Nuevo Leon is one examined from Monterrey, taken in March. The species occurs also in the states of Tamaulipas, Coahuila, and Chihuahua, as well as in the southwestern United States.

NOTES ON ILLINOIS NEMOGNATHINAE (Meloidae)

By JOHN K. BOUSEMAN[1]

Beetles of the meloid subfamily Nemognathinae have been rather infrequently collected in the region east of the Missiissippi River. The available distributional data for this group in America north of Mexico have recently been summarized by Enns (1956, Univ. Kansas Sci. Bull., 37: 685-909).

During the summer of 1958 the author made a special effort to collect representatives of Nemognathinae in Illinois, and the results are herein recorded. Unless otherwise stated, all collections were made by the author. The determinations of the species were verified by Richard B. Selander.

Nemognatha lurida LeConte

This species has been collected on *Helianthus* at two localities in south-central Illinois: Farina, Fayette County, August 16, and Mason, Effingham County, August 16 and 22. These records are of considerable interest as they are the first for the species east of the Mississippi River. A total of twenty-five specimens were taken at the two localities. The Illinois specimens are assignable to the race *lurida;* in three of them the scutellum, under surface of the thorax, and the base of the abdomen are black, and the femora are darkened.

Nemognatha nemorensis Hentz

Enns records this species from only a single locality in Illinois: Kahokia [Cahokia], St. Clair County, on the Mississippi River floodplain just south of East St. Louis. Since the publication of his paper it has been taken in the Shawnee Hills region of southeastern Illinois, at Pounds Hollow Recreation Area, Gallatin County, June 29, and in the west-central part of the state at Mason State Forest, Mason County, July 6, and July 13 (J. K. Bouseman and R. B. Selander). At both localities adults were found in abundance on the flowers of *Rudbeckia hirta.* At Pounds Hollow the *Rudbeckia* is limited to the edge of a stand of *Pinus echinata.* At Mason State Forest *Rudbeckia* occurs in a variety of situations, but the beetles were found on it only locally, along the edge of an oak-hickory woods. On July 13, at Mason State Forest, several females were observed ovipositing on the bracts of *Rudbeckia* flowers. Egg clusters collected at that time hatched July 15.

---

[1]Department of Entomology, University of Illinois, Urbana.

Rhyphonemognatha rufa (LeConte)

Enns records this interesting species in Illinois from Roseville, Warren County. At the time his revision appeared this was the easternmost point in the United States at which it had been collected. A specimen taken in flight at Urbana, Champaign County, July 8, extends the known range 100 miles eastward.

Zonitis vittigera (LeConte)

Two specimens of this species were taken at Mason State Forest, Mason County, July 13 (J. K. Bouseman and R. B. Selander), and two at Mason, Effingham County, August 13. The former were found on flowerheads of *Rudbeckia hirta*. Enns indicates that the species is probably statewide in distribution in Illinois.

THE MONOCHAMINI (Cerambycidae) OF THE ETHIOPIAN FAUNISTIC REGION. V. THE SUBTRIBE ACRIDOCEPHALIDI

By ELIZABETH S. DILLON AND LAWRENCE S. DILLON[1]

The genus *Acridocephala* is so highly divergent from the other Monochamini of the Ethiopian Region that special treatment for it was felt to be obligatory. In the first place, the plan of construction of the body is unique, for the dorsal surface of the head and of the thorax as well as the elytra lie in a single plane, whereas in the remaining genera the elytral bases are elevated out of line with the pronotum and the vertex is declivous. Moreover, the front is strongly narrowed above and placed at a sharp angle to the vertex, and the antennal tubercles are erect, not at all divergent. Many other characters of a singular nature are present, for an account of which the subtribal description should be referred to, forcing the recognition of the combination of traits, at least for the present, as representing a subtribal level of distinction.

For a list of collections studied and their abbreviations, reference should be made to part I of this series.[2]

Acridocephalidi Dillon and Dillon, new subtribe

Head of normal length; front meeting vertex at an acute angle, retracted below; vertex scarcely declivous; eyes with lower lobe much shorter than gena, upper lobe and isthmus of equal width; antennal tubercles contiguous, not divergent apically; clypeus fused with front, not evident. Pronotum and elytra on the same plane, the former without discal tubercles, lateral tubercles granuliform; elytra without basal gibbosities. Legs moderately long, middle ones shortest, hind ones longest; femora distinctly tapering apically and metatibiae notched externally; tarsal claws movable, divergent or divaricate, usually the latter.

Acridocephala Chevrolat

Acridocephala Chevrrolat. Lacordaire, Gen. Col. IX, 1869, p. 342, 349 Arch. Ent. II, 1858, p. 186; Class. Ceramb. 1860, p. 110, 112; Syst. Ceramb. 1864, p. 383. Breuning, Nov. Ent. suppl. III (2) 1944, p. 384.
Acridocephala Chevrolat. Lacordaire, Gen. Col. IX, 1869, p. 342, 349.

Moderate-sized, elongate-ovate, subcylindrical, black. Head finely punctuate, narrow of normal length, not declivous above; front convex, strongly retracted below, at least slightly higher than wide, sides subparallel below eyes, strongly narrowed between; eyes with lower lobe obliquely transverse, distinctly shorter than gena, upper lobes and isthmus of equal width, lobes separated by less than twice their width; antennal tubercles prominent, contiguous, not divergent apically. Pronotum

---

[1]Department of Biology, Agricultural and Mechanical College of Texas, College Station, Texas.

[2]Scientific Publications of The Reading Public Museum and Art Gallery, no. 9, 1959.

slightly wider across base than long, sides irregular tapering apically; lateral tubercles scarcely evident, usually granuliform; apical and basal transverse sulci usually distinct, more or less straight; disk medially transversely rugose, usually devoid of tubercles, occasionally with one or two small ones just before basal sulcus. Elytra without basal gibbosity; disk rather densely punctate, punctures sparser as a rule toward suture and, at least near humerus, provided with very small granules; each disk often with two or three very indistinct costae; apices squarely truncate or emarginate, angles more or less prominent or dentate; humeri simple. Prosternal process strongly arcuate from front to back, nearly attaining height of procoxae, anteriorly with a distinct prominence; mesosternal process broadly tuberculate, on same plane as mesocoxae. Legs moderately long, middle ones shortest, hind ones longest; femora robust, distinctly tapering apically and basally, metafemora attaining apex of third sternite. Antennae more than twice body length in male, about one-third longer in female, densely fimbriate beneath on first four segments, thence sparsely so at least on next two; scape robust, either gradually clavate or subcylindrical, extending to apical sulcus of pronotum, cicatrix broadly open mesially, extending less than halfway around apical margin, broad, nearly semicircular; third segment with sides parallel or narrowed from base to apex, three-fifths to three-fourths again as long as first; fourth distinctly shorter than third; rest gradually decreasing, or sometimes subequal in male; eleventh strongly elongate in male, feebly so in female.

Genotype: *Acridocephala bistriata* Chevrolat, by monotypy.

Remarks: Although this genus is highly discordant among the other African Monochamines, the authors feel that rather than adding to the confusion that exists in the division of Lamiinae into its tribes, it is better to let it stand here until a study of Palaearctic and Indo-Australian components of the tribe has been completed. From all the Ethiopian genera; it is distinct in having the front placed at an acute angle with the vertex, and strongly narrowed between the eyes; the antennal tubercles are contiguous throughout their length, not at all divergent; the mouthparts are retracted and are contiguous with the prothorax; and the prosternal process is armed anteriorly. Moreover, the entire upper surface is on a single plane.

KEY TO SPECIES

1. Elytra with a continuous white vitta from base to apex, not broken into separate maculae 2
   Elytra either with pubescence forming maculae or with vittae composed of separate maculae 3
2. Elytra white vitta not sharply defined, of uniform pubescence throughout .... **nubilosa**
   Elytra white vitta sharply defined, composed of dense, white, coalescent maculae .... **nicoletii**
3. Body beneath laterally with a continuous white vitta extending from gena to apex of abdomen .... **pulchra**
   Body beneath with lateral vitta broken into maculae on abdomen 4
4. Antennae with segments beginning with third distinctly white annulate basally 5
   Antennae with at most the third or fourth segment annulate basally 6

5. Elytra minutely irrorate with white and with a few, small, white maculae interspersed; vertex with a single broad whitish vitta each side .... **alboannulata**
   Elytra with small, rounded, white maculae, those before and behind middle more or less coalesced to form an irregular fascia, between which fasciae the area is almost devoid of any maculation; vertex with two vittae each side .... **bifasciata**
6. Elytra nearly immaculate broadly along suture and side margins .... **seriata**
   Elytra entirely and uniformly irrorate and maculate .... **bistriata**

Acridocephala nubilosa Breuning

Acridocephala nubilosus Breuning, Nov. Ent. VIII, 1938, p. 53; Nov. Ent. suppl. III (2) 1944, p. 386.

Female. Black. Head above with two narrow ashy vittae each side, the inner ones converging anteriorly, the outer ones behind isthmus of eye; front with four vittae, the middle ones ashy above, white on lower half and slightly widened there, that lateral ones densely white pubescent, attenuate below; genae broadly, densely, white pubescent. Pronotum with a broad ashy vitta each side of disk, leaving a broad glabrous area medially, the lateral margin of the vittae indistinct. Elytra finely ashy pubescent, the pubescence denser on disk to form a poorly defined vitta. Body beneath with a dense white vitta laterally, continuing that on gena without interruption to apex of abdomen, somewhat less densely pubescent on sides of sterna. Legs very sparsely, finely ashy pubescent; tibiae apically with a short, blackish line. Antennae rather densely clothed with reddish brown pubescence, except scape which is finely ashy pubescent.

Head above with a very fine, shallowly impressed sulcus medially, vertex smooth except for a small patch of fine punctures behind eye and a few coarse ones medially; front one-fifth higher than wide, strongly narrowed between eyes, parallel-sided below, median sulcus fine, with a few coarse, scattered punctures; eye with lower lobe obliquely transverse, three-fourths as tall as gena. Pronotom one-fourth again as wide at base as long, sides broadly arcuate to apex, not wider medially, apically strongly narrowed; lateral tubercles small, granuliform; apical and basal sulci fine and deep; disk finely, transversely rugose at middle, either side with a few rather fine punctures which become coarser laterally. Elytra with entire disk moderately finely, rather densely punctuate, a few granulate-punctures at extreme base and on humeri; each with two subobsolete costae behind middle; apices very feebly emarginate, outer angle with a small tooth. Prosternal process very narrow, prominence small, not bifurcate; mesosternal tubercle broad, not extending across entire angle, however. Antennae with eighth segment surpassing elytral apex, densely fimbriate beneath to fourth segment, more sparsely so then to the seventh; scape nearly parallel-sided, feebly surpassing pronotal apex, with a few small punctures over its entire surface; third segment straight, robust at base, tapering to apex, three-fifths longer than first; fourth one-third longer than first, tapering apically; fifth and following shorter.

Length 19 mm.; with 5.5 mm.

Type locality: Gabon

Distribution: Gabon

Gabon: 1; no further data [NRS-type]

Remarks: The solid ashy vitta of the pronotum and elytra, and the uninterrupted vitta of the underside will serve to distinguish this species.

Acridocephala nicoletii Thomson

Arcidocephala nicoletii Thomson. Lacordaire, Gen. Col. IX, 1869, p. 349.

Male. Black, shining, above with two white, feebly arcuate vittae, one each side extending from mesial surface of antennal tubercles to apex of elytron, tapering at each end, on elytra sometimes broken into small, more or less coalescent maculae, on vertex each somewhat subdivided into two narrow, vertical vittae; another vitta each side beginning at inner margin of eye continuing across sides of thorax to apex of abdomen, not interrupted but less dense and attenuate on fifth sternite. Pro- and meso-stermum medially, legs, and antennal scape, sparsely hoary pubescent; remainder of antennae densely covered with fuscous pubescence.

Head with front finely, irregularly punctate, strongly narrowed between eyes, nearly half again as high as wide; eye with lower lobe obliquely transverse, about one-third shorter than gena. Pronotum about one-sixth wider across base than long, sides arcuate, slightly widened medially, tapering at apex; lateral tubercles subobsolete, granuliform; apical transverse sulcus indistinct, broadly recurved medially, basal one deeply impressed, straight; disk medially irregularly, rather finely, transversely rugose, laterally with a few moderately coarse punctures. Elytra rather densely, deeply punctuate, punctures towards suture a little sparser and towards apex slightly finer, those at base bearing indistinct granules, especially near humerus; apices broadly emarginate, angles sometimes subdentiform. Prosternal process with anterior prominence scarcely bifurcate; mesosternal tubercle broad, rounded, not prominent. Antennae defective, densely fimbriate beneath on first four segments, less densely so to seventh; scape nearly parallel-sided, feebly widening to apex which is slightly expanded laterally, attaining apical third of pronotum, covered with moderate-size punctures and subrect black setae; third segment three-fourths again as long as first, robust, scarcely tapering apically; rest wanting.

Female. As in male but more robust; antennae only about one-third again as long as body.

Length 17-21 mm.; width 5:5-6.3 mm.

Type locality: Gabon

Distribution: West and west central Africa.

Gabon: 2; no further data [MRS; BM] 1; Ogové River (Good) [CM]. Gold Coast: 3; Accra (Webber) [SM].

Remarks: This species is easily distinguished by the two broad vittae on body above which extend from antennal tubercles to the elytral apices. In addition, the vitta of the undersurface is likewise uninterrupted, or is only very indistinctly interrupted on the fifth sternite.

Acridocephala pulchra Dillon and Dillon, new species

Male. Black; above as in *nicoletii,* with two white vittae, extending from antennal tubercles to apex of each elytra, tapering at each end but on elytral disk broken into small, more or less rounded maculae which are arranged subseriately. Front with a narrow, white vitta each side of middle, which is of sparser pubescence except at lower portion, and with a vitta beginning at upper front margin of eye, rather narrow, but becoming very broad on gena, and continuing to apex of fifth abdominal sternite along side of body, attenuate on abdomen, uninterrupted. Legs and scape rather sparsely ashy pubescent; rest of antennae with rather fine fuscous pubescence.

Head above finely punctulate; front one-third again as tall as wide, rather finely, densely punctuate; eye with lower lobe obliquely transverse, about two-thirds as tall as gena. Pronotum one-third again as wide at base as long, sides arcuate, strongly narrowed apically; lateral tubercles feeble, granuliform; apical transverse sulcus narrow, rather feebly impressed, basal one broader, more distinct; disk medially finely, transversely rugose, laterally sparsely punctate. Elytra with moderate-sized, not too densely placed punctures, becoming denser and somewhat coarser laterally, near humeri with a few granulate-punctures; apices narrowly emarginate, angles shortly, robustly dentate. Prosternal process with anterior prominence very feebly bifurcate, anterior face produced forward; mesosternal tubercle broad, anteriorly projecting forwards. Antennae two and one-half to three times as long as body, densely fimbriate beneath on first four segments, slightly more sparsely so on fifth and sixth; scape attaining apical sulcus of pronotum, nearly parallel-sided, at apex feebly expanded; third segment two-thirds again as long as first, robust, slightly tapering from base; fourth a little shorter than third; rest subequal or feebly diminishing in length, except eleventh which is as long as the preceding three together.

Female. As in male but much more robust; antennae only one-fourth or one-third again as long as body, segments from third noticeably decreasing in length, the eleventh not so strongly elongate.

Length 16.5--20 mm.; width 5.2-6.5 mm.

Holotype: Male; Ogowe River, Gabon (Good) [CM]

Allotype: Female; same data as Holotype [CM]

Paratypes: 15; topotypic [CM]

Remarks: While this species is very close to *nicoletii,* here the vitta on the elytra is broken into numerous, seriately arranged maculae.

Acridocephala alboannulata Breuning

Acridocephala sp. Jordon, Nov. Zool. X, 1903, p. 153.

Acridocephala alboannulata Breuning, Festschr. E. Strand, I, 1936, p. 300; Nov. Ent. Suppl. III (2) 1944, p. 385, f. 284.

Male? Black. Head above with a single, broad, sparsely pubescent, white vitta each side of middle; front with four yellowish white vittae, the median ones sparsely pubescent, widening below, the one each side broad, densely pubescent, narrower below; gena broadly, densely white pubescent. Pronotum each side of middle with a broad, somewhat sparsely pubescent, white vitta, not sharply defined. Scutellum glabrous. Elytra densely covered with minute white maculae, and with scattered, feebly larger ones, those on disk largest but still quite fine. Body beneath medially nearly glabrous except on pro- and mesosternum; laterally with a broad, yellowish white vitta extending from sides of pronotum to tip of abdomen, slightly tapering posteriorly, narrowly interrupted only on bases of first and second sternites.

Legs very sparsely, finely, nearly ashy pubescent; tibiae with a narrow, black line apically on outer surface. Antennae with scape sparsely, finely, gray pubescent; rest fuscous pubescent, fourth and fifth segments (sixth and following wanting) densely white annulate on basal third.

Head above finely, rather sparsely punctulate, very narrowly, deeply sulcate medially; front about one-tenth higher than wide, very strongly narrowed between eyes, slightly so below, finely, densely punctate medially, median sulcus deep and fine; eye with lower lobe transverse, two-thirds as tall as gena. Pronotum at base one-seventh again as wide as long, apex distinctly narrower than base, indented at middle; lateral tubercles minute, granuliform; apical sulcus obsolete, basal one broad, shallow, straight; disk medially finely, transversely rugose, each side of middle finely, moderately densely punctate, at sides rugosely so. Elytra uniformly covered with moderately coarse, well separated punctures, on humeri somewhat denser and granulate, somewhat rugosely punctate behind humerus, at apex a little more densely placed; each disk with two subobsolete costae; apices slightly emarginate, the angles subdentate. Prosternum with anterior prominence bearing two tubercles, not on a pedestal; mesosternal process with a distinct rounded tubercle medially at angle. Antennae with fifth segment attaining apical fourth of elytra, beneath densely fimbriate; scape nearly parallel-sided, very feebly widening apically, rather densely covered with moderate-sized punctures and with short, black setae which are more or less recumbent, reaching only slightly behind pronotal apex; third segment straight, not quite twice as long as first; rest gradually shorter, sixth and following segments wanting.

Length 18.5 mm.; width 5.5 mm.

Type locality: Mayumbe, Belgian Congo

Distribution: Belgian Congo

Belgian Congo: 1; Mayumbe, July 1917 (R. Mayne) [NRS-type]

Remarks: The small mesosternal tubercle, the poorly defined white pronotal vittae, the prominent white annulation of the antennae, and the lateral vitta of the body beneath interrupted only on first two abdominal sternites, combine to distinguish this species.

Acridocephala bifasciata Dillon and Dillon, new species

Female. Black. Head above with two fine, white vittae, the inner ones converging anteriorly; front with a narrow, yellowish white vitta each side of middle, of sparser pubescence than other markings, slightly wider below; each side in front of eye with a dense yellowish white vitta which broadens as it traverses the gena. Pronotum above with a broad, white vitta laterally on disk. Elytra with numerous small, rounded, white maculae, scattered on basal third and somewhat concentrated before and behind middle into two broken fascia, the intervening spaces with small flecks of white; apically with a few whitish, more or less coalescent maculae. Legs and antennae black, the former rather thinly clothed with whitish pubescence as is also the antennal scape; antennae with third segment at extreme base and extreme apex fuscous pubescent, intervening area white; fourth on basal half, and bases of remaining segments thinly white annulate.

Head above finely, rather densely puntate and with a few coarser punctures; front punctate as on the vertex except the coarser punctures are more numerous, one-third again as tall as wide; eye with lower lobe obliquely transverse, two-thirds as tall as gena. Pronotum one-fourth again as broad across base as long, sides tapering apically; lateral tubercles granuliform; apical and basal sulci rather broad, shallow, straight; disk medially rather finely rugose, laterally with scattered punctures, just before basal sulcus each side of middle with a small, subobsolete tubercle. Elytra with coarse, not densely placed punctures, which are somewhat finer toward suture, basally punctures somewhat granulate; apices subobsoletely emarginate, the angles subdentiform. Prosternal process with prominence distinctly bifurcate, the anterior surface vertical; mesosternal tubercle broad, rounded, the anterior surface nearly vertical. Antennae one-third again as long as body, moderately densely fimbriate beneath on first four segments, sparsely so thence to eighth segment; scape gradually clavate to apex, which is slightly flared laterally, densely, minutely punctulate, with a few moderate sized punctures interspersed, attaining apical sulcus of pronotum; third segment straight, not tapering apically, more than two-thirds again as long as first; rest gradually shorter, except eleventh which is a little longer than tenth.

Length 19.3 mm.; width 6 mm.

Holotype: Female; Tero, Uganda, July 6, 1912 (C.C. Gowley) [BM].

Remarks: While most closely allied to *seriata*, this form has the markings yellowish white, and the maculae of the elytra arranged in two broken fascia medially, leaving an almost glabrous fascia just behind middle, moreover, the antennae are annulate quite distinctly; and the scape is distinctly flared at apex.

Acridocephala seriata Jordan

Acridocephala seriata Jordan, Nov. Zool. X, 1903, p. 153. Breuning, Nov. Ent. suppl. III (2) 1944, p. 385, f. 285.

Male. Black, shining. Head above with a narrow, white vitta each side of middle, convergent anteriorly; front each side of middle with a narrow vitta of sparser pubescence, and a dense white vitta beginning at upper angle of eye, becoming very broad on gena, and extending along sides of body to apex of abdomen, widest on metasternum, broken into gradually diminishing maculae on abdomen. Pronotum each side of middle with a moderately wide, white vitta, divergent basally. Elytra each with four more or less irregular series of small, rounded, separated, white maculae, interspersed with many irregular flecks of the same color, with appear also in smaller numbers toward suture and sides. Legs and pro- and mesosternum medially sparsely ashy pubescent. Antennal scape, base of second segment, and basal fourth of fourth segment beneath, ashy grey pubescent.

Head finely punctulate, with a few fine punctures interspersed; front one-sixth again as tall as wide; eye with lower lobe obliquely transverse, three-fifths as tall as gena. Pronotum one-fifth wider across base than long, sides distinctly narrowing to apex, arcuate; apical and basal transverse sulci distinct, the basal one recurved medially, feebly bifurcating the median discal tubercle; disk medially rather finely, transversely rugose, on sides with scattered, small punctures. Elytra rather finely, somewhat sparsely punctate, punctures denser and coarser toward sides; basally subobsoletely granulate-punctate; apices emarginate, shortly, robustly dentate. Prosternal process feebly bifurcate, its anterior surface vertical; mesosternal tubercle broad, not prominent, its anterior face nearly vertical. Antennae two and one-third to two and one-half times as long as body, slender, beneath fimbriate rather densely to fifth segment, sparsely so on sixth and seventh; scape gradually clavate from base, attaining apical sulcus of pronotum; third segment two-thirds again as long as first; fourth and following scarcely diminishing in length; eleventh longer than preceding three segments combined.

Female. As in male but more robust; antennae about one-quarter to one-third longer than body, segments from fourth distinctly shorter, the eleventh slightly longer than tenth.

Length 16-20.2 mm.: width 5.5-6.4 mm.

Type locality: ''Batanga and Lolodorf, Cameroons''

Distribution: Cameroons.

Cameroon: 1; no further data [SM], 3; Bepindi, May 6, 1922 [CMNH] 15; Efulen [CAS]. 1; Batanga [SM]. 2; Lolodorf [SM; MCZ] 1; Kribi [authors' collection] 1; South Cameroons, May 9, 1907 (Fanggebite) [MCZ] 1; Poston [EFG]

Remarks: This form is very close to *pulchra,* but the elytral maculae are not coalescent, the posternal prominence is vertical anteriorly, the antennal scape is less robust and distinctly clavate apically, and the lateral vitta on the sternites is broken into maculae.

Acridocephala bistriata Chevrolat

Acridocephala bistriata Chevrolat, Rev. Zool (2) VII, 1855, p. 287; Cent. Long. 1858, v. 26. Murray, Ann. Mag. Nat. Hist. (4) VII, 1871, p. 50. Jordan, Nov. Zool. X, 1903, p. 153. Breuning, Nov. Ent. suppl. III (2) 1944, p. 384.

Acridocephala variegata Aurivillius, Ent. Tidskr. VII, 1886, p. 93. Breuning, Nov. Ent. suppl. III (2) 1944, p. 385 [new syn.]

Male. Black, antennal segments from fourth dark reddish brown. Head above with two fine, white vittae each side of middle, the inner ones converging anteriorly; front either side of middle with a broad, white vitta, laterally a similar vitta beginning along inner margin of eye, continuing broadly across gena and sides of body to tip of abdomen, on abdominal sternites broken into large maculae. Pronotum on each side of disk with a rather broad, white vitta. Elytra minutely white irrorate, and in addition with about five indistinct rows of larger maculae. Legs and antennal scape sparsely hoary pubescent; remainder of antennae fuscous pubescent, occasionally the third to sixth segments indistinctly white annulate basally.

Head finely sparsely punctate above; front slightly higher than wide, finely, rather densely punctate; eye with lower lobe obliquely transverse, about one-fifth shorter than gena. Pronotum about one-fourth as wide across base as long, sides arcuately narrowing to apex; lateral tubercles minute, granuliform; basal and apical transverse sulci distinctly impressed, basal one straight, the apical one slightly undulate; disk medially rather coarsely, transversely rugose, on sides finely punctate and with a few coarse punctures above lateral tubercles. Elytra moderately coarsely, densely punctate, punctures only slightly sparser toward suture, at base towards humeri the punctures bearing feeble granules; apices broadly truncate, angles often dentiform. Prosternal process with anterior prominence sometimes deeply bifurcate, the anterior face more or less vertical; mesosternal tubercle rather large, rounded, feebly produced anteriorly. Antennae about two and one-half times again as long as body, rather densely fringed beneath on first four segments, sparsely so on next two; scape robust, of nearly equal thickness throughout, apex scarcely expanded laterally, surface finely punctulate and with scattered, fine punctures, attaining apical fourth of pronotum; third segment two-thirds again as long as first; fourth distinctly shorter than third; rest subequal or feebly diminishing in length; eleventh nearly as long as preceding segments together.

Female. More robust than male; antennae only one-third again as long as body, segments gradually decreasing in length from fourth, eleventh scarcely longer than tenth.

Length 19-23.5 mm.; width 6-7.6 mm.

Type locality: Calabar [*bistriata*]; Mapanja, Cameroons [*variegata*].

Distribution: West central Africa

Nigeria: 1; Old Calabar [BM]

Cameroons: 11; no further data [NRS including one type of *variegata;* MCZ; SM] 2; Buea [NRS]. 1; Enydsberg [SM]. 1; Dibongo Vanaga [SM]. 5; Mukonje Farm [NRS]

Gabon: 1; no further data [NRS].

Remarks: *A. bristata* most closely resembles *alboannulata* in having the entire elytron white irrorate. However, in the present species, the pronotal white vittae are sharply defined and the frontal median vittae are subequal in width to that in front of the eye. Furthermore, on the vertex there are two fine, whitish vittae either side of middle instead of one broad one.

It was impossible to distinguish *A variegata* Auriv. in the material at hand. The original description offers no diagnostic character that is constant and the type specimen was in no way distinct from the Calabar example.

Acridocephala densepunctata Breuning

Acridocephala densepunctata Breuning, Nov. Ent. VIII, 1938, p. 53; op. cit. suppl III (2) 1944, p. 385.

"Close to *bistriata* Chevr. but the elytra more finely punctate, without elevated discal lines, and more strongly emarginate at apex.

"The pale markings of the head, pronotum, and body beneath are yellow, elytra very densely sprinkled throughout their length with very fine white maculae of irregular form; antennal segments annulate with white on the base beginning with third. Length: 17 mm.; width: 5½ mm. Described from an individual from Congo in the Paris Museum" [a translation of the original description].

BOOK NOTICE

MONOGRAPH OF THE TENEBRIONIDAE OF SOUTHERN AFRICA. Vol. I (Tentyriinae, Molurini.-Trachynotina: Somaticus Hope). By C. Koch. xiii + 242 pp., 158 text figs. (two are tipped-in folding pp.), 24 pls. (2 in color), 2 large folding maps. Pretoria: Memoir No. 7 of The Transvaal Museum, P. O. Box 413, Pretoria. 1955.

It is startling to read in the preface to this book that the monograph is expected to run to 25 or 30 volumes. One wonders how an author, even though he can give all his time to field work and taxonomic research, and has adequate help and financial backing, can hope to complete such a task. When it is realized that 48 earlier papers by Dr. Koch, cited in the bibliography to this volume, comprise nearly 3,000 printed pages plus 159 plates, with over 800 text figures—the wonder almost vanishes!

Dr. Koch states that about one million specimens have been studied to date, yet this represents only some 1,500 described species; by the end of the monograph he expects there will be 5,000 species ". . . of what is probably the most ancient family of Coleoptera" known from Southern Africa. This will include all discovered Tenebrionidae "from African localities, situated south of a line drawn across the continent from the Kunene River in the West to the Zambesi River in the East"; or in other words, from the southern border of Angola, eastward along the Zambesi to its mouth in Mozambique. This work will result in fundamental changes in the classification of the family, and as time permits, intercontinental studies will lead to a new classification.

The present volume shows the author's broad and interpretative knowledge of the morphology and zoogeography of his group. A thorough investigation of body structure is essential in the Tenebrionidae, the great simulators of the Coleoptera, where even close and detailed similarities may not indicate monophyletic origin.

Dr. Koch makes two divisions of the family (I omit his supporting characters):

Abdomen without intersegmental membranes between distal sternites (tentyrioid Tenebrionidae, with only one subfamily, Tentyriinae).

Abdomen with intersegmental membranes between distal sternites, except for Caenocrypticini, Belopini, and entire Cossyphini [which have other recognition characters] (tenebrioid Tenebrionidae, with several subfamilies).

He sinks Casey's tribe Araeoschizini (Texas to California, etc.) under Stenosini, and questions other of Casey's conclusions.

Plates I-V are lithographs by the late A. Raffray; X-XI are in color, from paintings by A. von Peez and F. Diehl. The reproduction of figures on the plates is excellent, and the photographs taken with special equipment manufactured by C. Reichert of Vienna, are outstanding. Much credit should go to the Board of Trustees of the Transvaal Museum, and to the South African Council for Scientific and Industrial Research, for sponsoring this long-time project. There is no doubt that Dr. Koch is the right man, at the right time, in the right place.—Hugh B. Leech, *California Academy of Sciences.*

Dr. M. Y. Marshall

(1889-1957)

Malcolm Yeaman Marshall was born in Henderson, Kentucky, September 14, 1889, the son of a grain and coal dealer, William J. Marshall and his wife, Lelia Y. He attended the University of Michigan where he received an A. B. degree in 1910 and an M. D. in 1913, and while here he began the collection of insects and birds now in the Audubon Museum in Henderson. During World War I, he served as pathologist and roentgenologist in charge of the laboratory at Navy Base Hospital Number 1 at Brest, France, coming out of the Army in 1919 as Captain. After the war he returned to Henderson, where he headed his own hospital for many years. Dr. Marshall joined the medical staff of the Veterans Administration in Little Rock, Arkansas in 1930, and was at various times stationed in San Diego, California; Tucson, Arizona; Los Angeles, California; and from 1940 to 1948 in Wadsworth, Kansas. He became a specialist in psychiatry certified by the American Board of Psychiatry and Neurology and, beginning in 1948, was connected with the Veterans Administration Hospital in Murfreesboro, Tennessee, where he died of uremia on August 28, 1957.

After leaving the University of Michigan, Dr. Marshall centered his natural history interests in the collection of beetles and built himself a general collection in that order which came to number about 100 insect boxes and one or two dozen glass-topped drawers. His hobby was, of course, greatly aided by his residence in various states, and his daughter writes that "every summer we went to different parts of the country on collecting trips".

Beginning with the middle 1930's Dr. Marshall specialized with increasing concentration on the Malachiidae, on which he published between 1937 and 1955 ten papers totaling 195 pages. These included keys to the genera of North America north of Mexico, and of the world, keys to the North American (north of Mexico) species of Tanops, Anthocomus, and Attalus and the Mexican species of Collops, and many new species and critical notes. He limited his personal collection of Malachiidae to about ten specimens of a species. He was a conscientious correspondent, and identified specimens for collectors and museums throughout the country.

I recall Dr. Marshall in terms of a visit Mrs. Hatch and I paid Dr. and Mrs. Marshall at their home in Murfreesboro, Tennessee the evening of April 19, 1955.

I called on Dr. Marshall in connection with the Malachiid portion of my "Beetles of the Pacific Northwest", and I remember a delightful evening talking beetles with him in his second floor study, where he had his collection and Coleoptera library.

Dr. Marshall was a kindly, dignified man—a fine gentleman. Outside of entomology, his hobbies were golf—he had two cups in his room—and his small greenhouse and garden, and he knew his plants by their scientific names.

His beetle collection of about 35,000 specimens, has been given to the University of Michigan Museum where, by direction of his will, the types have been sorted out and sent to the United States National Museum in Washington, D. C.

I am indebted to the Alumni Catalog Office of the University of Michigan and to Dr. Marshall's daughter, Mrs. Lelia Stone of Nashville, Tennessee for help in writing this memorial. Dr. Marshall is likewise survived by a son, Malcolmn Yeaman Marshall, Jr., a lawyer in Louisville, Kentucky.—Melville H. Hatch

Bibliography of Coleopterological Writings of Dr. M. Y. Marshall

A new Melyrid of the genus Tanaops (Coleoptera). Bull. S. Cal. Acad. Sci. 35, 1936, pp. 164-165.

A new Tanaops from New Mexico, with some notes on the genus (Coleoptera, Melyridae). Can. Ent. 76, 1944, pp. 164-166.

Note on *Hyperaspidius flavocephalus* Blatchley, with description of the female (Coleoptera, Coccinellidae), Can. Ent. 77, 1945, pp. 177-178.

Studies in the Malachiidae. Can. Ent. 78, 1946, pp. 183-195.

Studies in the Malachiidae II. Ent. Amer. 28, 1949, pp. 113-144.

Studies in the Malachiidae III. Proc. Cal. Acad. Sci. (4) 27, 1951, pp. 77-132.

The Malachiidae of North Central Mexico (Coleoptera). Amer. Mus. Nov. 1584, 1952, pp. 1-20

Studies in the Malachiidae IV. Amer. Midl. Nat. 49, 1953, pp. 825-831.

A key to the world genera of Malachiidae. Col. Bull. 8, 1954, pp. 69-82.

Studies in the Malachiidae V. Bull. Brook. Ent. Soc. 49, 1954, pp. 66-80.

Studies in the Malachiidae VI. Col. Bull. 9, 1955, pp. 35-48.

DISTRIBUTION RECORDS OF TWO AMERICAN SPECIES OF *CISSITES* (Coleoptera-Meloidae)

By Wilbur R. Enns[1]

Van Emden (1943) and MacSwain (1956) among others consider the Meloid genera *Horia* Fab. and *Cissites* Latr. to constitute a distinct subfamily, the Horiinae, based on the morphology of the larvae. Various other systematists have regarded this group as a remarkably distinct section of the Nemognathinae (= Zonitinae auctt.). Be that as it may, the biologies of these genera are very incompletely known and the desirability of more knowledge of distribution seems evident as a necessary prerequisite for further study and clarification of the phylogeny.

The genus *Horia* apparently does not occur in America. Of the genus *Cissites* only two species seem to occur in the more tropical parts of America, although some authors (as is the European custom) have given names to certain color variants of one of the species. The two species are *C. maculata* (Swederus) and *C. auriculata* (Champion). Individuals of both species, although variable, are relatively large meloids (length 10-30 mm.) living in the larval stages at the expense of xylocopid bees. Adults of these two species may be distinguished by the following key:

Anterior angles of pronotum rounded, sloping downward; head wider than front of pronotum .... **auriculata**
Anterior angles of pronotum produced and curved upward; pronotum as wide or wider than head .... **maculata**

In addition the males are easily separated by the length of the antennae. In *maculata* they extend only to the anterior angles of the pronotum while in *auriculata* they extend well beyond the posterior margin of the pronotum.

In *maculata* the more typical color form has broad black basal and apical elytral spots as well as two additional rows of transverse spots (coalesced in some specimens) approximately equally dividing the elytra into three yellow areas. A fairly common color variant, often taken together with the typical form, has only the basal and apical black spots. This form is known as *apicalis* Perty but, in my opinion, does not merit a name. The other variant is colored like the preceding but has, in addition, feeble vestiges of the intermediate rows of spots. Betrem (1932) has named this "*varietas intermedia.*" It too does not merit a name in my opinion and occurs along with the other two forms. According to

[1]Department of Entomology, University of Missouri, Columbia. Contribution from Missouri Agricultural Experiment Station, Project No. 36, Entomology Museum, Journal Series No. 1929.

Champion (1892, p. 371) a form with totally black elytra occurs in Colombia, South America.

The adults are usually found on wood near the nests of the host bees and the larvae presumably are to be found in the galleries of the bees or on the bodies of the bees, attached to the hairs of the host much as in the manner in which nemognathine larvae attach to a host bee.

Through the courtesy and cooperation of the major entomological museums in the United States as well as numerous individual collectors, many specimens of nemognathines have been made available to me for study (*vide* Enns, 1956). Among these have been several specimens of *Cissites* which contribute to our knowledge of distribution but which, so far as I can discover, have not been published. It is the purpose of this paper to summarize these records. Acknowledgment is hereby gratefully extended to the following (abbreviations used are in parentheses after each): Los Angeles County Museum (L.A.); Snow Entomological Museum, University of Kansas (K.U.); California Academy of Sciences (Cal. Acad.); Carnegie Museum (C.M.); American Museum of Natural History (A.M.N.H.); Chicago Natural History Museum (C.N.H.M.); Entomology Museum, University of Missouri (M.U.); and Dr. Floyd G. Werner, University of Arizona (F.G.W.). Specimens in the writer's collection are initialed (W.R.E.).

The following synonymies are only partially complete but include the more critical ones.

Cissites auriculata (Champion)

Horia auriculata Champion 1892, Biol. Centr.-Amer., 4(2):372; 1896, Trans. Ent. Soc. London, pt. 1, March, p. 52.

Cissites auriculata, Gahan, 1908, Ann. Mag. Nat. Hist., s. 8, v. 2, 201-203; Betrem, 1932, Treubia, XIV(1):85-102; MacSwain, 1956, Univ. Calif. Publ. Entom. 12:106-108.

Distribution records:

Mexico—*Guerrero:* Acapulco, one male, 16 July 1930, L. J. Lipovsky (K.U.); one female, 7 March 1932, M. Willows, Jr., Templeton-Crocker Exped. 1932 (Cal. Acad.). —*Morelos:* Cuernavaca, one male, 22 July, E. G. Smyth (L.A.).

In addition, Betrem lists one female, Balzas, Guerrero; 2 females, Colima; 2 females, 2 males, Tehuacan, Puebla, *Mexico* and 8 males, one female, from *Guatemala.* Champion lists, in *Mexico,* Mazatlan, San Blas, Acapulco, Colima, Guadalajara, Almolonga, Tasco, and Oaxaca; in *Guatemala,* Cerro Zunil, San Isidro, San Geronimo, and also *Costa Rica* and Barbados, *Antilles.*

Cissites maculata (Swederus)

Cucujus maculatus Swederus, 1787, Vetensk. Ac. nya Handl., 199, t.8, f.8.

Horia maculata, Latreille, 1802, Hist. nat. gen. et part. des Crust. et des Insectes, vol. 3, p. 182; Champion, 1892, Biol. Centr.-Amer., 4(2):371; 1896, Trans. Ent. Soc. London, pt. 1, March, p. 52; LeConte and Horn, 1883, Classif. Coleop. N. Amer., ed. 2, 417.

Cissites maculata, Latreille, 1804, ibid., vol. 1, p. 154; Gahan, 1908, Ann. Mag. Nat. Hist., s. 8, v. 2, 201-203; Betrem, 1932, Treubia, XIV(1):85-102; Rau, 1933, Jungle Bees and Wasps of Barro Colorado Isl., p. 190.

Distribution records:

United States—Arizona: Yuma, 2 males, 1 female, May 21, H. Klages collection (C.M.).

Mexico—I have seen no specimens from Mexico but Champion (1892) records a specimen in the Sallé collection from Morelos, and Blackwelder (1945) includes "Mexico" in the distribution cited for this species.

Guatemala—Guatemala, 1 female, no data, H. Klages collection (C.M.); Mauricio, 1 female, 500 ft.. no other data (M.U.); Panzos, 1 female, no other data, (F.G.W.).

British Honduras—San Antonio, 1 female, May, 1931, K. L. Maehler collection (Cal. Acad.).

Costa Rica—"La Fuente," 1 male, 20 Sept. 1930, A. Alfaro, 1200 ft., F. Psota collection (C.N.H.M.).

Panama—Barro Colorado Island, 1 (?). Aug. 16-Sept. 28, 1928 at light, P. Rau (U.S.N.M.?).

Haiti—Port-au-Prince, 1 female, 21-29 March, 1922, about 300 ft. alt., F4651A (A.M.N.H.).

Galapagos Islands—Indefatigable Island, 1 male, 17 November 1935, W. von Hagen, Acc. 34358 (A.M.N.H.).

Argentina—Concordia Prov., Etre. Rios, 1 male, 1 female, M. A. Cazier colln., Acc. 38903 (A.M.N.H.).

Bolivia—Chapare, Tropica Region, 1 male, 22 Oct., 1949, R. Zischka, 400 m. (F.G.W.); ditto, 1 female, 20 August 1949 (F.G.W.); ditto, 1 male, 25 August 1949 (F.G.W.).

Brazil—Corupa (Hansa Humbolt), Sta. Catharina, 1 female, A. Maller, December, 1945 (A.M.N.H.); Itaitubo, Para, 1 female, August, 1939. A. Maller (A.M.-N.H.): Nova Teutonia, Sta. Catharina, 1 male, 17 November 1950, F. Plaumann (F.G.W.); Sud-Brazil, 1 female, no other data (F.G.W.); Minas, Passa Quatro, Faz. Dos Campos, 1 male, J. F. Zikan, F. Psota colln. (C.N.H.M.); Brazil, 1 male, F. Psota colln. (C.N.H.M.).

Colombia—Colombia, S. A., Felipe Ovalle, Q., 1 male, 1 female, Ac 33501 (A.M.N.H.); Hacienda Garcia, Cauca Valley, 1 male, 29 January 1935, Herbert F. Schwarz (A.M.N.H.); Rio Opon, La Lechera, 1 male, December, 1945, 500 m., at light in forest. L. Richter (A.M.N.H.).

Ecuador—Ecuador, 1 male, W. von Hagen, Acc. 33930, (A.M.N.H.); Santo Domingo, 2 females, 15 August 1936, W. von Hagen, Acc. 34758 (A.M.N.H.); Zatzayacu, Oriente, 1 male, 2 October 1934, W. Macintyre (W.R.E.); ditto, 1 female, 12 September 1934 (W.R.E.).

Peru—Iquitos, 1 male, 1 female, 16 April 1924, F6062, H. Bassler colln., Acc.

33591 (A.M.N.H.); ditto, 1 male, 6 June 1924 (A.M.N.H.); Peru-Brazil Frontier, 1 female, 30 January 1928, F6094, H. Bassler colln. (A.M.N.H.); Middle Rio Ucayali, 1 female, 6 December 1928 (A.M.N.H.); Chanchamayo, 1 female, F6032, Bassler collin. (A.M.N.H.); Iquitos, 1 male, 10 August 1928, Bassler colln. (A.M.-N.H.); ditto, 1 female, 1927 (A.M.N.H.); Rio Santiago, 1 female, 2 November 1924, H. Bassler (A.M.N.H.).

Venezuela—Caripito, 1 male, 19 July 1942 (F.G.W.); Caracas, D. F., 1 male, 1938, G. Vivas B. (C.N.H.M.); Venezuela, 1 female, 1939, G. Vivas B. (C.N.H.M.); Caracas Valley, 1 male, 15 May 1921, L. R. Reynolds, F. Psota colln. (C.N.H.M.).

Champion (1896) also lists St. Vincent and the islands of San Domingo. Grande-Terre, Guadeloupe, and Barbados.

Two discrepancies seem immediately apparent, first the Arizona record for *C. maculata* and, second, the statements of Champion which indicate both species as occurring on Barbados. In my opinion the specimens labeled Arizona are mislabeled and in the second instance Champion was probably in error in assuming that *C. auriculata* occurs in Barbados. It seems probable that he never saw the specimens in question and was commenting on records or descriptions in the literature.

At any rate, this very poorly known group appears to be widely distributed. It should not be difficult, within the range of distribution, to study the biology of the species. It is interesting to note the occurrence of one of these species on the Galapogos Islands (See also Hurd, 1958).

Selected Bibliography

Betrem, J. F. 1932. Beitrage zur Kenntnis des Tribus der Horiini der Familie der Meloidae (Col.). Treubia XIV(1):85-102, 1 pl., 7 figs.

Blackwelder, R. E. 1945. Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America. Pt. 3. United States Nat. Mus. Bull. 185, pp. 481-488, Meloidae.

Champion, G. C. 1892. Heteromera-Meloidae. Biologia Centrali-Americana, 4(2): 364-450, pls. 17-21.

————. 1896. On the Heteromerous Coleoptera of St. Vincent, Grenada, and the Grenadines. Trans. Ent. Soc. London, March, 1896, Pt. I, pp. 52-54.

Enns, W. R. 1956. A Revision of the Genera *Nemognatha, Zonitis,* and *Pseudozonitis* (Coleoptera, Meloidae) in America North of Mexico, with a Proposed New Genus. Univ. Kansas Sci. Bull. vol. 37, pt. 2, no. 17, pp. 685-909.

Gahan, C. J. 1908. Notes on the Colepterous Genera ***Horia*** Fab. and ***Cissites*** Latr., and a List of the Described Species. Annals and Mag. of Nat. Hist., series 8, no. 2, 199-204.

Hurd, P. D. 1958. The Carpenter Bees of the Eastern Pacific Oceanic Islands (Hymenoptera: Apoidea). Jour. Kansas Ent. Soc., 31(4):249-255.

MacSwain, J. W. 1956. A Classification of the First Instar Larvae of the Meloidae (Coleoptera). Univ. California, Publ. Entomol., vol. 12, pp. 1-182. pls. 1-30.

Rau, Phil. 1933. Jungle Bees and Wasps of Barro Colorado Island (Panama). Publ. by the author, Kirkwood, St. Louis County, Mo. pp. 1-324, figs. 1-100.

Van Emden, F. I. 1943. Larvae of British Beetles. IV. Various Small Families. Ent. Mo. Mag., 79:209-223.

A LIST OF BEETLE FAMILIES

By Ross H. Arnett, Jr.[1]

The new code of nomenclature proposes that supergeneric names be established on a priority basis. In a large group like the Coleoptera (one-quarter of the named animals) the task of establishing the correct family name based on priority will be very time consuming, and it will result in a period of hectic name changing. But it must be done.

For the past several years I have issued in mimeograph form lists of beetle families of the world compiled from the major literature sources with the Junk catalog forming the nucleus. These lists have meant to serve only as a means of showing a logical arrangement of the families for collections, catalogs, and general papers, and not necessarily to show the ascending development or phylogenetic relationship of the families. However, every attempt has been made to make these lists as natural as is possible for any linear arrangement. The lists are undocumented, and reflect not only the recent classification of Crowson, but also unpublished ideas of the author, and therefore does not agree with any other published list. This list has been revised and is herein published.

In addition to the working list of family names, I have included an index to family names. This index includes only a small portion of the supergeneric names already in the author's catalog file (over 3,000 cards now available). This will give some idea of the task ahead in establishing priority of family names. In this index is included names which are synonyms of those in the main list. These names are not necessarily junior synonyms (more recent names for the same group), but they are names frequently appearing in the literature, at least since about 1880, which may not be familiar to the American Coleopterists. The names included in the main list also appear in the index, and each name is number keyed to the main list.

The major use of the following lists will be for the looking-up of a familiar family name when a less familiar name appears in a paper. For example, if the paper at hand deals with the family Serropalpidae, and the reader does not recognize this group by that name, he refers to the index list, notes that Serropalpidae is family 61. Reference to the taxonomic list then shows him that family 61 is the Melandryidae. If a name in the main list is not familiar, the process can be reversed by looking for the number in the index. For example, the family name Salpingidae

[1]Associate Professor of Biology, Catholic University of America, Washington 17, D. C.

may not be familiar. By looking for the number 57 in the index, the following names are located: Aegialitidae, Boridae, Cononotidae, Eurystethidae, Mycteridae, and Pythidae.

THE ORDER COLEOPTERA

(Families in parentheses are not North American)

Suborder **ARCHOSTEMATA**

1. Cupesidae
2. Micromalthidae

Suborder **ADEPHAGA**

3. Rhysodidae
4. Cicindelidae
5. Carabidae
6. Omophronidae
7. (Paussidae)
8. Amphizoidae
9. Haliplidae
10. (Hygrobiidae)
11. Dytiscidae
12. Gyrinidae

Suborder **HAPLOGASTRA**

Superfamily ***Hydrophiloidea***

13. Hydrophilidae
14. Limnebiidae

Superfamily ***Staphylinoidea***

15. Staphylinidae
16. Pselaphidae
17. Silphidae
18. Leptodiridae
19. Leptinidae
20. Platypsyllidae
21. Clambidae
22. Leiodidae
23. Sphaeriidae
24. (Phaenocephalidae)
25. Ptiliidae
26. Limulodidae
27. Scymaenidae
28. Scaphidiidae
29. (Catapochrotidae)
30. Brathinidae

Superfamily ***Histeroidea***

31. Histeridae
32. (Synteliidae)
33. Sphaeritidae

Superfamily ***Scarabaeoidea***

34. Lucanidae
35. Passalidae
36. Scarabaeidae

Suborder **POLYPHAGA**

Superfamily ***Lymexylonoidea***

37. Lymexylonidae
38. Telegeusidae

Superfamily ***Lampyroidea***

39. (Karumiidae)
40. Brachypsectridae
41. (Drilidae)
42. Phenogodidae
43. Cantharidae
44. Lycidae
45. Lampyridae

Superfamily ***Meloidea***

46. Meloidae
47. Mordellidae
48. Rhipiphoridae
49. Stylopidae

Superfamily ***Tenebrionoidea***

50. (Pterogeniidae)
51. (Nilionidae)
52. Tenebrionidae
53. Lagriidae
54. Alleculidae
55. Monommidae
56. Othniidae
57. Salpingidae
58. (Tretothoracidae)
59. Pyrochroidae
60. (Trictenotomidae)
61. Melandryidae
62. Cephaloidae
63. Oedemeridae
64. Pedilidae
65. Anthicidae
66. Euglenidae
67. (Petridae)
68. (Cossyphodidae)

Superfamily ***Cucujoidea***

69. Nitidulidae
70. Rhizophagidae
71. (Protocucujidae)
72. Sphinidae

73. HYPOCOPRIDAE
74. CUCUJIDAE
75. (HELOTIDAE)
76. (PHYCOSECIDAE)
77. (PROPALTICIDAE)
78. CRYPTOPHAGIDAE
79. BIPHYLLIDAE
80. BYTURIDAE
81. LANGURIIDAE
82. PHALACRIDAE
83. CISIDAE
84. ORTHOPERIDAE
85. (DISCOLOMIDAE)
86. LATHRIDIIDAE
87. COLYDIIDAE
88. MYCETOPHAGIDAE
89. (JACOBSONIIDAE)

Superfamily ***Dascilloidea***

90. DASCILLIDAE
91. HELODIDAE
92. EUCINETIDAE

Superfamily ***Byrrhoidea***

93. BYRRHIDAE

Superfamily ***Dryopoidea***

94. PSEPHENIDAE
95. PTILODACTYLIDAE
96. CHELONARIIDAE
97. HETEROCERIDAE
98. LIMNICHIDAE
99. DRYOPIDAE
100. ELMIDAE
101. GEORYSSIDAE
102. (CYATHOCERIDAE)

Superfamily ***Elateroidea***

103. RHIPICERIDAE
104. CEBRIONIDAE
105. ELATERIDAE
106. THROSCIDAE
107. CEROPHYTIDAE
108. PEROTHOPIDAE
109. EUCNEMIDAE

Superfamily ***Buprestoidea***

110. BUPRESTIDAE

Superfamily ***Cleroidea***

111. OSTOMIDAE
112. CLERIDAE
113. MELYRIDAE

Superfamily ***Dermestoidea***

114. DERODONTIDAE
115. NOSODENDRIDAE
116. DERMESTIDAE
117. THORICTIDAE

Superfamily ***Bostrichoidea***

118. ANOBIIDAE
119. PTINIDAE
120. BOSTRICHIDAE
121. LYCTIDAE

Superfamily ***Coccinelloidea***

122. ENDOMYCHIDAE
123. MYCETAEIDAE
124. COCCINELLIDAE
125. EROTYLIDAE

Superfamily ***Curculionoidea***

126. CERAMBYCIDAE
127. CHRYSOMELIDAE
128. MYLABRIDAE
129. ANTHRIBIDAE
130. BRENTIDAE
131. CURCULIONIDAE
132. PLATYPODIDAE
133. SCOLYTIDAE

INDEX TO FAMILY NAMES

(Numbers refer to the family number in the preceding list)

Acanthoceridae 36
Acanthoscelidae 128
Aclopidae 36
Aculognathidae 86
Aderidae 66
Adimeridae 87
Aegialiidae 36
Aegialitidae 57
Agathidiidae 22
Agnathidiidae 22
Aglycyderidae 131
Agrypnidae 105
Agyrtidae 17
Alleculidae 54
Allocorhynidae 131
Allidiostomidae 36

Amphizoidae 8
Anaspidae 47
Anchomenidae 5
Anisosphaeridae 27
Anisotomidae 22
Anobiidae 118
Anoplognathidae 36
Anthicidae 65
Anthiidae 5
Anthribidae 129
Apalidae 120
Apatidae 120
Aphaenocephalidae 85
Aphodiidae 36
Apionidae 131
Apotomidae 5
Aspidiphoridae 72
Attelabidae 131

Belidae 131
Bembidiidae 5
Biphyllidae 79
Blapsidae 52
Boridae 57
Bostrichidae 120
Bostrychidae 120
Bothrideridae 87
Brachinidae 5
Brachyceridae 131
Brachyrhinidae 131
Brachypsectridae 40
Brathinidae 30
Brenthidae 130
Brentidae 130
Broscidae 5
Bruchelidae 131
Bruchidae 128
Buprestidae 110
Byrrhidae 93
Byrsopidae 131
Byturidae 80

Calendridae 131
Callipharixenidae 49
Callirhipidae 103
Camiaridae 18
Campylidae 105
Cantharidae 43
Carabidae 5
Cassididae 127
Catapochrotidae 29
Cateretidae 69
Catopidae 18
Cavicoxidae 105
Cavicoxumidae 105
Cebrionidae 104
Cephaloidae 62
Carambycidae 126
Cerasommatidiidae 124
Cerocomatidae 46
Cerophytidae 107
Cetoniidae 36
Chaetosomatidae 112
Chapuisiidae 132
Chelonaridae 96
Chironidae 36
Chaeniidae 5
Cholevidae 18
Choragidae 129
Chrysomelidae 127
Cicindelidae 4
Ciidae 83
Cioidae 83
Cisidae 83
Cistelidae 54
Clambidae 21
Clavigeridae 16
Cleridae 112
Clytridae 127
Cnemacanthidae 5
Coccinellidae 124
Collyridae 4
Colonidae 18
Colydiidae 87
Cononotidae 57
Copridae 36
Corylophidae 84
Corynetidae 112
Cossyphodidae 68
Crioceridae 127
Cryptocephalidae 127
Cryptophagidae 78
Ctenostomidae 4
Cucujidae 74
Cupesidae 1
Cupedidae 1
Curculionidae 131
Cyathoceridae 102

Cybocephalidae 69
Cymbionotidae 5
Cyphonidae 91

Dacnidae 125
Dascillidae 90
Dasytidae 113
Dermestidae 116
Derodontidae 114
Diaperidae 52
Dicronychidae 105
Diphyllidae 79
Discolomidae 85
Donaciidae 127
Dorcatomidae 118
Drilidae 41
Dryopidae 99
Dryptidae 5
Dynastidae 36
Dytiscidae 11

Ectrephidae 119
Elacatidae 56
Elaphridae 5
Elateridae 105
Elenchidae 49
Elmidae 100
Endomychidae 124
Engidae 125
Engididae 125
Epilachnidae 124
Erotylidae 125
Eubriidae 90
Euchiridae 36
Eucinetidae 92
Eucnemidae 109
Eucnemididae 109
Euglenidae 66
Eumolpidae 127
Eurypogonidae 90
Eurystethidae 57

Feronidae 5

Galerucidae 127
Gehringiidae 5
Georyssidae 101
Geotrupidae 36
Glaphyridae 36
Glyptidae 5
Gnostidae 119
Gyrinidae 12

Halictophagidae 49
Haliplidae 9
Halticidae 127
Harpalidae 5
Helmidae 100
Helopidae 52
Helopheridae 13
Helodidae 91
Helotidae 75
Hemipeplidae 74
Heteroceridae 97
Hiletidae 5
Hispidae 127
Histeridae 31
Homalisidae 44
Homalistidae 44
Horiinidae 46
Hybosoridae 36
Hydraenidae 14
Hydrochidae 13
Hydrophilidae 13
Hydroporidae 11
Hydroscaphidae 13
Hygrobiidae 10
Hylophilidae 66
Hyphydridae 11
Hypocephalidae 126
Hypocopridae 73

Idiostomidae 36
Inopeplidae 74
Ipidae 133

Jacobsoniidae 89

Karumiidae 39
Korynetidae 112

Lagriidae 53
Lamiidae 126
Lampyridae 45
Languriidae 81
Laricobiidae 114

Lariidae 128
Lathridiidae 86
Lebiidae 5
Leiodidae 22
Lepiceridae 133
Leptinidae 19
Leptodiridae 18
Lepturidae 126
Licinidae 5
Limnebiidae 14
Limnichidae 98
Limniidae 100
Limulodidae 26
Liodesidae 22
Liodidae 22
Loroceridae 5
Lucanidae 34
Ludiidae 105
Lycidae 44
Lyctidae 121
Lymexylidae 37
Lymexylonidae 37
Lyttidae 46

Malachiidae 113
Malacodermidae 45
Malalopidae 127
Manticoridae 4
Masoreidae 5
Megacephalidae 4
Megalopidae 129
Megascelidae 127
Megatomidae 116
Melandryidae 61
Melanodidae 5
Melasidae 109
Meloidae 46
Melolonthidae 36
Melyridae 113
Mengeidae 49
Merophysiidae 86
Metriidae 5
Micromalthidae 2
Micropeplidae 15
Microsporidae 23
Migadopidae 5
Monocrepidiidae 105
Monoedidae 87
Monommatidae 55
Monomidae 55
Monotomidae 70
Mordellidae 47
Murmidiidae 87
Mycetaeidae 125
Mycetophagidae 88
Mycteridae 57
Mylabridae 128
Myrmecolacidae 49

Nebriidae 5
Necrophoridae 17
Nemenychidae 131
Nemosomidae 111
Nilionidae 51
Niponiidae 31
Nitidulidae 69
Nosodendridae 115
Noteridae 11
Notiophygidae 85
Notoxidae 65

Ochodaeidae 36
Odacanthidae 5
Oedemeridae 63
Omalidae 15
Ommatidae 1
Omophronidae 6
Orphinidae 36
Orsodacnidae 127
Orthoceridae 87
Orthogonidae 4
Orthoperidae 84
Ostomatidae 111
Ostomidae 111
Othniidae 56
Otiorhynchidae 131
Oxytelidae 15
Ozaenidae 5

Panagaeidae 5
Parnidae 99
Passalidae 35
Passandridae 74
Patrobidae 5
Paussidae 7
Pedilidae 64
Peleciidae 5
Pelobiidae 10

Peltidae 111
Peltasticidae 114
Perigonidae 5
Perimylopidae 52
Perothopidae 108
Petriidae 67
Phaenocephalidae 24
Phalacridae 82
Phengodidae 42
Phloeophilidae 113
Physosecidae 76
Phylloceridae 109
Pimeliidae 52
Plastoceridae 105
Platypidae 132
Platypodidae 132
Platypsyllidae 20
Platyrrhinidae 129
Platystomidae 129
Pleocomidae 36
Prionidae 126
Prionoceridae 113
Propalticidae 77
Prostomidae 131
Proterhinidae 131
Proterrhinidae 131
Protocucujidae 71
Protorhinidae 131
Psallidiidae 131
Pselaphidae 16
Psephenidae 94
Pseudocorylophidae 85
Pseudomorphidae 5
Psoidae 120
Psyridae 5
Pterocalidae 131
Pterogenidae 50
Pterostichidae 5
Ptiliidae 25
Ptilodactylidae 95
Ptinidae 119
Pyrochroidae 59
Pyrophoridae 105
Pythidae 57

Rhadalidae 113
Rhagophthalmidae 41
Rhinomaceridae 131
Rhipiceridae 103
Rhipidoceridae 103
Rhipiphoridae 48
Rhizophagidae 70
Rhyncophoridae 131
Rhysodidae 3
Rhyssodidae 3
Rhysopaussidae 52
Rutelidae 36

Sagridae 127
Salpingidae 57
Sandalidae 103
Scalidiidae 74
Scaphidiidae 28
Scarabaeidae 36
Scaritidae 5
Scolytidae 133
Scraptiidae 61
Scydmaenidae 27
Serropalpidae 61
Siagonidae 5
Silphidae 17
Silvanidae 74
Sinodendronidae 34
Smicripidae 69
Spercheidae 13
Spermophagidae 128
Sphaeridiidae 13
Sphaeriidae 23
Sphaeritidae 33
Sphinididae 72
Spondylidae 126
Staphylinidae 15
Stenidae 15
Stylopidae 49
Sticholrematidae 49
Synchroidae 61
Synteliidae 32

Tachyporidae 15
Taurocerastidae 36
Telegeusidae 38
Telmatophilidae 78
Telephoridae 45
Temnochilidae 111
Tenebrionidae 52
Tetraonycidae 46

Tetratomidae 61
Tetropiidae 126
Thorictidae 117
Throscidae 106
Tillidae 96
Trachypachyidae 5
Trechidae 5
Tretothoracidae 58
Trichopterygidae 25
Trictenotomidae 60
Tritomidae 125
Trixagidae 106
Trogidae 36
Trigositidae 111

Xenidae 49
Xyletinidae 118
Xylophilidae 66

Zarudniolidae 39
Zopheridae 52
Zuphiidae 5

LIST OF NEW TAXA DESCRIBED IN VOLUME 12

Acridocephala bifasciati Dillon and Dillon, new species (Cerambycidae) 54
Acridocephala pulchra Dillon and Dillon, new species (Cerambycidae) 52
Acridocephalidi Dillon and Dillon, new subtribe (Cerambycidae) 49
Epicauta bipunctata Werner, new species (Meloidae) 7
Epicauta nigritibialis Werner, new species (Meloidae) 5
Epicauta selanderorum Werner, new species (Meloidae) 16
Epicauta tenuemarginata Werner, new species (Meloidae) 13
Epicauta triquetra Werner, new species (Meloidae) 15
Ernoporus splendidus (Philippi), new combination (Chrysomelidae) 31
Neochlamysini Monrós, new genus (Chrysomelidae) 33
Lucidota bicellonycha McDermott, new species (Lampyridae) 26
Neochlamysini Monrós, new tribe (Chrysomelidae) 29
Oomorphus (*Histerogaster*) *alvarengai* Monrós, new species (Chrysomelidae) 32
Oomorphus (*Histerogaster*) *amazonicus* Monrós, new species (Chrysomelidae) 32
Oomorphus (*Histerogaster*) *caledonicus* Monrós, new species (Chrysomelidae) 32
Oomorhpus (*Histerogaster*) *goiasensis* Monrós, new species (Chrysomelidae) 33
Oomorphus (*isterogaster*) *microbius* Monrós, new species (Chrysomelidae) 32
Photinus bidenticauda McDermott, new species (Lampyridae) 25
Phaenolis mexicana McDermott, new species (Lampyridae) 21
Photinus sanctae-luciae McDermott, new species (Lampyridae) 23
Xenoomorphus cavifrons Monrós, new species (Chrysomelidae) 30
Xenoomorphus draconianus Monrós, new species (Chrysomelidae) 29
Xenoomorphus gingindhlovuanus Monrós, new species (Chrysomelidae) 31
Xenoomorphus innominatus Monrós, new species (Chrysomelidae) 31

TABLE OF CONTENTS

(Continued from front cover)

MALKIN, BORYS, On some water beetles from Oregon hot springs. 34

MALKIN, BORYS, Protective coloration in Thinopinus pictus. 20

MCDERMOTT, FRANK A., Four new lampyrid fireflies 21

MONRÓS, F., Notes on Lamprosomatinae (Chrysomelidae) 29

VAURIE, PATRICIA, New Distribution records of North American *Trox* (Scarabaeidae) 43

WERNER, FLOYD G., Studies in the genus *Epicauta* of the North American continent (Meloidae). II. The Uniforma-Group. 1

DATE OF PUBLICATION
Volume 12, 1958

Issued: Jan. 27, 1959

The Coleopterists' Bulletin

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

VOLUME 13, 1959

Published by

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: 3 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid. **Missing numbers:** Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten on 8½ x 11 sheets with at least 1 inch margins, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance after review by the Editorial Board. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five tear sheets of notes will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and *in all cases, descriptions of new species must be illustrated.* Descriptions of new species or genera MUST contain keys or be correlated with existing keys.

TABLE OF CONTENTS

Volume 13, 1959

ANDERSON, W. H., Review: Hispine beetles from the South Pacific (Coleoptera: Chrysomelidae) ... 101

ARNETT, R. H., JR., Under new management ... 6

BEAL, R. S., JR., A key to the Nearctic genera of Dermestidae ... 99

BURKE, H. R., Notes on some Texas Curculionidae with a description of a new species ... 36

DILLON, E. S. and L. S. DILLON, The Monochamini (Cerambycidae) of the Ethopian faunistic region. VI. The subtribe Docohammidi ... 7

DREISBACH, R. R. *et al.*, Michigan State list in preparation ... 46

EL-MOURSY, A. A. and G. E. BALL, A study of the diagnostic characters of two North American species of the genus *Diplocheila* Brulle, with notes on their ecology (Carabidae, Licinini) ... 47

ENNS, W. R., Two new species of blister beetles with an additional new designation (Meloidae) ... 13

GREEN, J. W., Revision of the Species of *Microphotus*, with an emendation of the Lampyrini (Lampyridae) ... 80

JOHNSTON, D. E., On the status of Casey's species of *Proculus* (Passalidae) ... 124

KISSINGER, D. G., The species groups of *Apion* occurring in North and Central America (Curculionidae) ... 21

KNUDSEN, J. W., *Necrodes surinamensis* (Silphidae) in Western Washington ... 110

LEECH, H. B., Notes on a few species of Pacific Coast Cerambycidae ... 42

LEECH, H. B., Earliest record of *Carabus nemoralis* in San Francisco, California ... 98

LITERATURE NOTICES ... 123

MALKIN, B., Review: Coccinellidae of Poland ... 57

NEW PUBLICATIONS ... 96

POST, R. L., Determiners needed ... 106

RADFORD, K. W., A new locality record for *Lytta viridana* LeConte (Meloidae) ... 35

ROGERS, C., Occurrence of Ladybird beetles biting humans ... 102

SEEVERS, C. H., North American Staphylinidae associated with Army Ants ... 65

SELANDER, R. B., Additional remarks on wing structure in *Atratocerus* ... 1

SELANDER, R. B., Additional records of *Cissites* (Meloidae) ... 41

SLEEPER, E. L., On *Bufomicrus* Sharp (Curculionidae: Brachyderinae). 21. A contribution to the knowledge of the Curculionoidea ... 107

SOKOLOFF, A., The habitat-niche of American Nosodendridae ... 97

SPILMAN, T. J., Notes on *Edrotes, Leichenum, Palorus, Eupsophulus, Adelium,* and *Strongylium* (Tenebrionidae) ... 58

SPILMAN, T. J., A study of the Thaumastodinae, with one new genus and two new species (Limnichidae) ... 111

WARNER, R. E., Three Neotropical species of *Pandeleteius* on Avocado (Curculionidae, Tanymecini) ... 33

YOUNG, F. N., Fossil beetles from the Vero Pleistocene ... 103

ZIMMERMAN, J. R., Habitat segregation as a factor in reducing interspecific competition among species of *Laccophilus* (Dytiscidae) ... 18

ZIMMERMAN, J. R., A note on flight emigrations of water beetles from a temporary pond ... 102

LIST OF NEW TAXA DESCRIBED IN VOLUME 13

Acontosceles tagalog Spilman, new species (Limnichidae) 116
Bufomicrus marshalli Sleeper, new species (Curculionidae) 108
CRATOMORPHINI Green, raised to tribe (Lampyridae) 93
Dinocoryna arizonensis Seevers, new species (Staphylinidae) 73
Dinocoryna carolinensis Seevers, new species (Staphylinidae) 75
Dinocoryna tibialis Seevers, new species (Staphylinidae) 74
DOCOHAMMIDI Dillon and Dillon, new subtribe (Cerambycidae) 7
Docohammus franzae Dillon and Dillon, new species (Cerambycidae) 9
Ecitoxenidia alabamae Seevers, new species (Staphylinidae) 77
Ecitoxenidia brevicornis Seevers, new species (Staphylinidae) 79
LAMPROCERINI Green, raised to tribe (Lampyridae) 92
Martinius Spilman, new genus (Limnichidae) 118
Martinius tellipontis Spilman, new species (Limnichidae) 119
Microdonia kansana Seevers, new species (Staphylinidae) 69
Microphotus chiricahuae Green, new species (Lampyridae) 88
Onychylis texanus Burke, new species (Curculionidae) 36
Pandeleteius pelodus Warner, new species (Curculionidae) 33
PLEOTOMINI Green, raised to tribe (Lampyridae) 91
Zonitis nemognathoides Enns, new species (Meloidae) 15
Zonitis oaxacae Enns, new species (Meloidae) 13

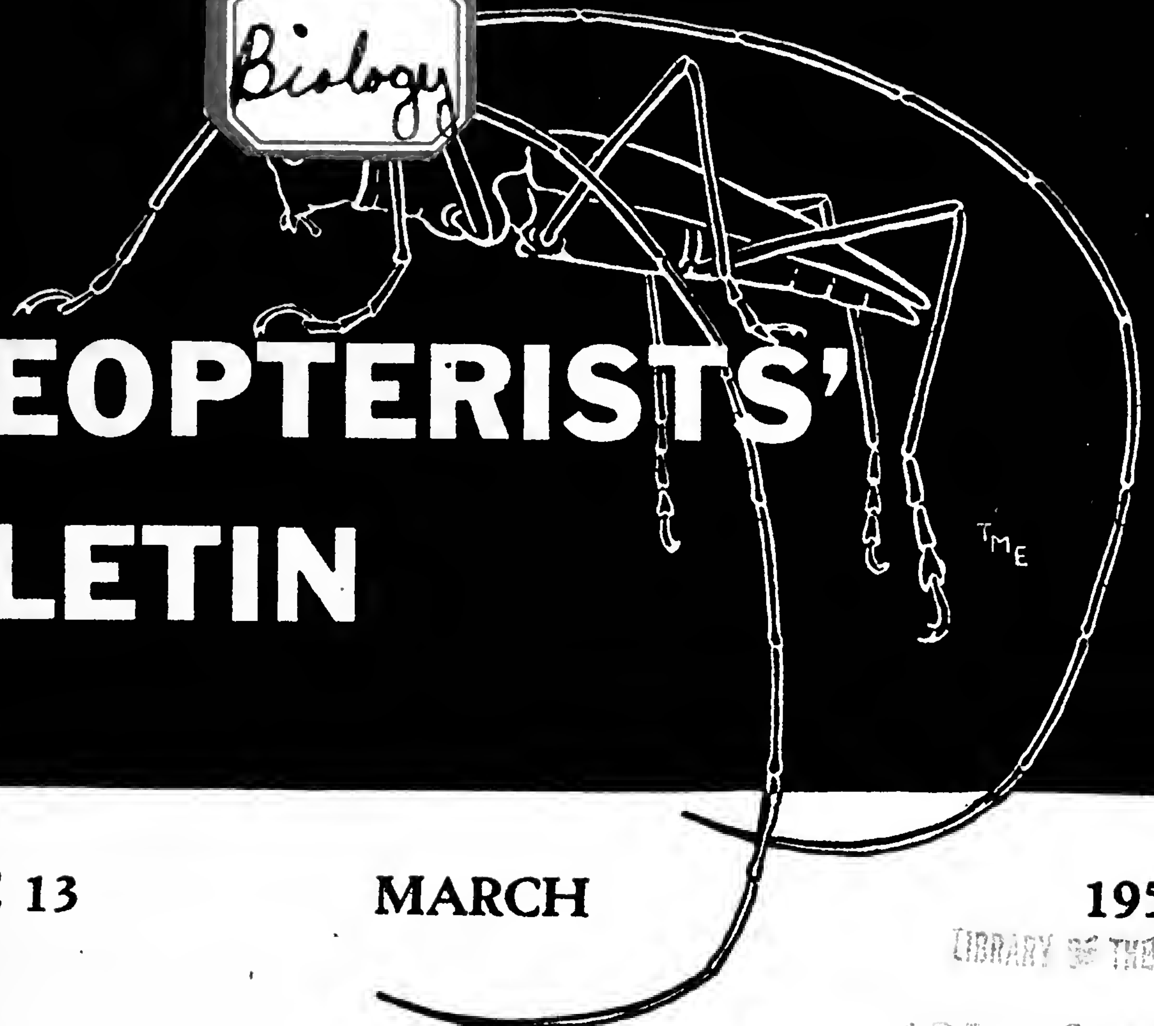
DATES OF PUBLICATION OF VOLUME 13 ,1959

March (No. 1), March 27, 1959
June (No. 2), June 27, 1959
September (No. 3), September 9, 1959
December (No. 4), December 30, 1959

THE MONUMENTAL PRINTING COMPANY

AN EDITORIAL

Beginning with volume 14, 1960, the BULLETIN will have a new and capable printer. However, as Editor of the BULLETIN, I cannot let pass unrecognized, the help and encouragement given to the BULLETIN by Mr. John Ferguson, III, President of The Monumental Printing Company of Baltimore, Md., the company that has printed the BULLETIN since 1948. Mr. Ferguson heads a very large company with many major magazines as clients. Yet in spite of the size of the account, large or small, he has always given to anyone as many hours of his time as needed. In this respect he has favored us many times. In addition, during our struggle to get the BULLETIN on a firm basis, bills have gone unpaid for months without a single "please" attached. He has offered us every economy known to printers, and on many occasions has produced for us difficult printing jobs with no additional charge, certainly at cost, and I suspect on occasions, even below cost. Nor can I forget to mention Mrs. Carll in the Washington office of the company. Her efficiency on the other end of my phone has saved me literally hundreds of hours over the years in the course of editing the BULLETIN. I feel that these two people have had an important and prominent part in the development of the BULLETIN. Therefore, on behalf of all of the subscribers, I hereby thank them publicly.—EDITOR



THE COLEOPTERISTS' BULLETIN

VOLUME 13 MARCH 1959

TABLE OF CONTENTS

ARNETT, ROSS H., JR., Under new management 6

DILLON, E. S. and DILLON, L. S., The Monochamini (Cerambycidae) of the Ethiopian faunistic region. VI. The subtribe Docohammidi 7

ENNS, WILBUR R., Two new species of blister beetles with an additional new designation (Meloidae) 13

KISSINGER, D. G., The species groups of *Apion* occurring in North and Central America (Curculionidae) 21

SELANDER, RICHARD B., Additional remarks on wing structure in *Atractocerus* 1

ZIMMERMAN, JAMES R., Habitat segregation as a factor in reducing interspecific competition among species of *Laccophilus* (Dytiscidae) 18

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: Vol. 4, $5.00; Vol. 5, $4.50; Vol. 6 (4 nos. only published), $2.50; Vols. 7 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid.

Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five copies of the issue containing the article will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and in all cases, descriptions of new species must be illustrated. Descriptions of new species or genera must contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XIII March (No. 1) 1959

ADDITIONAL REMARKS ON WING STRUCTURE IN ATRACTOCERUS

By RICHARD B. SELANDER[1]

In a recent article published in the BULLETIN, King (1955) advances the hypothesis that "the ancestor of the genus *Atractocerus* diverged from that of the remainder of the Coleoptera after the development of elytra and before the formation of the usually accepted suborders." Accordingly, he proposes to remove the genus from the Lymexylonidae and to place it in a separate suborder of Coleoptera, the Aplicalae.

King's hypothesis rests on two conclusions, neither of which seems justified to me. These are (1) that the wing of *Atractocerus* retains a vein (Cu_{1b}) not present in the wings of other Coleoptera and (2) that the absence of transverse folding in the wing of *Atractocerus* is a primitive feature retained from a common ancestor of the Megaloptera and Coleoptera. In a note published shortly after the appearance of King's article Forbes (1956) points out that the distribution of furrows at the base of the wing indicates that King's identification of Cu_{1b} in *Atractocerus* is erroneous. However, Forbes does not discuss the absence of folding or certain other venational peculiarities of the wing of the genus which have some bearing on the problem of determining venational homologies.

Rather than enter into a detailed discussion of King's argument myself, I propose to demonstrate that the wing of *Atractocerus,* with all its peculiar features, may be easily derived from that of a typical lymexylonid by means of a number of specialized steps most of which have been duplicated elsewhere in the Coleoptera, and particularly in the Rhipiphoridae.

The derivation suggested is shown in figures 1 to 7, beginning with the wing of a species of *Melittomma,* proceeding through several hypo-

[1]Department of Entomology, University of Illinois, Urbana.

thetical intermediate stages, and ending with the wing of *Atractocerus brasiliensis*. Needless to say, it is extremely unlikely that the steps postulated actually occurred in the order shown. Many of them are evident in the figures of the wings of representative genera of Rhipiphoridae given in my paper on *Nephirtes* (Selander, 1957). The venational nomenclature used for *Melittomma* follows that of King except that his $1A_1$ is labeled $1A_2$ in keeping with Forbes' (1922) interpretation that the first branch of this vein has been lost in the Lymexylonidae and a number of other Polyphaga. It should be noted that in both Forbes (1922) and my *Nephrites* paper the vein labeled Cu_2 in the present paper is called 1A, and the vein labeled 1A is called 2A, etc.

Step 1 (fig. 2). *The first radial crossvein (1r) is lost, and the remnant of the radial recurrent vein* ($2r+R_s$) *aligns with crossvein r-m.* This specialization has occurred several times in the evolution of the Polyphaga. For example, the radial cell is eliminated in some Pyrochroidae, Anthicidae, Rhipiphoridae, Tenebrionidae (Forbes, 1922, fig. 50), and Dryopidae (Forbes, 1922, fig. 41), and in all Meloidae. In most instances the radial recurrent vein retains its longitudinal position and projects as a free tip basad of crossvein *r-m*. This is not the case, however, in the species of *Melittomma* shown in figure 1. Various degrees of alignment of the radial recurrent vein and *r-m* are seen in the Meloidae. Nearly perfect alignment is attained in some species of this family and in the genera of Rhipidiinae in the Rhipiphoridae.

Step 2 (fig. 3). *The part of media (M) basad of its connection with crossvein r-m (i.e., the free part of the median recurrent vein) is lost.* In *Atractocerus,* then, the transverse vein interpreted by King as *r-m* is actually a serial vein formed by this crossvein and a short length each of R_s and media. A close approach to this condition is found in many Meloidae, and Forbes' (1922) illustrations show that the free tip of media is quite short in representatives of several other families of beetles.

Step 3 (fig. 4). *The basal connection of* Cu_2 *with* Cu_1 *is broken, and* Cu_2 *attaches to the base of 1A.* Under King's interpretation also the venational fork produced in step 3 is regarded as of secondary origin. The basal connection of Cu_1 and Cu_2 is weak in many beetles, including *Melittomma,* and is broken in some others (*e.g.,* several Rhipiphoridae).

Step 4 (fig. 5). *The base of* $1A_2$ *is lost.* Vein $1A_2$ now appears to arise as a branch of Cu_2, to which it is connected by crossvein *cu-a*. Again, this specialization is paralleled in some Meloidae (*Eletica*) and *Rhipiphoridae* (*Pelecotoma, Toposcopus*). An intermediate step, in which $1A_2$ is only narrowly broken from 1A, is seen in *Melittomma sericea* Harris as well as in some Melandryidae and Mycetophagidae (Forbes, 1922, figs. 45, 53) and a few Rhipiphoridae.

Step 5 (fig. 6). *Cell 1A is eliminated by complete fusion of vein $1A_3$ with $2A_1$.* This leaves a swelling at the middle of vein $1A_3+2A_1$. Essentially the same specialization has taken place within the family Rhipiphoridae and is the general rule in the Meloidae.

Steps 6 to 11 (fig. 7). *The costal vein is extended to the apex of the wing. Vein M_4+Cu_1 is straightened. The discal cell is narrowed. The shape of the wing is modified. The transverse vein and the fork $Cu_2—1A_2$ migrate basad. Strong convexity of venation is developed.* All but the last two steps are duplicated or closely paralleled in the wings of the rhipidiine Rhipiphoridae. All appear to be intimately related specializations, serving to increase the rigidity of the wing and to otherwise adapt it for powerful flight. The resulting wing, with its triangular form and fanlike arrangement of heavy, straight, well-spaced veins, is not much different basically from the wings of such rapid-flying insects as the Sphingidae, Aegeriidae, and in particular the aberrant mayfly *Lachlania* (fig. 8; see also Edmunds, 1951).

Barber (1952) describes *Atractocerus* as a rapid and powerful flyer and correctly interprets the signifigance of the modified venation and form of its wings. Barber also calls attention to the reduced, essentially rudimentary condition of the elytra in *Atractocerus,* an aspect of its morphology whose importance King overlooks. Brachelytry itself is not particularly unusual in Coleoptera, but it is a pertinent observation that specializations of wing venation, many of which parallel those in *Atractocerus,* are particularly common (although by no means universal) among beetles with shortened elytra, including members of the Cantharidae, Phengodidae, Teleguesidae, certain groups of Cerambycidae (*e.g.,* Necydalini) and Rhipiphoridae (Rhipiphorinae and Rhipidiinae), and the Stylopidae.

The explanation of this correlation seems evident enough. The more or less complex system of folds in the apical region of the hind wings of most beetles and the interrupted venational pattern which facilitates this folding are adaptations surely developed concomitantly with the evolutionary modification of the fore wings to form elytra. By protecting the hind wings and the dorsum of the abdomen the elytra evidently conferred a great advantage on the first beetles; indeed some authors would ascribe the phenomenal success of the order Coleoptera in large part to the possession of elytra. However, this advantage was gained at the expense of mobility. Thus not only have the fore wings lost much or all their value in flight, they probably are outright hindrances to rapid movement. Similarly, the hind wings in developing folding have become less efficient as organs of flight.

From this it follows that should a selective premium be placed on rapid, powerful flight (or on some other specialized flight ability), there would be strong selection for reduction or loss of the elytra. This seems to have been the case in *Atractocerus* and many other brachelytrous beetles showing deviation from the normal pattern of wing folding and interrupted venation. In others, such as the Cantharidae and Cerambycidae, whose wings retain the folding specializations intact or nearly so, this explanation is not satisfactory. Presumably in these cases reduction of the elytra serves mainly or entirely the purpose of exposing the membranous hind wings for mimetic effect.

Interestingly, in the Rhipiphoridae, Teleguesidae, Stylopidae, Phengodidae, and *Atractocerus* the surface area of either the antennae or the palpi has been greatly enlarged in the male, which presumably enhances the sensory function of these organs. In the Phengodidae, Stylopidae, and some Rhipiphoridae, and possibly in the Teleguesidae the female is wingless, and in these groups it would appear that the increased efficiency of sensory perception and flight of the males compensates for the general immobility and secretiveness of the females. This does not hold true for *Atractocerus*, however, where the females show the same specializations as the males in the characters under consideration. Perhaps in this genus low population density or some peculiority of dispersal or courtship has placed a premium on ability to orient on prospective mates and to fly with great rapidity. Other lymexylonids have the maxillary palpi as highly modified as in *Atractocerus*, but none has developed the specialized flight of the genus.

References Cited

Barber, H. S. 1952. Notes on Teleguesis and some relatives (Coleoptera, Lymexylidae). Pan-Pacific Ent., 28:163-170, illus.

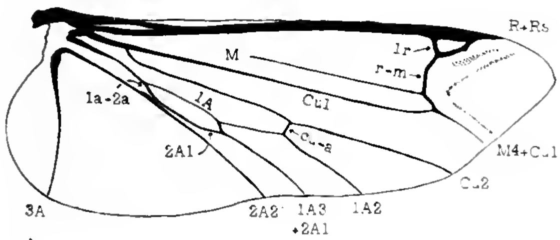
Edmunds, G. F., Jr. 1951. New species of Utah mayflies. I. Oligoneuriidae (Ephemeroptera). Proc. Ent. Soc. Washington, 53:327-331, illus.

Forbes, W. T. M. 1922. The wing-venation of the Coleoptera. Ann. Ent. Soc. America, 15:328-352, illus.

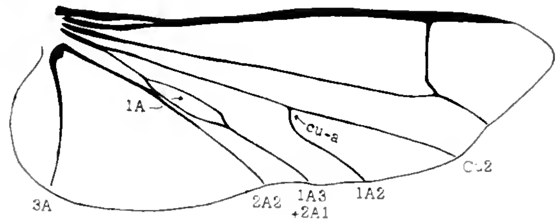
————————. 1956. Note on Atractocerus. Coleop. Bull., 10:10.

King, E. W. 1955. The phylogenetic position of *Atractocerus* Palis. Coleop. Bull., 9:65-74, illus.

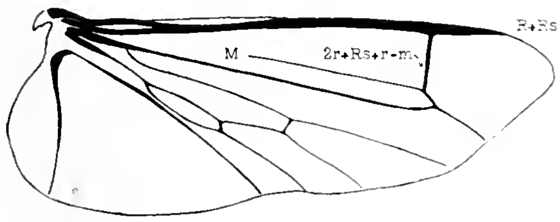
Selander, R. B. 1957. The systematic position of the genus Nephrites and the phylogenetic relationships of the higher groups of Rhipiphoridae (Coleoptera). Ann. Ent. Soc. America, 50:88-103, illus.



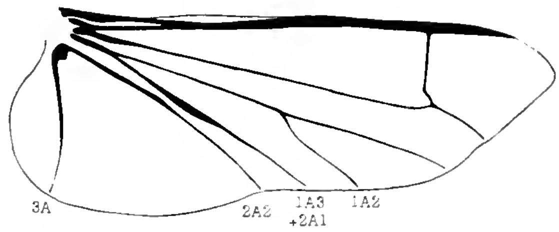
1



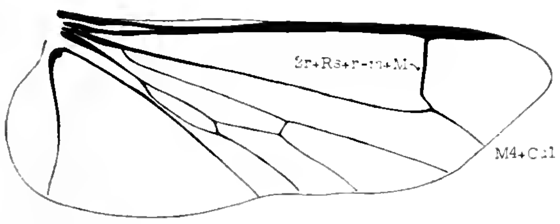
5



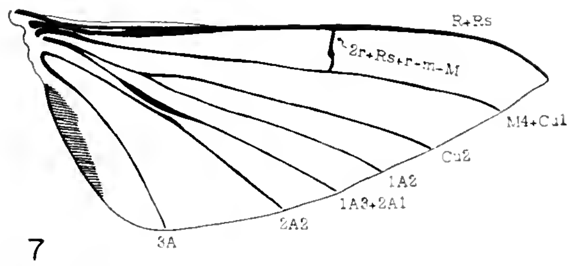
2



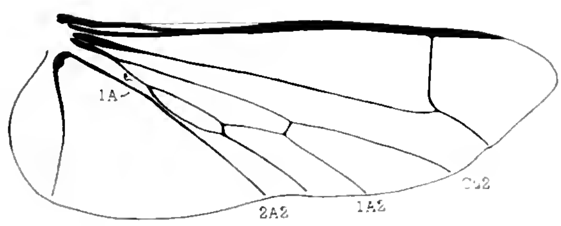
6



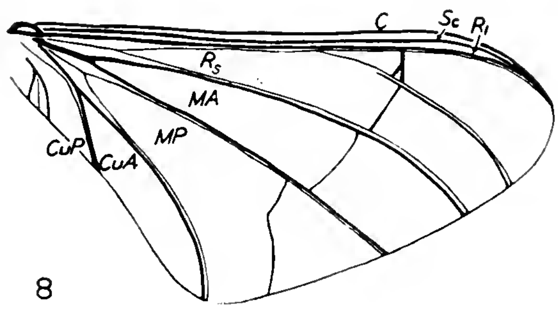
3



7



4



8

FIGURE 1. *Melittomma* sp. (Mexico), wing. FIGURES 2-6. Hypothetical stages in the evolution of the wing of *Atractocerus*. FIGURE 7. *Atractocerus brasiliensis* Lepeltier & Serville, wing. FIGURE 8. *Lachlania powelli* Edmunds (Ephemeroptera), fore wing (after Edmunds, 1951).

UNDER NEW MANAGEMENT

As announced to all subscribers in my letter last December, THE COLEOPTERISTS' BULLETIN is now published by The Catholic University of America Press, beginning with this issue. All business matters should be addressed to The Coleopterists' Bulletin, The Catholic University of America Press (see cover). All editorial matters should continue to be addressed to the editor at his new address (see cover).

This management of the Bulletin has greatly relieved the editor; and as a result, it is hoped that he can spend more time checking manuscripts and in general improving the Bulletin. There are no changes in policy and no changes in format planned at the present time, with the exception of the addition of the cover made possible by the advertisers.

May we call your attention to the new Board of Editors listed on the front inside cover. This board is made up entirely of local people who have an interest in the Bulletin. The Board elects the editor and elects new members to the Board. In this way we hope to insure the continuation of the Bulletin should be become impossible for the present editor to carry on the work. It is also the function of the Board to approve for publication papers submitted to the Bulletin. The Coleopterists on the Board review each paper before the meeting of the Board. This is a very important function and one which will be a very great help in improving the quality of this publication.

Volume 12, as most readers are aware, has been completed and mailed. Some subscribers have not received their copies, for the simple reason that they have not renewed their subscription. All subscriptions must be paid in advance.

Mr. T. J. Spilman of the United States National Museum has very kindly helped the editor to finish the business end of the Bulletin. The final printer's bill has been received. There is a shortage of several hundred dollars. In past years this has been made up by using the next year's funds to pay the printer for last year's issues, always with the hope that "this year" we will get back into a balanced budget, something which never happened. Frankly, this leaves the editor holding the "bag." He hopes very much to recover this money by selling volume 12 and perhaps by receiving a few donations from subscribers. Second bills have been sent out. We hope this brings results. The purchase of back volumes would also help. Your response will be greatly appreciated.

Finally, a word about a matter which some may think is "delicate." The Catholic University of America Press is a well established press affiliated with the Association of American University Presses. As a general press, it publishes works dealing with science, art, travel, literature, and, of course, religion. The publication of the Bulletin by this Press in no way reflects the religious beliefs of the contributors or the Board of Editors, and in no way reflects an endorsement of any religious belief. Both Catholics and non-Catholics in equal numbers serve on the Board, and we are sure that the contributors represent many faiths. Therefore, there appears to be no need to add any statement regarding non-endorsement to the masthead of the Bulletin.

R. H. ARNETT, *Editor*

THE MONOCHAMINI (Cerambycidae) OF THE ETHIOPIAN FAUNISTIC REGION. VI. THE SUBTRIBE DOCOHAMMIDI

By ELIZABETH S. DILLON *and* LAWRENCE S. DILLON[1, 2]

In addition to the Acridocephalids, another small group of Ethiopian monochamines, represented by two genera, proved to be discordant with the remaining members of the tribe. These two, *Docohammus* and *Docolamia,* agree in body form more closely with the typical representatives, having the elytral and pronotal dorsal surfaces on separate planes, but are quite diverse from these and the acridocephalids in the structure of the femora and tibiae as well as in the upper mouthparts.

Material for this final portion of this series of studies was received from the British Museum (Natural History) [BM]; the E. F. Gilmour collection [EFG]; and the Senckenberg Museum [SM]. The authors express their appreciation to Mr. J. Balfour-Browne, Mr. E. F. Gilmour, and Dr. Elli Franz for making their collections available to them.

Docohammidi Dillon and Dillon, new subtribe

Head relatively short; front meeting vertex at 90° angle or more; clypeo-frontal suture distinct, clypeus strongly produced over epistoma, concealing it, at apex bilobely emarginate. Pronotum and elytra not in the same plane. Legs short, successively longer posteriorly; femora constricted before apex, then reëxpanded; mesotibiae and metatibiae not sulcate nor notched; tarsal claws fixed, divaricate.

Key to genera

Mesosternum simple; pronotal disk with five tubercles .... **Docohammus**
Mesosternum with a distinct tubercle; pronotal disk with three tubercles .... **Docolamia**

---

[1]Department of Biology, Texas A. & M. College, College Station, Texas.

[2]The various parts that compose this series have been, or are being, published as follows:

Part I. Subtribe Monochamidi. *Pseudhammus* and Allies. Reading Public Museum and Art Gallery, Scientific Publication No. 9, 1959.

Part II. Subtribe Monochamidi. Genera Related to *Monochamus*. British Museum (Natural History), Bulletin. Entomology, Vol. 8. 1959.

Part III. Subtribe Monochamidi. *Oxylamia* and Related Genera. Entomologische Arbeiten (Munich). Vol. 10, Part 3. 1959.

Part IV. Subtribe Monochamidi. *Melanopolia* and Allies. Annals of the Entomological Society of America, Vol. 52. 1959.

Part V. Subtribe Acridocephalidi. Coleopterists' Bulletin, Vol. XII. 1958.

Part VI. Subtribe Docohammidi. Coleopterists' Bulletin, Vol. XIII. 1959.

Docohammus Aurivillius

Docohammus Aurivillius, Deutsche Ent. Zeit. 1908, p. 217. Breuning, Nov. Ent. suppl. III (2) 1944, p. 389.

(Female). Moderate in size, elongate-oblong, subcylindrical. Head slightly shortened, vertex feebly declivous, deeply impressed between antennal tubercles; front distinctly taller than wide, sides subparallel, slightly constricted below eyes, lateral margins each with two setigerous punctures near eye; clypeus distinct, produced over epistoma entirely concealing it, bilobedly emarginate. transversely sulcate above process so as to be entirely distinct from front; eye with lower lobe broadly oblong, erect, at least two-thirds again as tall as gena, isthmus broad, slightly narrower than upper lobe, which is three-fifths as wide as interocular space; antennal tubercles very prominent, subapproximate basally, moderately divergent apically. Pronotum one-third again as broad across base as long, sides nearly parallel; lateral tubercles prominent, placed slightly before middle, armed with a robust spine; disk with five prominent tubercles, impunctate; apical and basal transverse sulci very distinct, the former narrowly recurved at middle. Elytra with basal gibbosities broad, not prominent; disk entirely foveately punctate, punctures at extreme base bearing granules, those on apical half finer; apices narrowly, submarginately truncate, angles unarmed; humeri simple. Prosternum simple, narrow between procoxae; mesosternal process rather broad, apex slightly covered by a process of the metasternum, not tuberculate anteriorly. Legs rather short, hind ones longest; femora robust, gradually clavate from base, feebly constricted before apex; protibiae slightly shorter than femora; mesotibiae and metatibiae not sulcate. Antennae as long as body in female, longer in male, robust, depressed, feebly fimbriate beneath nearly to apex; scape robust, biflexuose, distinctly thickened to apex, where it is suddenly expanded, especially so laterally, nearly attaining middle of pronotum, cicatrix extending about one-third around apical margin, broad, subtriangular; third segment one-sixth shorter than first, apex slightly expanded; fourth subequal to third; rest. including eleventh, gradually decreasing in length.

Genotype: *Docohammus bennigseni* Aurivillius, by monotypy.

Remarks: The very broad, subtriangular cicatrix, the elongate, bilobed clypeus, concealing the epistoma, the metasternum partially covering apex of mesosternal process, the lack of any sulcus on mesotibiae, and the antennal formula will distinguish this genus from all others.

Key to species

1. Third antennal segment longer than fourth; body length 20 mm. or more 2
   Third antennal segment no longer than fourth; body length no more than 12 mm .... **flavescens**

2. Lower ocular lobe twice genal height; elytra strongly transversely rugose, especially on basal gibbosity; femora not fuscous annulate apically .... **franzae**
   Lower occular lobe two-thirds again as tall as gana; elytra at base foveately punctate; femora fuscous, annulate apically .... **bennigseni**

Docohammus bennigseni Aurivillius

Docohammus Bennigseni Aurivillius, Deutsch. Ent. Zeit. 1908, p. 217, pl. 3, fig. 3. Breuning, Nov. Ent. suppl. III, (2) 1944, p. 389.

Female. Black, densely covered with medium brown pubescence. Head above broadly tinged with fulvous; front and genae irregularly variegated with ashy, the former margined each side with fulvous. Pronotum irregularly variegated with ashy and fulvous; disk each side of middle with a broad poorly defined, fuscous vittae. Scutellum sparsely ashy pubescent at extreme base. The elytra irregularly variegated with fulvous and hoary pubescence, the latter more or less condensed at apical third into a poorly indicated fascia, and with a number of fuscous maculae, of which there are three larger ones, one towards sides behind basal third and two near middle placed in an oblique row. Body beneath medially ashy pubescent; the abdomen brownish pubescent with a row of ashy maculae on sides. Legs brownish pubescent; femora near apex and tibiae near base indistinctly fuscous annulate; tarsi entirely ashy pubescent. Antennae fuscous pubescent; scape at apex narrowly, remaining segments with basal halves, fulvous-ashy annulate, as well as also extreme tip of eleventh.

Head with a few fine punctures near eye, vertex deeply impressed between antennal tubercles; front distinctly taller than wide, sides subparallel, slightly constricted below eyes, near each eye with two large, setigerons punctures; eye with lower lobe broadly oblong, erect, two-thirds again as tall as gena. Pronotum one-third again as broad across base as long, sides parallel; lateral tubercles prominent, placed slightly before middle, armed with an obtuse, robust spine; disk with five small, but strongly elevated tubercles, the three basal ones more or less contiguous, impunctate; apical and basal transverse sulci deeply impressed, the apical one narrowly recurved at middle. Elytra with basal gibbosities broad but poorly elevated; disk on basal half foveately punctate, the punctures at extreme base bearing fine granules, behind middle coarsely punctate to apex; apices subemarginately truncate, the angles unarmed. Antennae about as long as body, robust, depressed, distinctly fimbriate beneath nearly to apex; scape robust, biflexuose, distinctly thickened to apex, where it is suddenly expanded, nearly attaining middle of pronotum; third segment one-sixth shorter than first; fourth subequal to third; rest gradually decreasing in length, including eleventh.

Length 21.5 mm.; width 7.0 mm.

Type locality: Mpuapua, German East Africa

Distribution: East Africa

Kenya: 1, Namanga River, Oct. 1950. (van Someren) [BM]

Docohammus franzae Dillon and Dillon, new species

Male. Head and pronotum piceous, elytra dark reddish brown, covered with fine brownish gray pubescence. Head above with large, vague, ashy areas above on sides, and laterally on front. Pronotum medially with a similar large, vague, ashy area. Elytra behind middle with a broad, indistinct ashy fascia, the anterior margin somewhat oblique and preceded by an irregular fuscous marking. Body beneath largely sparsely ashy pubescent; abdominal sternites each with a small, poorly defined ashy macula on sides. Legs reddish brown, sparsely ashy pubescent. Antennae reddish brown, scape piceous; sparsely covered with fine ashy pubescence, which is feebly denser on basal halves of segments.

Head minutely alutaceous; front one-third higher than wide, parallel-sided, very slightly narrowed below eyes, laterally with several coarse punctures; eyes with lower lobe broadly oblong, erect, twice as tall as gena. Pronotum one-fourth wider at base than long, sides subparallel; lateral tubercles prominent, placed near middle, armed with a robust spine; basal and apical sulci shallow but distinct, latter slightly recurved medially; disk with five tubercles, the median one broad, well-elevated, the anterior ones most prominent of all, but narrow, the lateral basal ones quite small. Elytra at extreme base with a number of coarse granulate-punctures, on basal gibbosities and behind humeri toward sides rugosely punctate, the rugosities on gibbosity much stronger, disk thence to middle coarsely foveately punctate, behind middle punctures somewhat finer; apices feebly obliquely subtruncate. Antennae nearly one-half again as long as body, robust, depressed, beneath very sparsely fimbriate on first four segments; scape robust, biflexuose, distinctly clavate to apex, where it is suddenly expanded, nearly attaining middle of pronotum; third segment straight, slightly thickened at apex, one-sixth longer than scape; fourth feebly shorter than third, rest gradually diminishing in length, except eleventh which is a little longer than tenth.

Length 21.5 mm; width 7 mm.

Holotype: Male; Windhoek-Swakopmund, May, 1912. (F. Schmidt) [SM].

Remarks: This species is somewhat similarly marked as *benningseni*, but here the pattern is much more indistinct, also the antennae are scarcely annulate and the elytra are strongly transversely rugose (or granulate), especially on basal gibbosity, and the femora are not fuscous annulate apically. Moreover, the lower lobe is somewhat longer, being twice as tall as the gena.

The authors take pleasure in naming this form for Dr. Elli Franz, who has made this species and other fine material of the Senckenberg Museum available for study.

Docohammus flavescens Breuning

Docohammus flavescens Breuning, Ann. Mus. Stor. Nat. Genoa, LVIII, 1938, p. 204; Nov. Ent. suppl. III (2) 1944, p. 389.

"Antennae as long as (♂) or distinctly shorter (♀) than body, the third segment as long as fourth, a little shorter than scape, eleventh segment tapering apically. Lower ocular lobes five times as long as gena. Front much higher than wide. Lateral spine of pronotum fine, acute; several fine punctures on sides of disk; scutellum quadrangular, rounded at apex. Elytra densely and finely punctate, finely granulate at base, the punctures very fine towards apex.

"Dark brown, covered with pale yellow pubescence. On elytra a vague gray transverse macula in common at the suture behind the scutellum and a similar slightly broader band a little before middle (usually indistinct). Tarsi and antennae covered with bright gray pubescence Length 10.5-11 mm; width: 3-3.5 mm. Abyssinia: Diré-Daoua in Museum of Genoa" (A translation of the original description).

Docolamia Breuning

Docolamia Breuning, Nov. Ent. suppl. III (2) 1944, p. 389.

Moderate sized, elongate-oblong, subcylindrical. Head somewhat shortened, vertex distinctly declivous, rather feebly impressed between antennal tubercles; front subquadrate, sides parallel, not constricted below eyes; clypeus produced over epistoma and entirely concealing it, bilobedly emarginate, transversely sulcate above so as to be distinct from front; eye with lower lobe broadly oblong, not quite half again as tall as gena, isthmus broad, slightly narrower than upper lobe, which is three-fifths as broad as upper interocular space; antennal tubercles only slightly prominent, subapproximate basally, strongly divergent apically. Pronotum one-fourth wider across base than long, sides irregular, subparallel; lateral tubercles prominent, placed at middle, at apex with a robust tooth; disk with three prominent, subequal tubercles, at base either side of middle with a few small granules; apical and basal transverse sulci distinct, the former recurved medially. Elytra with basal gibbosity rather feebly elevated; preceded at base by a small group of prominent granules; disk granulate-punctate on basal fourth, thence simply, subfoveately punctate, punctures becoming finer apically; apices broadly, separately rounded or obliquely subtruncate; humeri simple. Prosternal process simple, narrow, of nearly equal width except at extreme base where it suddenly expands; mesosternal process broad anteriorly, tapering behind, anteriorly with a large, rounded tubercle. Legs rather short, hind ones longest, front ones very short; femora robust, gradually clavate from base, feebly constricted before apex; meso and metatibiae without any trace of a sulcus, with a dense patch of pubescence on outer margin; protarsi in male feebly expanded, all tarsal segments short. Antennae about one-third again as long as body in male, in female as long as body, rather sparsely fimbriate beneath to apex, robust, subdepressed; scape sinuate, robust, gradually clavate to apex, where it is feebly expanded, attaining apical third of pronotum, cicatrix extending about one-third around apical margin, broad, subtriangular; third segment slightly shorter than first, distinctly expanded at apex; remaining segments, including eleventh, gradually shorter, eighth to eleventh distinctly incised at base on mesial-surface in male, scarcely perceptibly so in female.

Genotype: *Docohammus incisus* Aurivillius, by original designation.

Remarks: The mesosternal tubercle will at once distinguish this genus from *Docohammus.* Further distinctions are to be found in the presence of only three tubercles on the pronotal disk, and the much shorter antennae, the apical segments of which, in the male, are distinctly incised.

Docolamia incisa Aurivillius

Docohammus incisus Aurivillius, Tijd. Ent. LIX, 1916, p. 220, pl. 8, fig. 8.

Docolamia incisa Aurivillius. Breuning, Nov. Ent. suppl. III (2), 1944, p. 390.

Male. Dark reddish brown to fuscous, rather densely covered with fulvous pubescence. Head above each side of middle with an indistinct, subdenuded vitta. Pronotum often with brighter fulvous pubescence on discal tubercles. Elytra largely hoary pubescent, broadly, irregularly varied with fulvous, on side with a broad, triangular, fuscous plaga extending from humerus to slightly behind middle, its apex nearly attaining suture at the middle of the length; at apical fifth a short, broad, poorly defined, brownish plaga on sides. Body beneath and legs pale brownish fulvous pubescent, irregularly tinged with ashy; abdominal sternites broadly bright fulvous each side, with denser patches forming vague maculae. Antennae fulvous-ashy pubescent.

Head minutely alutaceous; front subquadrate, sides parallel, with a few fine scattered punctures; eye with lower lobe broadly oblong, not quite half again as tall as gena. Pronotum one-fourth again as wide across base as long, sides irregular, subparallel; lateral tubercles prominent, placed at middle, armed with a robust, obtuse tooth; apical and basal transverse sulci rather shallowly impressed, the former slightly recurved at middle, disk with three prominent tubercles, the anterior pair slightly more elevated, and with a small indistinct tubercle each side, basally with a number of fine granules. Elytra rather coarsely granulate-punctate on basal fourth, punctures thence coarse, subfoveate, becoming much finer behind middle to apex; basal gibbosity broad, feebly prominent, preceded at extreme base by a small group of more prominent granules; apices broadly, separately rounded or obliquely subtruncate. Antennae about one-third again as long as body, robust, subdepressed, beneath rather densely fimbriate to apex, scape sparsely so; scape sinuate, robust, gradually clavate to apex, feebly expanded at extreme tip, attaining apical third of pronotum; third segment slightly shorter than first, straight, somewhat thicker apically; remaining segments gradually shorter, including eleventh; eighth to eleventh segments deeply incised at base on mesial side.

Female. Antnnae as long as body, sparsely fimbriate beneath to apex, apical segments not incised at base.

Length 18.5-21 mm.; width 6.7-7.8 mm.

Type locality: Banana, Congo.

Distribution: West and Central Africa.

Ivory Coast: 3; Dimbroko [EFG]

Remarks: The three specimens described above have near the apex of the elytra a brownish plaga which Aurivillius does not mention in his original description, based on a Congo specimen. It may prove that these Ivory Coast examples represent a distinct subspecies.

TWO NEW SPECIES OF BLISTER BEETLES WITH AN ADDITIONAL NEW DESIGNATION (Meloidae)

By WILBUR R. ENNS[1] [2]

Through the courtesy of Dr. Richard B. Selander of the University of Illinois and of the British Museum (Natural History), several beetles from Mexico and Central America have been made available to the writer for study. Since some of these constitute species new to science they are being described here. An additional purpose is to make the names available for larval studies in progress elsewhere.

Zonitis oaxacae new species

Nemognatha tarasca (in part), Champion, 1892, Biologia Centrali-Americana, 4(2) : 379. **New Synonymy**

Zonitis tarasca tarasca (in part), Enns, 1956, Univ. Kansas Sci. Bull., 37(2) : 841-842. **New Synonymy**

Closely resembles *Zonitis tarasca* (Dugès) and obviously a member of the *sayi-dunniana* complex. Readily recognizable, however by the galeae extending to the metacoxae, the elytra densely, coarsely punctate with three feebly raised discal costae, moderately densely punctate pronotum, and greenish color.

Body surface moderately shining. Yellowish-green except eyes, antennae, palpi, extreme apices of femora, tibiae, tibial spurs, and tarsi black or fuscous. Ventral abdominal segments variable, usually brown with poorly defined black apical bands. Galeae pale, slender, in repose extending to metacoxae. Metatibial spurs large, spatulate, inner and outer subequal. Males with densely punctulate abdominal sterna. Length 9-11 mm.

MALE: Head elongate triangular (Fig. 3), distance from vertex to anterior margin of labrum slightly more than one fifth greater than distance across tempora, vertex evenly rounded, tempora very feebly inflated; surface coarsely, densely punctate except a narrow median line from vertex to between eyes almost impunctate, each puncture giving rise to to a short erect pale seta. Eyes moderately large, widely separated above and below, feebly emarginate behind antennal bases. Clypeus impressed, basal half punctate, distal half glabrous, anterior margin a straight transverse line. Labrum about as wide as long, outer margins punctate and pubescent, distal portion depressed, mandibles long, slender, evenly arcuate from bases to apices, sides punctate and hairy. Palpi long, slender, segments finely punctate and pubescent. Galeae pale, slender, pubescent, extending to metacoxae. Antennae moderately long, about two and one-half times as long as pronotum, each with first segment reaching half way across eye, moderately inflated, shining but punctate and pubescent; second two thirds as long as first, evenly but feebly enlarged from base to apex, shining,

---

[1]Department of Entomology, University of Missouri. Contribution from Missouri Agricultural Experiment Station, Project 36, Entomology Museum, Journal Series No. 1940.

[2]Grateful acknowledgement is made to Mr. F. Eugene Wood, University of Missouri, for making the illustrations.

punctured and pubescent like first; third one and one-half times as long as second, somewhat flattened, more densely punctate and pubescent than second; fourth to tenth similar to third but progressively shorter; eleventh one and one-half times as long as tenth, distal third evenly tapered to subacute apex.

Pronotum (Fig. 2) shining, scarcely wider than long, widest at base, basal angles distinctly expanded, side margins feebly arcuate from base to anterior fourth, thence somewhat more abruptly narrowed, anterior margin evenly arcuate, basal margin somewhat sinuate; surface moderately densely punctate, less densely along median line, punctures each with a very short, fine pale seta; a shallow median impression at basal third not extending to base; entire pronotum somewhat tumid. Scutellum moderately large, uniformly densely and finely punctate, shallowly impressed distally, apex subacutely rounded. Elytra moderately shining, moderately densely punctate, sutures, three discal costae, and side margins distinctly elevated, discal costae not extending to apices of elytra, humeri somewhat inflated. Thorax beneath shining, uniformly dense and finely punctate, short pubescent. Abdomen finely, densely punctulate, very finely pubescent. Legs punctate and pubescent like thorax. Spurs of anterior tibiae long, slender, spur-like; of middle tibiae similar but somewhat flattened; metatibial spurs large, spatulate, inner subequal to outer in size. Sixth abdominal sternum medially cleft to the base, centrally impressed. Genitalia as illustrated (Fig. 1).

FEMALE: Similar to male but abdominal sterna not punctulate, moderately densely punctate and finely pubescent, sixth sternum not cleft, shallowly emarginate medially at apex.

Types: Holotype male from 13 miles South of El Camaron, Oaxaca, MEXICO, July 11, 1957, R. B. and J. M. Selander collectors. Allotype, San Geronimo, GUATEMALA, (G. C.) Champion collector. Two male paratypes, Los Tunillos, Oaxaca, Mexico, same data as holotype. One male paratype, same data as allotype. The holotype will be deposited in the Chicago Natural History Museum; the allotype and one male paratype in the British Museum (Natural History); and the other paratypes in the collections of R. B. Selander and the author.

Dr. Selander has informed me (*in litt.*) that the specimens from Oaxaca were taken on flowers of Compositae which have not yet been determined.

The specific name alludes to the general geographic area in which this species occurs.

This species belongs in the subgenus *Parazonitis* as defined by the writer (1956). In the key to the species (p. 819, *op. cit.*) this form would run to the *cribricollis-perforata-vittigera* complex from which it is at once distinct by its greenish color, costate elytra, and other characters.

The two specimens from San Geronimo, Guatemala are those referred to by Champion (1892) as "variety alpha" under *Nemognatha tarasca* (Dugès) and by the present writer (1956) under *Zonitis tarasca tarasca* (Dugès). They agree in every particular with the holotype of the new species here described except that the galeae are just a little shorter.

Zonitis nemognathoides new species

This species is unique in appearance, superficially resembling *Nemognatha miranda* Enns but the genitalic characteristics place it in *Zonitis*. Its affinities are not clear but it is probably near *Z. cribricollis* (LeConte). The adult morphology indicates it to be a member of the subgenus *Parazonitis.*

Body surface shining. Rather uniformly testaceous above and below except eyes, antennae, tips of mandibles, distal palpal segments, variable portions of the galeae, tibial spurs, and most tarsal segments fuscous or black. The two basal antennal segments in some specimens are pale; the galeae in others are testaceous, and the basal tarsal segments usually are pale. Galeae short, slender, extending only a little beyond mesocoxae. Metatibial spurs elongate-spatulate, similar and equal, contiguous. Length 8-9 mm.

MALE: Head triangular (Fig. 6), distance from vertex to anterior margin of labrum about one eighth less than distance across tempora, vertex evenly arcuate, tempora feebly inflated; surface irregular, densely, moderately coarsely punctate, each puncture giving rise to a short, fine, pale seta. Eyes moderately large, widely separated above and below, emarginate anteriorly. Clypeus impressed, distal half glabrous, basal half punctate and pubescent. Labrum scarcely wider than long, punctate and pubescent except median line, anterior margin rounded, feebly emarginate medially at apex. Mandibles moderately slender, outer margins straight (basal half), abruptly curved mesad at about half their lengths, sides punctate and hairy. Palpi shining but punctured and pubescent, segments slender. Galeae slender, shining, punctured and pubescent, no longer than distance from vertex to anterior margin of labrum. Antennae moderately long, about two and one-half times as long as pronotum, each with first segment shining, reaching half way across eye behind emargination, moderately inflated, sparsely punctured and pubescent; second somewhat more than two thirds as long as first, shining, punctured and pubescent like first, gradually but feebly widened from base to apex; third about as long as first, more densely punctured and pubescent than first and second, form similar to second; fourth to tenth similar to third but progressively slightly shorter, segments feebly flattened, eleventh about one fourth longer than tenth, apical fourth sharply tapered to apex.

Pronotum (Fig. 5) somewhat wider than long, disk shining, irregularly, moderately densely, coarsely punctate but finely pubescent except medially a feebly raised impunctate area on apical two thirds, a shallow depression anteriorly each side of median line; side margins rather evenly arcuate from anterior to posterior margins. posterior margin feebly but evenly arcuate. Scutellum moderately large, densely punctate and pubescent, a shiny carina near each lateral margin basally, apex subacutely rounded. Elytra shining, uniformly moderately densely and rather finely punctate, somewhat rugose-punctate at extreme bases and apices, clothed with short, erect pale setae, humeri faintly inflated, sutures and side margins feebly raised. Thorax beneath shining, finely punctate and pubescent. Abdomen beneath shining, more densely punctate and hairy than thorax. Legs shining, punctate and pubescent, more densely so on tarsi; spurs of anterior and middle legs short, slender, spurlike, metatibial spurs similar and equal, spatulate, inner margins contiguous. Fifth abdominal sternum broadly, shallowly emarginate medially, sixth medially cleft and centrally impressed. Genitalia as illustrated (Fig. 4).

FEMALE: Similar to male but abdominal sterna not so modified, posterior margin of fifth abdominal sternum almost straight, sixth shallowly emarginate medially at apex.

TYPES: Holotype male, El Refugio, San Luis Potosi, MEXICO, September 2, 1958, R. B. Selander collector. Allotype and three female paratypes, same data as holotype. The holotype and allotype will be deposited in the Chicago Natural History Museum. Paratypes will be added to the collections of R. B. Selander and the author. The allotype bears this notation: ''Eggs obtained in field from this female. Larvae Sept. 13, 1958.''

Selander has informed me (*in litt.*) that these specimens were taken on flowers of Compositae thus far undetermined.

In the key to the species of *Parazonitis* (Enns, 1956, p. 819) this species would run to the *vittigera-perforata* complex from which it is easily distinguishable by the rounded, uniformly punctate pronotum, uniformly and less densely punctate elytra, and pale color. Its indicated distribution is, of course, also quite different.

The specific name alludes to its remarkable resemblance to species of *Nemognatha.*

Zonitis interpretis Enns

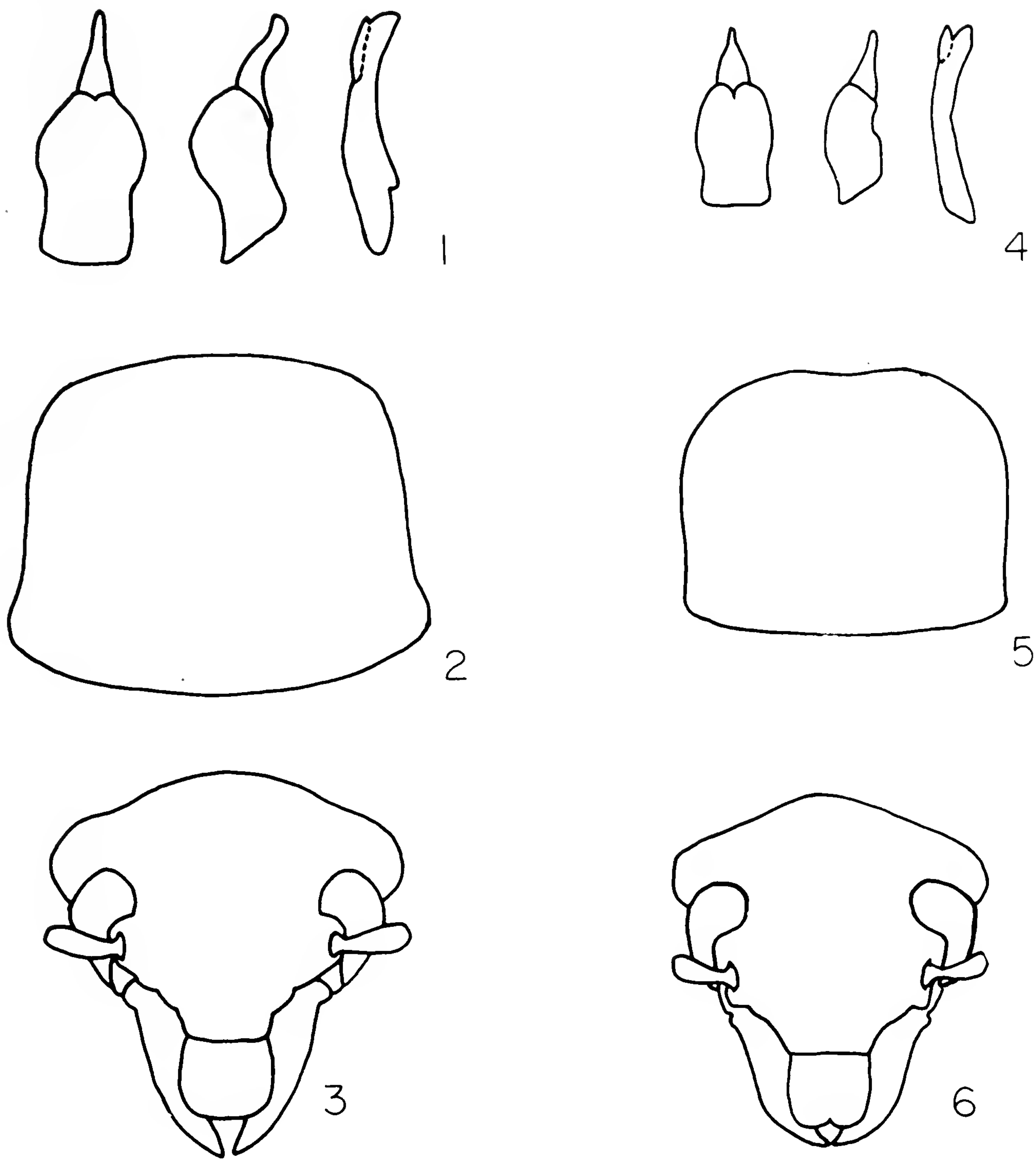
In 1956 (p. 817), the author named and described this species based on a single male specimen from the Chisos Mountains, Texas. The holotype is in the Ohio State University collection.

Recently, Dr. Floyd G. Werner of the University of Arizona sent a series of blister beetles to me for study. Among them was a single female specimen of *Z. interpretis.* It is exactly like the holotype except the elytra are somewhat more piceous and the abdominal sterna not modified as in the male but with the sixth sternum convex, apex truncate. The collection label reads Sabino Canyon, Catalina Mountains, Pima County, Arizona, August 8, 1955, F. G. Werner and G. D. Butler collectors. This specimen is hereby designated as the allotype of the species (NEW DESIGNATION). It will be deposited in the University of Arizona collections.

Literature Cited

Champion, G. C. 1892. Meloidae. Insecta, Coleoptera, Heteromera. Biologia Centrali-Americana, vol. 4, part 2, pp. 364-450.

Enns, W. R. 1956. A revision of the Genera *Nemognatha, Zonitis,* and *Pseudozonitis* (Coleoptera, Meloidae) in America North of Mexico, with a Proposed New Genus. Univ. of Kansas Sci. Bull., vol. 37, part 2, no. 17, pp. 685-909.



FIGURES 1-3. *Zonitis oaxacae* n. sp. Fig. 1—Dorsal and lateral aspects of male tegmen and lateral aspect of median lobe. Fig. 2—Dorsal outline of pronotum. Fig. 3—Cephalic aspect of head.

FIGURES 4-6. *Zonitis nemognathoides* n. sp. Fig. 4—Dorsal and lateral aspects of male tegmen and lateral aspect of median lobe. Fig. 5—Dorsal outline of pronotum. Fig. 6—Cephalic aspect of head.

HABITAT SEGREGATION AS A FACTOR IN REDUCING INTERSPECIFIC COMPETITION AMONG SPECIES OF *LACCOPHILUS* (Dytiscidae)

By JAMES R. ZIMMERMAN[1]

Of approximately fifteen species of *Laccophilus* known from the United States, four have been reported from Indiana. These small aggressive beetles have habits and habitats similar to that of many other members of the family Dytiscidae or predacious diving beetles. Some species of *Laccophilus* can be collected from almost any pond or stream in Indiana. During September and October hundreds can usually be taken in a short time in a favorable situation.

Three species, *Laccophilus maculous* Say, *Laccophilus fasciatus* Aubé, and *Laccophilus proximus* Say, occur in nearly every if not all counties in the state, but a fourth, *Laccophilus undatus* Aubé, has been reported from only a few separated localities in Lake, Laporte, Tippecanoe, and Monroe Counties. All four species have been taken in the same pond in Monroe County near Bloomington. In a few instances, three, and even four species have been taken in a single dip of the collecting net.

The species can be readily distinguished from one another in the field on the basis of size, coloration, and elytral pattern. In size they range from largest to smallest as follows: *maculosus* from about 5.5 to about 5.0 mm; *fasciatus* from about 5.0 to about 4.5 mm; *proximus* from about 4.5 to about 4.0 mm; and *undatus* from about 4.3 to about 3.8 mm.

Laccophilus species can be found most commonly in shallow water along the margins of ponds, sloughs, and streams in water less than one foot deep. Some occur in streams in other regions, but *fasciatus* seems to be the only Indiana species commonly found in running water. Vegetation, rocks, debris, and algal mats serve as cover and points of attachment. The beetles are buoyant due to the air bubble which is carried beneath the elytra and sometimes extruded at the tip of the abdomen, and thus swimming effort or attachment to some heavier or fixed object is required in order for them to stay beneath the surface.

Laboratory observations indicate that all four species feed on the same prey organisms. Since these animals utilize the same prey and are found in the same habitats, it is assumed that they compete against one another. According to Gause's rule, two species (or more) can not persist in the same microcosm if they have the same food requirements. The species of *Laccophilus* do persist in the same habitat, but it is unlikely that they have identical requirements. Adults, at least, may be found

[1]Indiana Central College, Indianapolis, Indiana.

together frequently, but there may be a more distinct segregation in the case of the voracious larvae.

In order to determine some of the factors affecting their interrelationships, collections were made in certain ponds in Monroe County, Indiana, for a period of about 14 months from 1955 to 1957. Collections were made at about two-week intervals to try to detect changes which might occur in adult populations. Considerable fluctuations in numbers were found in all four species of *Laccophilus*. The details of this study will be reported elsewhere. In summary, all show the following pattern: A high population level in early spring—in March, followed by a striking decline which reaches a low in June. This decline is a mortality curve of the adults of the previous year. Then a gradual increase of emerging adults (tenerals) through the summer and early fall, and finally a decrease with the onset of cold weather. The beetles apparently begin hibernation at this time, but a few individuals can be found all winter. The place and mode of hibernation has not yet been established.

For much of the year few habitat preferences can be detected among the four species. But in the late summer and early fall when the populations become heavily concentrated through the gradual increase in numbers and also through the decrease in available habitat, some segregation into different parts of a single situation is indicated. In order to test this, samples were taken from two ponds on August 30 and from another on September 21. The collections were made in such a way that two categories were represented as follows:

(1) specimens collected along the extreme margins of the ponds in water an inch or less in depth, and

(2) specimens collected in the deeper central portion of the ponds where the water was up to 12 inches in depth.

The collecting effort was equal in the two localities. The ponds were relatively similar in each case with debris, but little vegetation at the margin, and considerable vegetation, principally *Ludwigia*, in the middle. *Ludwigia* is a fleshy plant common in ponds and ditches which dry up in the latter part of the year.

The results of sampling these three ponds is summarized in Table 1. The differences in frequencies found for *fasciatus, proximus*, and *undatus* are statistically significant by the Chi Square Test. The data for *maculosus* showed no statistical significance in these ponds, but they suggest that there might be some preference for the middle over the marginal area of a pond. Recent collecting in other geographical areas tends to bear this out.

I believe that these data demonstrate that *fasciatus* and *proximus* usually occur on the extreme edge of ponds and that *undatus* is largely confined to the middle in deeper water among submerged plants.

A possible explanation of this segregation may be a preference for a warmer or cooler temperature. The temperature readings were 3 to 4 degrees centigrade higher in the surface water than six inches beneath.

Young and Zimmerman (1956) report that in Indiana *fasciatus* and *maculosus* are not found in the shallows of ponds at times of the day when the temperature at the surface approaches 40 degrees centigrade.

TABLE 1. SAMPLING RESULTS TO TEST HABITAT SEGREGATION IN *LACCOPHILUS*

	Pond A 8/30/56		Pond B 8/30/56		Pond C 9/21/56		
Species	*edge*	*mid*	*edge*	*mid*	*edge*	*mid*	x_2 *value*
undatus	2	26	2	8	2	16	17.29
proximus	17	8	9	0	18	3	9.14
fasciatus	40	4	20	2	60	45	13.44
maculosus	1	4	1	1	4	7	1.00

They tend to concentrate under sticks and floating vegetation or burrow into the bottom. Conversely, in the early morning and at night they can be found foraging at random in the shallows.

Another explanation may involve the amount of vegetation present in the middle of these three ponds and the general absence of vegetation in the margins. *L. undatus,* if present, was nearly always found in thick, submerged vegetation. This is often true of *maculosus,* but on occasion, *maculosus* is found in large numbers in situations almost completely free of submergent plants.

In summary, these data suggest that one way in which inter-specific competition among sympatric species can be minimized at critical times of the year when available habitat is at a premium is by differential habitat occupancy. At seasons of the year when concentration is not so great each species can then utilize less restricted areas.

LITERATURE CITED

YOUNG, F. N., and J. R. ZIMMERMAN. 1956. Variations in temperature in small aquatic situations. Ecology. 37:609-611.

THE SPECIES GROUPS OF *APION* OCCURRING IN NORTH AND CENTRAL AMERICA (Curculionidae)

By D. G. KISSINGER[1]

This paper consists of three parts, an explanation of some characters used in the key presented, a key to North and Central American *Apion* species groups, and a listing of the species assigned to the various groups with a general indication of the distribution of the group. Twenty-two species are keyed out separately either because they apparently do not fit into the groups proposed or because only females were available for study. In every case species which are keyed out separately are so placed on the basis of material identified by the author who described the species.

This paper will serve as the nucleus of a proposed revision of the *Apion* of the New World. Three papers of the series have been published (Kissinger 1956, 1957, 1958) and a revision of the *Trichapion* of the New World is to be published soon.

The weevil genus *Apion* is reputed to be an extremely difficult taxonomic problem. This paper is not intended to refute this reputation; *Apion* will always be a perplexing genus with which to work. This taxonomic difficulty does not arise because individuals of a species are notably variable—a given species of *Apion* is surprisingly uniform in most respects, but rather in the other direction. Not only are the members of a species uniform, but the members of the genus are uniform, so much so that it is extremely difficult to find characters which will split the genus into groups of a convenient size. It is very important to be able to divide a genus the size of *Apion*—more than 250 species in North and Central America—so that identification of the species is possible and ecological studies thereby encouraged. Virtually nothing is known about the ecology of the members of the genus.

The following key is presented to summarize in a useable way certain characteristics that I have found to divide the genus into groups. The names applied to species groups, with the exception of established subgenera, are not intended to have nomenclatural standing but are to be used until subgeneric relationships can be determined. The scope of this key is North and Central America but not including the West Indies. A similar key is in preparation for South American *Apion*.

One of the most serious problems encountered while trying to construct the key was the variation of "convenient" characters within a species group, that is, the majority of species in a group may have a certain character while one does not. This type of difficulty is nearly impossible

[1]Oakwood College, Huntsville, Alabama.

to circumvent and in several instances in using the key it may be hard to place a certain species of a group.

The characters most convenient to use in identification are the secondary sexual modifications of the legs of the male; unfortunately an arrangement based on these characters does not always produce a homogeneous grouping. I have tried to write the key so that females can be properly placed, but this is sometimes difficult.

The following explains some couplets of the key likely to be difficult.

Couplet three takes advantage of the fact that most *Apion* have the first segment of the tarsi rather long and slender. Both the *peculiare* and *herculanum* groups have stout tarsi, the first segment being just about as wide as long; this together with the other characters given should make these two groups easily recognized.

Couplet five requires explanation. Most New World *Apion* have the middle coxae separated from each other by a structure formed by the union of two median projections of the sternum, an anterior part projecting posteriorly and a posterior part projecting anteriorly. These two projections generally join near the middle of the coxae. However in the *chrysocomum, punctinasum* and *tantillum* groups and *A. macilentum* Blanchard, known from Chile, the middle coxae are separated somewhat from each other but the two median projections of the mesosternum do not meet so that there is a distinct gap between the coxae. I am indebted to Mr. Balfour-Browne of the British Museum (N.H.) for calling my attention to this character.

Couplet nine may be difficult because of the intermediate nature of the basal lateral expansion of the prothorax characteristic of some species. Generally if this expansion is present the prothorax in dorsal view appears to have a sort of basal flange. I have tried to follow the plan of placing species with any suggestion of an acute basal lateral expansion into the couplets following number ten.

Couplet ten refers to the antennal scrobes. The dorsal margin of the scrobes of most *Apion* gradually slants downward from the anterior part of the scrobe to beneath the eye, this condition is here termed "dorsal margin of scrobe nearly parallel with longitudinal axis of beak." Some species have the anterior part of the dorsal margin at an oblique angle to the posterior part; some, like the *nodicorne* group, have the dorsal margin produced into a prominent angulation, which is visible when viewed from the side; others, like the *luteirostre* group, have the antennae inserted so close to the eyes that the entire dorsal margin is at an oblique angle to the longitudinal axis of the beak. These three types of modifications of the dorsal margin of the scrobe are termed "anterior dorsal margin of scrobe sharply oblique."

Couplet 14 uses the phrase "derm black." Here and in other couplets this refers to the color of the prothorax and elytra and not the legs. *Trichapion* includes two species with red elytra, *rufipenne* Gyllenhal and *vinosum* Sharp. Also the latter species, *glyphicum* Sharp and *chuparosae* Fall have the frons narrower than the tip of the beak, especially in the case of the males.

Couplet 15 may seem weak since it is based in part on size, however *pedestre* Sharp is from 2.5 to 3.0 mm. long while *ferrugineum* Sharp is 1.8 mm and *aegrotum* Sharp is 1.5 mm. long.

The measurement of frons at couplet 16 and other couplets is taken at its narrowest width. I make these and other measurements with a square, ruled reticule in the eye piece; this insures measuring along a straight line.

Couplet 18 and several others makes use of the color of the legs. This seems to be a reasonably stable character where used and it is quite convenient to contrast black legs with those which are yellow or reddish in whole or in part. Another convenient character is the color of the first and second coxae. Most species have black coxae even though the femur and tibia might be yellow; thus the small number of species with yellow or reddish coxae are quite conspicuous. Unfortunately this character can vary in some cases from yellow to dark red.

Couplet 29 refers to the prominence of the eyes. This is determined by viewing the head from above and noticing whether or not the eyes protrude beyond the lateral outline of the head. If they do, the eyes are said to be at least moderately prominent.

Couplet 37 may seem to be based on a weak character. Fortunately both *altum* Sharp and *fuscimanum* Sharp are more than 2.25 mm. long and *aduncirostre* Gerstaecker and *panamense* Sharp are less than 1.80 mm. long. Here and at other points in the key the facies of the species are quite different but facies is very difficult to define concisely in a key.

KEY TO NORTH AND CENTRAL AMERICAN *APION* SPECIES GROUPS

1. Beak short, straight, stout, subcylindrical; body slender, subparallel; prothorax apex as wide as base; frons narrower than dorsal tip of beak.................. **Stenapion** Wagner
   Beak curved and/or prothorax apex narrower than base.................. 2
2. Third tarsal segment strongly bilobed; femora not strongly club shaped; body not clothed with erect pubescence.................. 3
   Third tarsal segment feebly bilobed; femora strongly club shaped; frons narrower than dorsal tip of beak; body clothed with suberect fine pubescence.......... **Heterapion** Sharp
3. First segment of tarsus I distinctly longer than wide; body not gibbose in outline in side view, without transverse pattern of scales or tibiae of male mucronate 5
   First segment of tarsus I nearly as wide as long; frons generally wider than dorsal tip of beak; anterior part of dorsal margin of antennal scrobe distinctly oblique; derm brownish; eyes prominent.................. 4

4. Body robust, convex to gibbose in outline from side........**peculiare** group
Body moderately robust, elongate, not convex in outline from side........**herculanum** group
5. Middle coxae separated from each other by a structure formed by the union of an anterior and posterior projection of the sternum........ 8
Middle coxae not separated from each other by the sternum, with a distinct gap between the anterior and posterior projections of the sternum........ 6
6. Legs and coxae black or piceous........ 7
Femora, tibiae and coxae 1 and 2 pale yellow; pubescence yellowish, sparse, uniform ....**chrysocomum** group
7. Pubescence minute, inconspicuous; beak in lateral view noticeably attenuate toward apex; eyes not prominent; Texas to Guatemala........**tantillum** Sharp
Pubescence conspicuous, with a post-scutellar spot; beak in lateral view subcylindrical; eyes moderately prominent........**punctinasum** group
8. (5) Front coxae of male not dentate; frons not depressed adjacent to eyes or beak short and stout 9
Front coxae of male dentate at apex; striae on frons adjacent to eye more deeply impressed; beak slender, nearly as long as head and prothorax combined in both sexes; prothorax with slight basal lateral expansion........**coxale** group
9. Prothorax with a definite acute basal lateral expansion........ 10
Prothorax not expanded laterally into a sharp angle at base........ 30
10. Dorsal margin of antennal scrobe distinctly oblique, at least in anterior region........ 11
Dorsal margin of antennal scrobe nearly parallel with longitudinal axis of beak........ 19
11. Antennae inserted at about middle of beak; Mexico........**basale** Sharp
Antennae inserted behind basal third of beak........ 12
12. Beak in dorsal view not or slightly expanded at antennal insertion........ 13
Beak in dorsal view strongly, acutely expanded laterally at antennal insertion........ 17
13. Antennae inserted under eye at distance from eye much less than width of frons ....**luteirostre** group
Antennae inserted at distance from eye at least equal to width of frons and usually greater 14
14. Derm black; frons wider than dorsal tip of beak and with a wide flat median area which may be shallowly sulcate; tibiae 2 and 3 of male mucronate........ ....**Trichapion** Wagner (in part)
Frons not wider than dorsal tip of beak, lacking wide, flat median area; legs of male not mucronate 15
15. Size under 2.0 mm.; legs of male simple........ 16
Size over 2.0 mm.; frons about equal to dorsal tip of beak; male with first sement of tarsus 3 produced into a short, blunt spine; derm black; Panama........**pedestre** Sharp
16. Derm black; frons narrower than dorsal tip of beak; Panama........**aegrotum** Sharp
Derm rufous; frons equal to dorsal tip of beak; Guatemala........**ferrugineum** Sharp
17. (12) Elytral intervals with a single row of scales, pubescence not denser basally........ 18
Elytra with a dense post-scutellar spot or intervals with two rows of scales; beak slender, attenuate beyond antennal insertion........**nodicorne** group
18. Legs black; first segment of fore tarsus slightly longer than wide; male with first segment of tarsus 2 spined........**spretissimum** group
Legs yellow; first segment of fore tarsus two or more times as long as wide; tarsi of male simple........**decoloratum** group (in part)
19. (10) Frons as wide or wider than dorsal tip of beak........ 24
Frons not as wide as dorsal tip of beak........ 20

20. Pubescence arranged in a pattern on basal portion of elytra or coarser there; prothorax not conical; legs black; body at most moderately convex in side view .... **frontellum** group
Pubescence of elytra uniform 21
21. Legs of male simple; legs yellow 22
Male with tibiae 2 and 3 mucronate and first segment of tarsus 3 with a short blunt spine on inner surface; legs black, Arizona .... **carinirostrum** Fall
22. Derm dark reddish or red 23
Derm black; legs and coxae 1 and 2 yellow; body moderately convex in side view; prothorax parallel sided in basal half; Panama .... **epicum** Sharp
23. Prothorax conical; in side view body very convex; coxae and beak dark; Guatemala .... **lentum** Sharp
Prothorax parallel sided in basal half; in side view body moderately convex; coxae 1 and 2 and beak in part yellow; Florida and Mexico .... **lividum** Smith
24. (19) Prothorax definitely constricted at apex 25
Prothorax not constricted apically; nearly glabrous, above, pubescence dense on sides of mesothorax and metepisternum; little sexual dimorphism in structure in beak; tibiae 2 and 3 of male mucronate .... **pleuriticum** group
25. Beak at most slightly expanded laterally, at tip, generally attenuating toward apex; apical region of beak more finely sculptured than basal region 26
Beak more or less expanded toward apical region, rather uniformly punctured and pubescent throughout; legs vary from black to yellow; eyes generally not prominent; legs of male simple .... **attenuatum** group
26. Body moderately stout; coxae and beak of both sexes black 27
Body slender; legs and coxae 1 and 2 yellow; beak of male yellow in part; male with tibiae 2 and 3 mucronate; Mexico to Panama .... **hastifer** Sharp
27. Frons with two approximate rows of coarse punctures separated by a narrow interval, generally not sulcate; legs generally pale; legs of male simple 28
Frons with a rather broad median area which may be flat, convex or obviously sulcate medially; legs generally black; tibiae of male (usually 2 and 3, sometimes only 2) mucronate, in some species tarsi of male modified or spined .... **Trichapion** Wagner (in part)
28. Elytra black or very dark piceous 29
Elytra dark red; prothorax evenly, sparsely, shallowly punctured; eyes prominent; male with a few coarse scales on side of prothorax and on anterior face of front coxae; Mexico .... **teapense** Sharp
29. Eyes modrately prominent; pubescence very sparse, uniform; little sexual dimorphism in structure of beak; prothorax subparallel in basal half .... **decoloratum** group (in part)
Eyes not prominent; pubescence conspicuous, more or less condensed at base of interval 3; obvious sexual dimorphism in structure of beak; prothorax subconical .... **segnipes** group
30. (9) Prothorax conical in form, punctation of prothorax generally fine, superficial 31
Prothorax parallel in basal half or subcylindrical in form, punctation of prothorax generally deep 34
31. Beak greatly expanded laterally at antennal insertion; prothorax not constricted apically .... **dilatatum** group (in part)
Beak not strongly expanded laterally at antennal insertion 32
32. Coxae 1 and 2 yellow or reddish; legs not banded with red nor entirely black; beak of male may be yellow in part 33

Coxae and beak of both sexes black; legs black or banded with red .... **dilatatum** group (in part)

33. Elytra obviously nodose at apex; longitudinal axis of eye of male distinctly longer than vertical axis .... **Bothryopteron** Wagner

Elytra not nodose at apex; eye nearly round in outline, middle tibia of male mucronate, male with first segment of tarsus 3 with a blunt spine; Mexico and Guatemala .... **subauratum** Sharp

34. (30) Frons not narrower than dorsal tip of beak or beak of male in part yellow 40

Frons narrower than dorsal tip of beak, beak of male black 35

35. Elytra distinctly less than three times as long as prothorax, at least moderately robust in outline 36

Elytra more than three times as long as prothorax, rather slender in outline being nearly twice as long as wide; Lower California .... **filum** Fall

36. Eyes at least moderately prominent; elytra not ventricose in outline 37

Eyes not at all prominent; elytra somewhat ventricose in outline; beak subcylindrical, not at all dilated at antennal insertion .... **ventricosum** group

37. Size over 2.0 mm.; beak glabrous in apical third 39

Size less than 2.0 mm. 38

38. Prothorax distinctly constricted at apex, apex three-fourths as wide as base; elytral intervals about twice as wide as coarse striae; metasternum with deep punctures; Mexico to Venezuela .... **aduncirostre** Gerstaecker

Prothorax not constricted at apex, apex five-sixths as wide as base; elytral intervals more than twice as wide as fine, shallow striae; metasternum virtually impunctate; Mexico and Panama .... **panamense** Sharp

39. Tarsal claw with a long, acute basal tooth; beak of female in dorsal view slightly attenuate to apical third, tip subparallel; antennae of female inserted at basal one-third of beak; Panama .... **altum** Sharp

Tarsal claw with a short, acute basal tooth; beak of female in dorsal view slightly expanded at antennal insertion and definitely expanded at apex; antennae of female inserted at basal one-fourth of beak; Guatemala .... **fuscimanum** Sharp

40. (34) Metasternum lacking a median tubercle 41

Metasternum with an acute median tubercle; legs of male simple .... **sordidum** group

41. Elytral intervals not concave 42

Elytra aeneous, intervals in part concave, twice as wide as striae; pubescence inconspicuous; tibiae, base of femora and antennae rufous; male with three pairs of tibiae with minute to small mucrones, first sternite of male with medio-basal tubercle .... **brachyspinosum** group

42. Elytra lacking a bluish luster 43

Elytra with distinct blue luster; beak of male very strongly expanded laterally over antennal insertion, beak of female only slightly expanded there; legs of male simple; eyes prominent; frons wide, strigose; Alberta .... **cyanitinctum** Fall

43. Pubescence conspicuous, at least on side of mesothorax or legs reddish yellow 47

Pubescence inconspicuous, uniform, legs black or piceous; eyes moderately prominent 44

44. Front femora of male with ventral median smooth polished area generally bounded

by a distinct ridge; tips of elytra of female may be prolonged into a distinct lobe .... Fall's Group[1]
Front femora of male simple; tips of elytra of female not prolonged........ 45[1]

45. Legs of male not mucronate; elytral intervals about twice as wide as striae........ 46
Tibiae 1 and 2 of male mucronate; elytral intervals narrow, hardly wider than striae .... **porosicolle** group

46. Beak slender, strongly curved, distinctly attenuate toward apex; western United States .... **oedorhynchum** LeConte
Beak moderately stout, subcylindrical; western United States........ **antennatum** Smith

47. (43) Dorsal margin of antennal scrobe more or less evenly descending from anterior part of scrobe to beneath eye........ 48
Dorsal margin of scrobe strongly oblique over antennal insertion, produced into a distinct, acute projection which is visible in side view; male with tibiae 2 and 3 mucronate........ **metallicum** group

48. Tarsal segment 1 distinctly longer than tarsal segment 2; tibiae of male not mucronate 50
Tarsal segments 1, 2 and 3 subequal in length; tibiae 2 and 3 of male mucronate 49

49. Legs black; beak glabrous and strongly polished beyond antennal insertion; antennal club about as long as eye........ **tenuirostrum** group
Femora and tibiae pale reddish yellow; beak of male pubescent to tip; antennal club distinctly longer than eye........ **Rhopalapion** Schilsky
(**longirostre** Olivier, introduced into eastern U. S. from Europe)

50. Frons punctured; beak moderately slender, subcylindrical in side view; eyes at most slightly prominent........ 51
Frons canaliculate or sulcate, may be depressed adjacent to eye; beak short, stout, attenuate; eyes prominent........ **cavifrons** group

51. Femora black or piceous........ 53
Femora yellow or reddish........ 52

52 Elytral intervals at least twice as wide as striae; pubescence on dorsal surface evident, generally denser at base of interval 3; scales on prothorax definitely projecting beyond rim of punctures; beak of male in part yellow; legs of male simple .... **disparatum** group
Elytra intervals slightly wider than striae; pubescence inconspicuous, scales on prothorax barely projecting beyond rim of punctures; Panama........ **maceratum** Sharp

53. Prothorax widest in front of base, more or less constricted apically; elytral striae fine, shallow; beak not both deeply punctate and pubescent beyond antennal insertion........ 54
Prothorax subcylindrical, hardly constricted apically; elytral striae deep, coarse; beak punctured and pubescent beyond antennal insertion; Guatemala to Colombia .... **picipes** Gerstaecker

54. Moderately robust, tarsi of male not spined........ **varicorne** group
Narrow, elongate, subcylindrical; male with first segment of tarsus 2 spined .... **parallelum** group

---

[1]Females of species of Fall's Group I lacking prolonged elytral tips will have to be placed by association with males.

NORTH AND CENTRAL AMERICAN *APION* SPECIES NOT AVAILABLE FOR STUDY AND NOT PLACED IN KEY

1. *amoenum* Sharp
2. *auripes* Fall
3. *auropilosum* Wagner
4. *consanguineum* Wagner
5. *contusum* Smith
6. *costaricense* Wagner
7. *cuprascens* Mannerheim
8. *filipes* Sharp
9. *laterale* Sharp
10. *latipenne* Sharp
11. *luteinasus* Wagner
12. *macropus* Wagner
13. *nodirostre* Gerstaecker
14. *omissum* Wagner
15. *pacificum* Sharp
16. *paradoxum* Gerstaecker
17. *persulcatum* Wagner
18. *pilirostre* Wagner
19. *pulchripes* Sharp
20. *quericola* Sharp
21. *sallei* Wagner
22. *scydmaenoides* Sharp
23. *seriatum* Sharp
24. *subferrugineum* Wagner
25. *subglobosum* Gerstaecker
26. *vile* Gerstaecker

ATTENUATUM GROUP

Members occur in North and Central America.

1. *attenuatum* Smith
2. *chiriquense* Sharp
3. *elutipes* Fall
4. *fulvotibiale* Wagner
5. *hibisci* Fall
6. *perlentum* Fall
7. *relictum* Sharp
8. *solutum* Fall

BOTHRYOPTERON WAGNER

The only described species from this region is *A. grallarium* Sharp known from Vera Cruz, Mexico and Guatemala.

BRACHYSPINOSUM GROUP

Two species belong here, *brachyspinosum* Wagner from Mexico and *smithi* Wagner from eastern United States.

CAVIFRONS GROUP

The three species assigned to this group occur in the northern part and west coast region of North America.

1. *alaskanum* Fall
2. *cavifrons* LeConte
3. *huron* Fall

CHRYSOCOMUM GROUP

This group ranges from the extreme western part of the United States into northern South America. Specimens of *auctum* Sharp have been seen from the Huachuca Mountains, Arizona and constitute the first U. S. record of this species.

1. *auctum* Sharp
2. *chrysocomum* Gerstaecker

COXALE GROUP

This group occurs in eastern United States and from Arizona to Panama. See Kissinger (1957) for a key to the species of the group.

1. *colon* Sharp
2. *coxale* Fall
3. *lassum* Sharp
4. *neocoxale* Kissinger
5. *occiduum* Kissinger

DECOLORATUM GROUP

The members of this group occur in eastern United States and Mexico and Guatemala.

1. *carinatum* Smith
2. *decoloratum* Smith
3. *emaciipes* Fall
4. *errabundum* Sharp
5. *pallitarse* Sharp
6. *solitare* Sharp

DILATATUM GROUP

This group occurs in southeastern United States and from Arizona into South America.

1. *championi* Sharp
2. *crassum* Fall
3. *derasum* Sharp
4. *dilatatum* Smith
5. *inflatipenne* Sharp
6. *juno* Sharp
7. *latipes* Sharp
8. *samson* Sharp

DISPARATUM GROUP

This group ranges from Texas and Arizona into Mexico and Guatemala; a single undetermined species has been seen from Venezuela. See Kissinger (1956) for a key to the species.

1. *alloeum* Kissinger
2. *bickleyi* Kissinger
3. *disparatum* Sharp
4. *hirtum* Wagner
5. *schwarzi* Kissinger
6. *sectator* Kissinger
7. *seminudum* Wagner
8. *setifrons* Wagner

FALL'S GROUP I

This very distinct group (see Fall, 1898) occurs mainly north of Mexico, a few members have been seen from northern Mexico.

1. *anceps* Fall
2. *atripes* Smith
3. *bischoffi* Fall
4. *coracellum* Fall
5. *desolatum* Smith
6. *diffractum* Fall
7. *dilaticolle* Fall
8. *ellipticum* Smith
9. *erraticum* Smith
10. *finitimum* Fall
11. *floridanum* Smith
12. *funerum* Fall

13. *hesperum* Fall
14. *impeditum* Fall
15. *impunctistriatum* Smith
16. *melanarium* Gerstaecker
17. *minutum* Smith
18. *molestum* Fall
19. *obsoletum* Smith
20. *occidentale* Fall
21. *pennsylvanicum* Boheman
22. *protensum* LeConte
23. *quadricolle* Fall
24. *robustum* Smith
25. *sinuirostrum* Fall
26. *speculiferum* Fall
27. *texanum* Smith
28. *virile* Fall

FRONTELLUM GROUP

This group occurs in southwestern United States and Mexico.

1. *erythropterum* Sharp
2. *frontellum* Fall
3. *subornatum* Fall

HERCULANUM GROUP

The members of this group appear to be confined to northeastern United States; a single specimen has been seen from Oregon.

1. *herculanum* Smith
2. *puritanum* Fall
3. *umboniferum* Fall

HETERAPION SHARP

This distinct group, proposed as a separate genus by Sharp, occurs in southeastern Mexico and Guatemala.

1. *femoratum* Sharp
2. *inerme* Sharp

LUTEIROSTRE GROUP

This isolated group occurs in an almost unbroken line from Massachusetts along the Atlantic seaboard to Argentina, members also occur inland, especially in the tropics.

1. *liridum* Smith
2. *longipenne* Wagner
3. *luteirostre* Gerstaecker
4. *perminutum* Smith

METALLICUM GROUP

Two species are in this group, *metallicum* Gerstaecker in southern United States and *troglodytes* Mannerheim in Oregon and California.

NODICORNE GROUP

Members of this group range from southern Virginia to Brazil. See Kissinger (1958) for a key to the following species.

1. *buchanani* Kissinger
2. *delta* Buchanan
3. *expilator* Kissinger
4. *fumitarse* Fall
5. *nodicorne* Sharp
6. *saginans* Kissinger

PARALLELUM GROUP

Members of this group occur in eastern, midwestern and southwestern United States, Mexico and Guatemala.

1. *disparipes* Fall
2. *extensum* Smith
3. *graciliforme* Fall
4. *parallelum* Smith
5. *pauper* Sharp
6. *spinipes* Fall
7. *tenuiforme* Fall

PECULIARE GROUP

The members of this group occur from southern Texas to Brazil; *A. martinezi* Marshall occurs in Puerto Rico.

1. *americanum* Wagner
2. *basirostre* Sharp
3. *cretaceicolle* Sharp
4. *lebasi* Gyllenhal
5. *matricum* Sharp
6. *peculiare* Wagner
7. *xanthoxyli* Wagner

PLEURITICUM GROUP

The members of this group occur in eastern United States, Baja California and from Mexico to Panama.

1. *peninsulare* Fall
2. *pleuriticum* Sharp
3. *reclusum* Fall

POROSICOLLE GROUP

This group occurs in western United States and Mexico.

1. *acrophilum* Fall
2. *opacicolle* Smith
3. *porosicolle* Gemminger

PUNCTINASUM GROUP

This group occurs in eastern United States and the northern half of the country and neighboring Canada.

1. *pulchrum* Blatchley
2. *punctinasum* Smith

SEGNIPES GROUP

This group occurs in eastern United States and from Arizona to Panama.

1. *arizonae* Fall
2. *segnipes* Say

SORDIDUM GROUP

The members of this group occur in southeastern and western United States and Mexico.

1. *californicum* Smith
2. *curticorne* Fall
3. *germanum* Sharp
4. *sordidum* Smith

SPRETISSIMUM GROUP

The members of this group occur in southeastern and southwestern United States and from Mexico to Brazil.

1. *aculeatum* Fall
2. *dissimilipes* Sharp
3. *fibulipes* Fall
4. *persimile* Fall
5. *praeditum* Sharp
6. *spretissimum* Sharp

STENAPION WAGNER

This group ranges from Mexico into Argentina. Wagner (1915) presents a revision of the group.

1. *constricticolle* Sharp
2. *macrothorax* Wagner
3. *terminale* Sharp

TENUIROSTRUM GROUP

This group occurs in midwestern United States and Mexico.

1. *impexum* Fall
2. *tenuirostrum* Smith

TRICHAPION WAGNER

This group ranges from Canada to Argentina and Chile. A complete list of the species included and a key will be presented in a revision of the New World species soon to be published. Seventy species have been described from North and Central America.

VARICORNE GROUP

With the exception of the northeastern portion this group occurs throughout the United States and in Mexico and Guatemala.

1. *alternatum* Fall
2. *varicorne* Smith
3. *tomentosum* Wagner
4. *chalceum* Gerstaecker

VENTRICOSUM GROUP

This group occurs in southwestern United States and western Mexico.

1. *eriogoni* Fall
2. *haplopus* Wagner
3. *ventricosum* LeConte

References Cited

Fall, H. G. 1898. Revision of the species of *Apion* of America north of Mexico. Trans. American Ent. Soc., 25:105-184, pl. 2-5.

Kissinger, D. G. 1956. Studies on North American *Apion*: the *Apion disparatum* group (Curculionidae). Coleopt. Bull., 10:69-80.

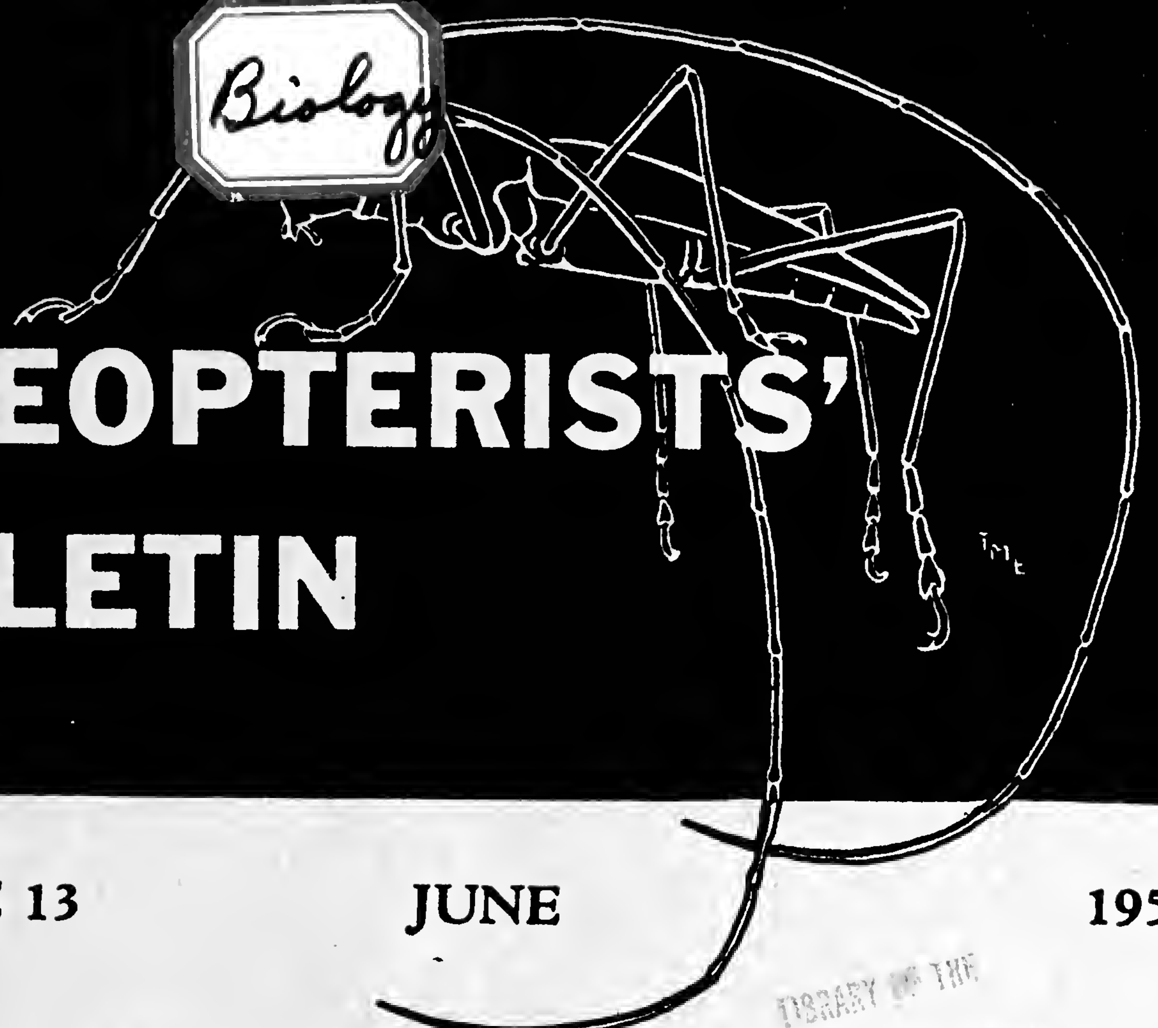
————. 1957. Studies on North American *Apion* with descriptions of two new species (Curculionidae). Coleopt. Bull., 11:17-24.

————. 1958. Studies on North American *Apion*: the *Apion nodicorne* group (Curculionidae). Coleopt. Bull., 11:71-78.

Wagner, H. 1915. Revision der bisher bekannten Arten des *Apion*-Subgenus ***Stenapion*** Wagner (Col., Curcul.). Ent. Mitt., 4:35-62.

Biology

THE COLEOPTERISTS' BULLETIN



VOLUME 13 JUNE 1959

TABLE OF CONTENTS

WARNER, R. E. Three neotropical species of Pandeleteius on Avocado (Curculionidae, Tanymecini) ... 33

RADFORD, K. W. A new locality record for Lytta viridana LeConte (Meloidae) ... 35

BURKE, H. R. Notes on some Texas Curculionidae with a description of a new species 36

SELANDER, R. B. Additional records of Cissites (Meloidae) ... 41

LEECH, H. B. Notes on a few species of Pacific Coast Cerambycidae ... 42

DREISBACH, R. R., *et al.* Michigan State list in preparation ... 46

EL-MOURSY, A. A. and BALL, G. E. A study of the diagnostic characters of two North American species of the genus Diplocheila Brulle, with notes on their ecology (Carabidae, Licinini) ... 47

MALKIN, B. Review: Coccinellidae of Poland ... 57

SPILMAN, T. J. Notes on Edrotes, Leichenum, Palorus, Eupsophulus, Adelium, and Strongylium (Tenebrionidae) ... 58

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: Vol. 4, $5.00; Vol. 5, $4.50; Vol. 6 (4 nos. only published), $2.50; Vols. 7 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid.

Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five copies of the issue containing the article will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and in all cases, descriptions of new species must be illustrated. Descriptions of new species or genera must contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XIII June (No. 2) 1959

THREE NEOTROPICAL SPECIES OF PANDELETEIUS ON AVOCADO (CURCULIONIDAE, TANYMECINI)

By Rose Ella Warner[1]

Three weevils of the genus *Pandeleteius* are pests of avocado in Costa Rica. One is a new species, and is described here and placed in a key with the other two species.

The three species agree with the description of the subgenus *Exmentypes* Voss (1954) in having the apex of the rostrum with an inter-antennal transverse sulcus, but they differ greatly from *Pandeleteius hieroglyphicus* Champ., the type species of *Exmentypes,* and hardly belong to that subgenus.

For the present the species have been retained in *Pandeleteius* (s. str.). More collecting and a study of all the Mexican, Central and South American *Pandeleteius* material should be undertaken before the genus is split into the numerous subgenera that appear to be required.

Key to Three Species of *Pandeleteius* Found on Avocado

1. Vestiture with a metallic luster; vestiture of glittering vari-colored scales; elytra maculate; anterior coxae well separated; tarsal claws connate at the base; elytral intervals without elevations. Length 7.25-8.80 mm. .... **erubescens** Champion

   Vestiture dull, without a metallic luster .... (2)

2. Anterior coxae well separated; tarsal claws free; elytral intervals 3, 5 and 7 raised, except on the disc anteriorly. Color uniformly white. Length 5.5-6 mm. .... **boops** Champion

   Anterior coxae very little separated; tarsal claws connate at the base; elytral intervals irregular, intervals 3, 4, 5, and 6 each with elevations, interval 7 raised. Color brown and tan. Length 5.5-7 mm. .... **pelodus**, n. sp.

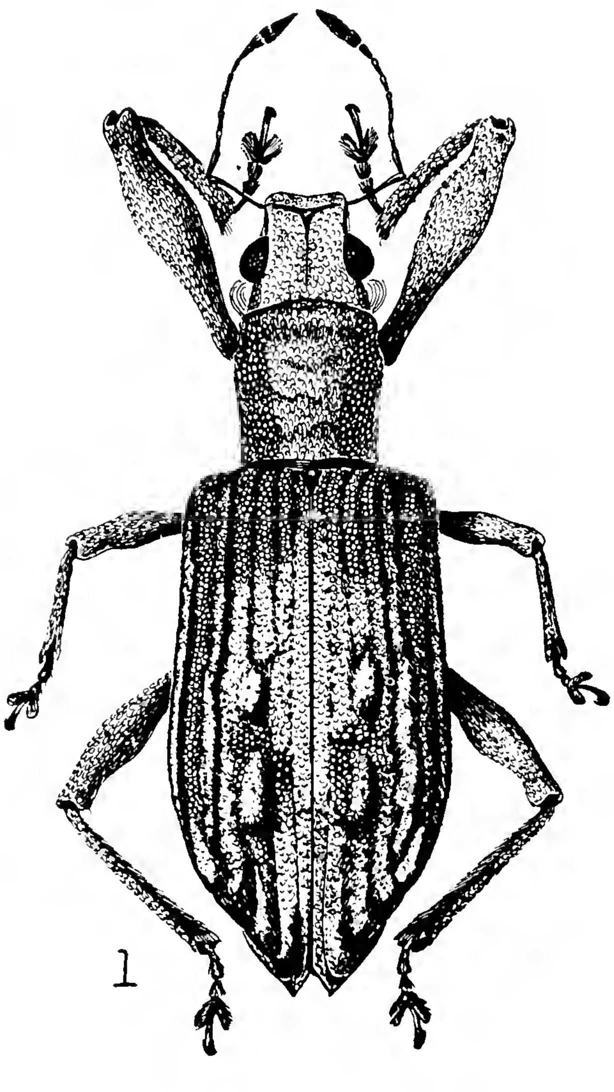
Pandeleteius pelodus, n. sp.

Elongate, slender. Length ♂, 5.5-6 mm; ♀, 7 mm. Body testaceous, shiny, antennae and tarsi lighter, apices of tarsal claws black; clothed with thick, tan and cocoa scales, those of head, rostrum, pronotum, disc of elytra and legs tan, the cocoa scales condensed into a lateral line behind each eye that extends to the base of the thorax, cocoa scales of the elytra not forming any definite pattern but blending into the tan scales,

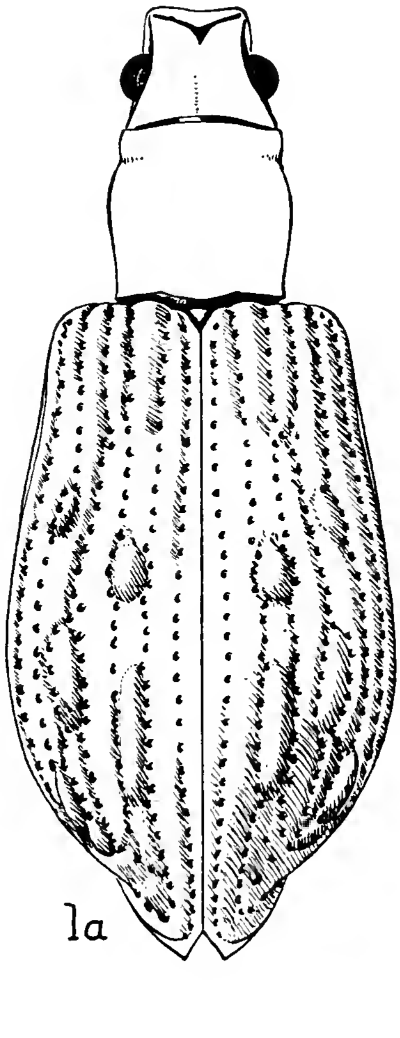
[1]Entomology Research Division, Agr. Res. Serv., U.S.D.A. Washington, D. C.

covering intervals 1 to 7 at the base, laterally extending to the apex of interval 7; scutellum with white shiny scales. Scales of rostrum, except apex in front of transverse sulcus, and pronotum, dense, of elytra sparse, especially laterally and toward the apex leaving polished areas; scales of ventral surface cream colored, iridescent, in contrast to the dull dorsal scales; pubescence of minute decumbent whitish setae, most prominent on the elytral declivity, above the eyes, and on the legs.

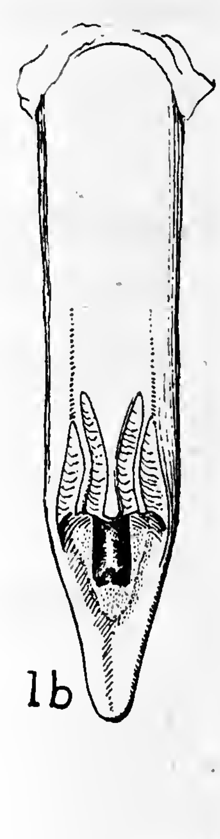
Rostrum stout, broader than long, apex emarginated, deeply canaliculate, and depressed medially, the median groove terminating anteriorly in an interantennal transverse sulcus; nasal plate small, triangular, not limited behind by a ridge; scrobes deep, angulate, descending, passing in front of the eye some distance from the eye. Antennae long and slender, with segment 2 of the funicle as long as 1, 3 to 7 decreasing slightly in length, club nearly as long as the scape, densely pubescent. Eyes prominent. Forehead convex. Thorax cylindrical, punctation hidden by the dense scale covering; vibrissae long, projecting from a knob. Elytra much broader than the thorax, widening beyond the middle, much more strongly so in the female, humeri prominent, acuminate and dehiscent at the apex, the interlocking lower margin of the suture exposed for a short distance, base convex from interval 1-5, coarsely punctate-striate, intervals very irregular, especially on the disc at the middle, interval 3 with two elevations, the median elevation the most prominent, behind this an oblong lower one, interval 5 raised from base to declivity, sometimes twice interrupted, interval 6 narrow, elevated at the declivity, interval 7 keeled entire length, more prominently



1



1a



1b

Fig. 1—Adult, ♂, *Pandeleteius pelodus*, n. sp. Fig. 1a—Adult, ♀, *Pandeleteius pelodus*, n. sp. Fig. 1b—Median lobe of aedeagus, *Pandeleteius pelodus*, n. sp.

so in the female. Anterior coxae narrowly separated. Legs slender, anterior pair elongated, anterior femora abruptly clavate, anterior tibiae gently curving in at the apex, sharply unguiculate and distinctly dentate; tarsal claws connate at the base.

Holotype male, U.S.N.M. no. 64650 and 7 paratypes (6 ♂ ♂, 1 ♀). Turrialba, Costa Rica, November 17, 1953, ex avocado, C. A. Fleschner, collector.

This species differs from the other two in the more approximate anterior coxae, the distribution of the elevations on the elytral intervals, and the cocoa scales which give the species a muddy appearance.

Representatives of *P. erubescens* and *P. boops* in the U. S. National collection are as follows:

Pandeleteius erubescens Champion

Pandeleteius erubescens Champion (1911) Biologica Centrali-Americana, Ins., Coleop., Vol. 4, pt. 3, p. 188.

San José, Costa Rica, 1000-1200 m. 1-XII-25, Neverman, in garden, 1 ♀; Same, 1-X-25, 1 ♀ Blatt von *Acanistus arborescens;* Same, 9-11-38 (18, 11 ♂ ♂, 7 ♀ ♀), frisst Blatt, *Persea americana;* San Pedro de Montes de Oca, Costa Rica, 961, July 15, 1933 1 ♂, C. H. Ballou; Same, Nov. 18, 1933, 4 ♂ ♂, on *Persea americana.* The type locality of this beautiful insect is Savanillas de Pirris, Costa Rica.

Pandeleteius boops Champion

Pandeleteius boops Champion (1911) Biologica Centrali-Americana, Ins., Coleop., Vol. 4, Pt. 3, p. 189.

San Pedro de Montes de Oca, Costa Rica, 3934, C. H. Ballou, Dec. 30, 1935, on *Persea gratissima* —1 ♀. The type locality of this species is Panama, Volcan de Chiriqui 4000 feet.

A NEW LOCALITY RECORD FOR LYTTA VIRIDANA LeCONTE (Meloidae)

Among a collection of Arizona Meloidae sent to me for identification by Dr. John S. Garth of the Allan Hancock Foundation (University of Southern California) was a series of *Lytta viridana* LeConte. These specimens were collected by the Allan Hancock Foundation in the San Francisco Mountains north of Flagstaff, Coconino County, Arizona, July 2, 1947, on *Iris missouriensis* Nutt. This is a new locality record for this species, as it is unrecorded from this state.—KEITH W. RADFORD, *Department of Entomology, University of Arizona, Tucson, Arizona.*

NOTES ON SOME TEXAS CURCULIONIDAE WITH A DESCRIPTION OF A NEW SPECIES

By HORACE R. BURKE[1, 2]

The 1 new species herein described was collected during a current survey of the weevil fauna of Texas. Notes of interest on other species encountered in the State are also included.

Onychylis texanus new species

Oblong-ovate, reddish brown; densely clothed with agglutinated, grayish brown scales; darker scales forming patterns on pronotum and elytra; alternate intervals of elytra each with a row of narrow, decumbent setae.

Holotype male: Body length, 3.7 mm (from anterior margin of eyes to tip of elytra); body width, 1.7 mm (across widest portion of elytra); rostrum length, 1.3 mm (along straight line from lower anterior margin of eye to tip of rostrum); pronotum length, 1.0 mm (along midline); pronotum width, 1.2 mm (across widest portion).

Rostrum longer than pronotum, moderately and evenly curved, slightly expanded at antennal insertions, then widening gradually to apex; basal two-thirds clothed with shining scales which obscure punctation; apex shining, finely and remotely punctured beyond antennal insertions. Mandibles piceous. Suprascrobes narrow, deep, widening at posterior extremities, opening against upper two-thirds of eyes. Antennae (fig. 7) light reddish brown, inserted slightly less than two-thirds distance from base of rostrum; scape slender on basal three-fourths, distinctly enlarged at apex, not attaining eye; funicle six-segmented; first segment elongate, clavate; second narrower, subequal to first, almost as long as next three combined; third, fourth and fifth segments a little longer than wide; sixth not closely joined to club. Club elongate oval, twice as long as wide, rather densely pubescent, with scattered long setae.

Head with a slight transverse impression above eyes; large punctures on frons covered with scales; a few scattered recurved setae on frons adjacent to upper anterior margins of eyes. Eyes oval.

Head with a slight transverse impression above eyes; large punctures on frons covered with scales; a few scattered recurved setae on frons adjacent to upper anterior margins of eyes. Eyes oval.

---

[1]Technical Contribution No. 3130, Department of Entomology, Texas Agricultural Experiment Station, College Station.

[2]I am indebted to Mr. R. T. Thompson, British Museum (Natural History), for the loan of type material for comparison, and to Dr. Vasco M. Tanner, Brigham Young University, for information on material in his collection.

Prothorax wider than long, sides subparallel on basal two-thirds, then feebly converging to apical constriction; apex moderately constricted. Pronotum coarsely, densely punctate, depressed before apex; disk with three dark longitudinal vittae, two lateral ones narrow, middle one broader and somewhat diamond-shaped.

Elytra wider than prothorax, transversely impressed on disk before middle; sides almost parallel, slightly wider at middle, thence converging to rounded apex. Humeri oblique, rounded, subangulate behind. Intervals subequal in width; alternate ones slightly more convex, each bearing a row of pale, narrow, decumbent setae which are longer and more prominent on the declivity; basal extremities of second and fourth intervals darker for a short distance; first to fifth intervals elevated at base. Striae wide, shallow, but well defined; strial punctures covered with scales. V-shaped pattern of dark scales on disk of elytra originating on suture at beginning of declivity, from which point a narrow arm extends obliquely forward across first four intervals of each elytron. Scales on declivity infuscated.

Ventral side of body, except third, fourth and fifth abdominal sterna, clothed with scales similar to those on dorsal surface. First and second abdominal sterna with rather large, uniformly placed punctures; first deeply impressed at middle. Third, fourth and fifth sterna finely punctate; clothed with scattered suberect setae and small, rounded grayish white scales which become rather elongate along lateral edges of segment. Last sternum with slight impression in middle at apex and a tuft of setae projecting from posterior margin on each side of impression.

Legs long; femora and tibiae with scattered recurved setae. Tibiae each with a prominent apical spine; long, suberect setae and row of small, acutely pointed denticles along inner margin; scales on inner side of tibiae grayish white, rounded, with feathery margins. Fore and middle tibiae feebly curved at apex; hind tibiae straight. Tarsi four-segmented, third segment deeply bilobed, nearly twice as wide as second, fourth equal in length to third, bearing a pair of slender, slightly divergent claws.

Allotype female: Body length, 3.7 mm.; body width, 1.7 mm.; rostrum length, 1.4 mm.; pronotum length, 1.0 mm.; pronotum width, 1.2 mm.

Resembles male, except that the first abdominal sternum is convex and the impression on the last segment is deeper and more distinctly defined.

Type material: Holotype male and allotype female, Anderson Co., Texas, VIII-31-1958 (H. R. Burke), in Collection of Department of Entomology, A. & M. College of Texas. Eleven paratypes (5 males, 6 females) same data as holotype and allotype, and one additional female paratype, Walker Co., Texas, IV-26-1957 (M. J. Lukefahr), to be deposited as follows: 1 female, 1 male, United States National Museum; 1 female, 1 male, British Museum (Natural History); 1 female, 1 male, V. M. Tanner, Brigham Young University; 2 females, A. & M. College of Texas; and 2 males, 2 females, author's collection.

The type series from Anderson County was collected while sweeping vegetation around a small pond. The specimen collected by M. J. Lukefahr in Walker County was taken while sweeping in a roadside ditch.

There is little variation in the paratype series, except in size. Seven paratype females range from 3.3 to 4.4 mm. (Av. 3.9) in body length. The body length of five paratype males ranges from 3.3 to 3.7 mm. (Av. 3.5).

Aedeagus with aedeagal apodemes and endophallus of male paratype illustrated in figures 6a, 6b and 6c.

Spermatheca of female paratype, and eighth sternum of same, illustrated in figures 3 and 5, respectively.

This is the largest known species of *Onychylis*. It is most closely related to *Onychylis setiger* Champion (Biol. Cent. Amer., Col., Vol. 4, Pt. 3:134) from Mexico, from which it differs by the larger size, the rostrum being longer in comparison with the length of the pronotum, the sides of the prothorax being more nearly parallel (figs. 1, 2), and the elytral striae being wider and shallower. Differences are also evident in the spermathecae of the two species (figs. 3, 4). *Onychylis texanus* was compared with a female cotype specimen of *O. setiger* Champion, which was made available by loan from the British Museum (Natural History). Both species have a row of spines on the inner side of each tibia, and both have the first and second segments of the funicle elongated. *Onychylis texanus* traces to *O. alternans* Lec. in Tanner's key to species occurring in America north of Mexico (Great Basin Nat. 4(1-2):7). However, *O. texanus* may be easily distinguished from *O. alternans* by having the more elongate first funicular segment and a row of spines on the inner side of each tibia.

Additional notes on other species

Auletobius cassandrae (Lec.)—A single example of this species was collected VIII-16-1958, Montgomery Co., while beating underbrush in the edge of a thickly wooded area. This weevil is listed in the Leng Catalogue from Georgia and Florida, and has not previously been reported from Texas. Another species, *Auletobius ater* (Lec.), also occurs in the State.

Apion disparatum Sharp—Adults were collected in large numbers at College Station, June and July 1958, on *Petalostemum multiflorum* Nutt., growing along the edge of a pond. The larvae develop in the flower heads of this plant.

Isodacrys ovipennis Schffr.—Abundant in Central and South Texas during March, April and May. Numerous specimens have been swept from low vegetation in open fields near College Station during March and April. Examples were examined from Gonzales Co., April 1955, where they were reported doing considerable damage to the foliage of young watermelons and peas.

Aphrastus unicolor Horn—Common in South Texas. Members of the species were found defoliating young watermelons and cowpeas in Wilson and Karnes Cos., May 1955. Crop damage by this and the preceding species has not been reported before or since the 1955 growing season. Since 1955 was a particularly severe drouth year, it is possible that these two weevils moved from their natural host plants, which perhaps were suffering from lack of moisture, into the irrigated and succulent watermelon and pea fields.

Achrastenus griseus Horn—Common in East and Central Texas. It is known to feed on the foliage of roses, pear, peach, plum, grape and pecan. It frequently damages pecan, peach and plum trees by destroying the young buds. A recent case was reported where this weevil damaged young tomato plants.

Endalus laticollis Blatcheley—A large series of this weevil was taken while sweeping vegetation along the edge of a pond in Anderson Co., VIII-31-1958. Additional specimens were collected at College Station. This species has previously been reported only from Florida.

Numerous examples of *Brachybamus electus* Germ., *Onychylis longulus* Lec. and a single *Lixellus filiformis* Lec. have been collected on vegetation around the edges of ponds in Central Texas. The latter species apparently is not at all common in this area.

Amercedes sublirostis Csy.—This weevil occurs abundantly on *Xanthoxylum clava-herculis* L. in Brazos Co. during April and May. Adults have been observed feeding on the fruit of this tree, but an extended search has failed to reveal the immature stages. Pierce (Proc. Wash. Ent. Soc. 13:60) lists *Zygobaris xanthoxyli* Pierce as breeding in the seeds of *X. clava-herculis* in Victoria Co.

Stethobaris cicatricosa Csy.—Several adults emerged at College Station, May 1957, from cotton gin trash which had been collected at Brownsville. These weevils had likely entered the trash the preceding fall at Brownsville. From collection records it appears that the species is confined to the extreme southern portion of the State.

Centrinapsis perscitus Hbst.—This weevil may be collected at College

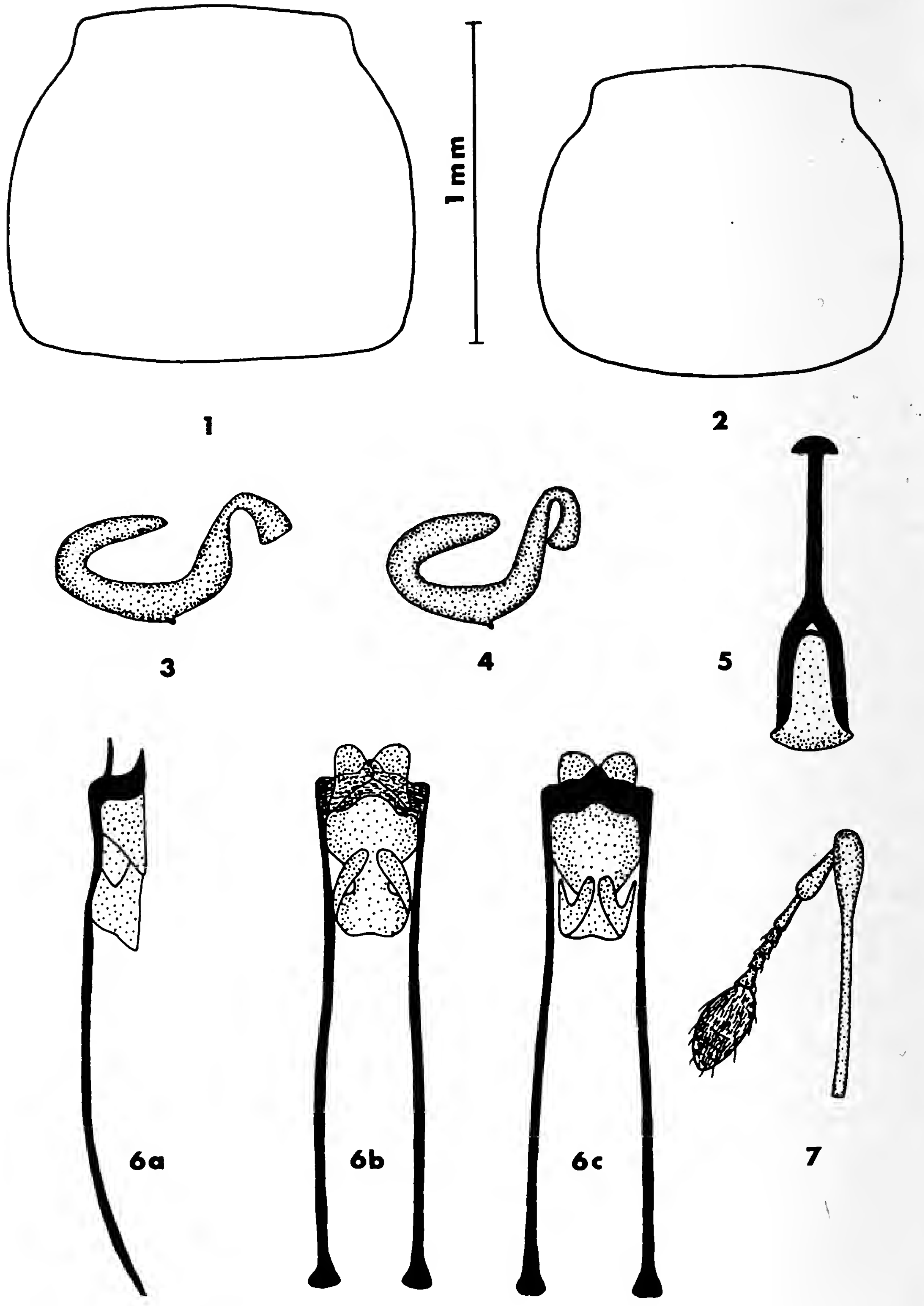


FIGURE 1. Outline of prothorax of female *Onychylis texanus* n. sp. FIGURE 2. Same of female *O. setiger* Champion. FIGURE 3. Spermatheca of *O. texanus* n. sp. FIGURE 4. Same of *O. setiger* Champion. FIGURE 5. Dorsal view of eighth sternum of female *O. texanus* n. sp. FIGURE 6a. Lateral view of aedeagus and aedeagal apodemes of male *O. texanus* n. sp. FIGURE 6b. Dorsal view of same. FIGURE 6c. Ventral view of same. FIGURE 7. Antenna of *O. texanus* n. sp.

Station from June through September. Several examples were taken on *Portulaca oleracea* L., VI-16-1923 (H. J. Reinhard). Other specimens were collected recently on the sides of screen cages in fields where this plant was abundant.

Tyloderma baridia Lec.—Adults are extremely abundant on the ground beneath *Oenothera laciniata* Hill, during the spring months. The larvae feed on the roots of this plant. Adults, sometimes in large numbers, often invade houses during late fall.

ADDITIONAL RECORDS OF CISSITES (Meloidae)

The recent summary of distributional records of *Cissites* published by Enns (1958, Coleopterists' Bull., vol. 12, pp. 61-64) prompted me to review the records of the genus that I have accumulated during the past few years, and I take this opportunity to add them to Dr. Enns' lists of localities. I wish to thank the collectors and the curators of the various institutional collections mentioned below for making this material available to me.

Cissites auriculata (Champion). Most of the localities from which *auriculata* has been recorded lie within the tropical zone of México and Central America, although previously published records from the southern end of the Mexican Plateau (Guadalajara, Jalisco, and Tehuacán, Puebla) demonstrate that the species is also able to withstand temperate conditions. In addition, I have records of two females from the northern part of the plateau, in Nuevo Leon: one from El Diente, October 1957, H. Ramírez; and the other labeled Monterrey, April 28, 1954. Both specimens are in the collection of the Instituto Tecnologico y de Estudios Superiores de Monterrey. Mr. Jean Mathieu, a member of the staff of the Instituto, tells me that El Diente is a large toothlike boulder 4 miles southwest of Monterrey that has become a familiar landmark. He describes the vegetation at El Diente, which lies in a canyon, as considerably more mesic than usual for the Monterrey region. The records from Nuevo Leon extend the known range of *auriculata* in eastern México some 475 miles northward (from Almolonga, Veracruz). Other Mexican records are represented by single specimens from: Jalastoc, Morelos, November 30, 1957, F. Mendoza; Mesa de San Diego, Puebla, April 10, 1953, Riess; Cotaxtla, Veracruz, April 10, 1956, Ortega; Tehuantepec, Oaxaca, July 12, 1955, P. & C. Vaurie; Río Papagayo, Guerrero, January 5, 1948, S. & D. Mulaik; and Tuxtla Gutiérrez, Chiapas, August 20, 1952, M. Alvarez del Toro. The specimens from Morelos, Puebla, and Veracruz are in the collection of the Rockefeller Foundation Agricultural Program in México, at Chapingo, México; the specimen from Oaxaca is in the American Museum of Natural History; and the rest are in my collection.

Cissites maculata (Swederus). There is little to add to Enns' account of the distribution of this species except to point out that in the West Indies there are published records for the islands of Puerto Rico and Dominica (see Selander and Bouseman, Proc. U. S. Nat. Mus., *in press*, for a summary of all West Indian records). Records of specimens of *maculata* in my collection are as follows: Ascushinga, Córdoba, Argentina, January 1953, J. Foerster, 2; Nova Teutonia, Santa Catarina, Brasil, December 17 and 20, 1955, F. Plaumann, 2; Obados, Pará, Brasil, 1; Hacienda María Sancuratambo, 3000 ft., Cosnipata Valley, Cusco, Perú, February 27, 1952, tropical jungle, F. Woytkowski, 1.—RICHARD B. SELANDER, *University of Illinois, Urbana.*

NOTES ON A FEW SPECIES OF PACIFIC COAST CERAMBYCIDAE

By HUGH B. LEECH[1]

Anoplodera laeta (LeConte)

The only published host record listed for this species by Swaine and Hopping (1928:53) is *Quercus Garryana* Dougl., given by Hardy (1926: C29; and p. 6 in the reprint). However, it was recorded from "Dead Quercus agrifolia and Quercus sp." by J. J. Rivers (1886a-:71; 1886b: 67; 1886c:7), and from the branches of dead *Quercus agrifolia* Néc.) [sic], as *Septura lœcta,* again by Rivers (1887a:73; 1887b:11).

On February 7, 1955, at Mill Valley, Marin Co., California, I found a dead adult in its pupal cell in chinquapin, *Castanopsis chrysophylla* (Dougl.) A. DC. [Fagaceae] which had died in the fall of 1953. The cell was under the bark at and just below ground level (*i.e.* at the level of the duff, not the mineral soil), in a tree having a diameter of 12.5 cm, at 38 cm. above the ground. Three *A. laeta* larvae were recovered, and the remaining wood brought indoors and caged; eight adults emerged during March and April.

Necydalis laevicollis LeConte

Linsley (1940:277) wrote that "This is the only North American species of *Necydalis* known to attack coniferous trees" and cited *Picea, Abies, Pseudotsuga.* On the next page he placed records of this species from non-conifers (Hardy and Preece, 1926:37) as misidentifications of *N. diversicollis* Schaeffer. This may apply to Rivers' listing of "Decayed oak, Quercus agrifolia, and in dead Eucalyptus globulus" (1886a:71; 1886b:67; 1886c:7), but an example of true *N. laevicollis* from the Ralph Hopping collection is labeled "McDonalds Wood, Victoria [B.C.], X.16.-1925. G. A. Hardy. In dead Alder stump." Mr. Gordon Stace Smith of Creston, B.C., who is familiar with both species, wrote (letter of June 22, 1957) that he has one *N. laevicollis* from Gordon Head [near Victoria], *ex* "caged willow" (G .A. Hardy), and nine from Wellington, B.C.. "reared from *Arbutus*" (R. Guppy).

On August 24, 1930, on the campus of the University of British Columbia at Vancouver, I took a number of dead *Necydalis laevicollis* from the outer ends of their tunnels in a log of *Alnus rubra* Bong. They had failed to gnaw their way out through the last milimeter or two of bark, after leaving their actual pupal cells.

[1] California Academy of Sciences, San Francisco 18.

The two species are readily separated on the characters given in Linsley's key (1940:272):

"5. First segment of posterior tarsi slender, at least one and one-half times as long as remaining segments together; antennal tubercles acute above; fourth segment of antennae distinctly longer than scape; elytral apices dehiscing gradually from basal one-third. 15-20 mm. Pacific Coast from British Columbia to northern California (p. 276) .... laevicollis

First segment of posterior tarsi robust, about as long as following segments together; antennal tubercles obtuse above; fourth segment of antennae subequal in length to scape; elytral apices dehiscing gradually from apical one-fourth. 13-20 mm. Rocky Mountains and Pacific Coast from British Columbia to southern California (p. 278) .... diversicollis"

Linsley divided *N. laevicollis* into two subspecies, *N. l. laevicollis* LeConte (rufous coloration, with only the eyes and mandibles dark; occurring along the Pacific Coast from British Columbia to Plumas County, California; type locality, "Vancouver's Island."), and *N. l. seminiger* Linsley (black, usually with the elytra brownish and the femora rufous; along the coast in southern Oregon and northern California; type locality, Crescent City, California).

In the southern part of their range one is thus coastal and the other from the interior, but in the north they come together, as is to be expected. Three British Columbia examples before me are by definition *N. l. seminiger:* two from Hunter Creek, Restmore, 19 and 20.VII.1938 (E. C. Van Dyke); and one from Annis Bay, Nelson Island, 31.VII.1927 (L. V. Hopping). The one specimen now before me from my Vancouver *Alnus rubra* series is perhaps dark enough to be *N. l. seminiger,* but since it died before emerging from the wood, the coloration may not be normal.

All this suggests either that there is still some confusion in the records as non-coniferous wood. More host-associated specimens are needed!
for *N. laevicollis,* or that the larvae are able to utilize coniferous as well

Necydalis cavipennis LeConte

Linsley (1940:275) summarizes the host records as "*Quercus, Eucalyptus, Alnus, Heteromeles.*" Chemsak (1958:41) records *Quercus agrifolia* Née. I have seen the following additional material: Seventeen specimens from Novato, Marin Co., California, June 21-July 4, 1957 (E. L. Kessel), reared from *Quercus agrifolia* Née. One from Mill Valley, Marin Co., June 7, 1957 (H. B. Leech), reared from a dry, standing, fungus-infested dead *Quercus Wislizeni* var. *frutescens* Engelm. of 65 cm. diameter. Larvae and pupae (adult reared) from Mill Valley, in a wet, rotting log of *Lithocarpus densiflora* (H.&A.) Rehd., May 26, 1957 (H. B. Leech).

Phymatodes aeneus LeConte

Recorded from Douglas fir, *Pseudotsuga taxifolia* (Lamb.) Britt. (= *P. mucronata* Raf.) from the vicinity of Victoria, B.C., by Hardy and Preece (1927a:190; and with fuller data in 1927b:65-66). I have seen specimens reared from western hemlock, *Tsuga heterophylla* Sarg. at Vancouver, B.C., June 12 and 27, 1939, by W. G. Mathers.

These coniferous hosts, in the northern range of *P. aeneus,* are strangely at variance with its known hosts along the coast of central California. At Mill Valley, Marin County, I have reared it from dead hazel, *Corylus californica* (A. DC.) Rose, from wood showing the emergence holes of at least one previous generation; judging by the sizes of larvae present a life cycle takes more than one year in *Corylus.* I have reared it also from *Castanopsis chrysophylla* (Dougl.) A. DC., and from *Quercus Wislizeni* var. *frutescens* Engelm.; for the the latter record see Leech (1955:40). All emergences were in March, April and May; field captures in the same area were in May and June. The beetles from conifers in British Columbia do not appear to differ from those taken at Mill Valley, California; Dr. E. G. Linsley has examined them and agrees with this statement.

Holopleura marginata LeConte

First reported (as *H. helena* LeConte) from the dead twigs of *Umbellularia californica* (H. & A.) Nutt. by Rivers (1886a:71; 1886b:67). Not knowing of his papers, I recorded it from the same host (1955:40). I have reared it from branches still attached to the trees, dead, dry and from 7 to 12 mm. in diameter; from similar branches on the ground; and once from a small rotting (''punky'' stage) log of 8 cm. in diameter. Emergences were in March and April; field collections in the same area are for April, May and June, but I have also cut fully matured adults from their pupal cells in mid-September.

Triodoclytus lanifer (LeConte)

An adult emerged on March 23, 1957, from a dead stem of chaparral pea, *Pickeringia montana* Nutt., from Mill Valley, Marin Co., California. I have taken an adult on the trunk of a dying *Ceanothus thyrsiflorus* Esch. in July, so this may also prove to be a host plant.

ACKNOWLEDGMENT

It is a pleasure to thank Miss E. M. Alexander of the Documents Department, the General Library of the University of California, Berkeley, for her help in identifying the articles by J. J. Rivers.

LITERATURE CITED

CHEMSAK, J. A. 1958. Rearing records for some California Cerambycidae. Pan-Pacific Entomologist, 34 (1): 41-42.

HARDY, G. A. 1926. Cerambycidae of Vancouver Island. (Preliminary annotated list.) Province of British Columbia, Report of the Provincial Museum of Natural History for the Year 1925. The King's Printer, Victoria, B.C. Pp. C24-C33; pl. IV and its explanations between pp. C28-C29. Received by mail at San Francisco on June 21. Also issued as a separately paged reprint with covers, with pls. at back, and a pink insert of Corrigenda and Addenda next to the back cover.

HARDY, G. A., and W. H. A. PREECE. 1926. Notes on some species of Cerambycidæ (Col.) from the southern portion of Vancouver Island, B.C. Pan-Pacific Entomologist, 3 (1): 34-40. (The July number, actually published on September 29.)

———— 1927a. Further notes on some species of Cerambycidæ (Col.) from the southern portion of Vancouver Island, B.C., with descriptions of some new varieties. Pan-Pacific Entomologist, 3 (4): 187-193. (Published June 9.)

———— 1927b. Additional notes on some Cerambycidæ (Col.) from Vancouver Island, B.C. Pan-Pacific Entomologist, 4 (2): 61-67. (Published December 3.)

LEECH, H. B. 1955. [Untitled note in the Minutes of the 236th meeting.] Proceedings of the Pacific Coast Entomological Society, *in*: Pan-Pacific Entomologist, 31 (1): 40. (Published March 24.)

LINSLEY, E. G. 1940. A revision of the North American Necydalini (Coleoptera, Cerambycidae). Annals of the Entomological Society of America, 33 (2): 269-281.

RIVERS, J. J. 1886a. Contributions to the larval history of Pacific Coast Coleoptera. Bulletin of the California Academy of Sciences, 2 (5): 64-72. (Published April 23, 1886.)

———— 1886b. Contributions to the larval history of Pacific Coast Coleoptera. Annual Report of the Secretary to the Board of Regents of the University of California for the Year Ending June 30, 1886. The State Printer [James J. Ayers], Sacramento, California. [The article by Professor Rivers is on pp. 63-69; a second ar'icle by him finishes p. 69 and completes p. 70. Despite the similar title, parts of the text differ radically from that of the previous item (*e.g.* under Chrysomelidae, Melandryidae, *Polycaon confertus* from Napa Valley, announcement of the rearing of a female of *Zarhipis riversi* Horn, etc.). The date of publication is given only as 1886, but Miss E. M. Alexander of the Documents Department at the General Library of the University of California, Berkeley, writes: ''Since the letter of transmittal for the Report of the Secretary is date June 30, 1886, it is unlikely that the type was set previous to that date for this printing of the publication.'' To the best of my knowledge this paper has not been cited previously in entomological literature.]

———— 1886c. Contributions to the larval history of Pacific Coast Coleoptera. The State Printer, Sacramento, California. [This is a separately published edition of the previous item. It has a cover, a separate title page, and the whole is paged 1-9 (p. 1 is the title page, p. 2 is blank; there is a second article by Rivers on pp. 9-10). It differs from the one in the above Annual Report to the Secretary in the lay-out of pp. 5-8, resulting from the removal of a printer's signature ''5^{14}'' which is at the foot of page 65 of the Annual Report printing. Since it otherwise has the appearance of an author's reprint, I am presuming that it was issued after the original volume; but it could have appeared as a preprint. It is the first item under "Rivers" in the bibliography to Leng's Catalogue of the Coleoptera of America, North of Mexico.]

———— 1887a. The oaks of Berkeley and some of their insect inhabitants. Annual Report of the Secretary to the Board of Regents of the University of California for the Year Ending June 30, 1887. The State Printer, Sacramento, California. [Miss Alexander notes that this was first read as a paper before the Berkeley Scientific Club on March 12, 1887. It comprises pp. 67-74 of the Annual Report.]

———— 1887b. The oaks of Berkeley and some of their insect inhabitants. The State Printer, Sacramento. [Like the 1886c item listed above, this is a separate publication, in the general form of a separately paged reprint. It has a cover, a title page (= p. 1, page 2 being blank) and is paged 1-12. The title page is the same as the front cover, but lacks the ornamental border, just as in the 1886c item. The lines of type are spaced further apart in the reprinting, so that the same text covers two pages more than in the 1887a item, above.]

SWAINE, J. M., and RALPH HOPPING. 1928. The Lepturini of America north of Mexico. National Museum of Canada, Bulletin No. 52 (Biological Series, No. 14). 97 pp., incl. pls. I-XIII.

MICHIGAN STATE LIST IN PREPARATION

Work has begun on a list of the insects, arachnids, and other land arthropods of Michigan. Preliminary records of about 17,000 species and about 85,000 individual county occurrences are on hand. These will be supplemented from all reasonably available sources, typed, and revised by specialists before final typing and publication. Assistance from interested persons is requested. Definite locality records with authentic determinations, determiners for material on hand that is still unnamed, specialists to advise on taxonomic arrangements and nomenclature, and in some areas workers to take entire responsibility for the manuscript on taxonomic groups in their specialties, all are needed.

It is planned to have a typed copy of available records in the hands of specialists by January, 1960, and a manuscript for final typing ready by January, 1962.

Specialists so far agreeing to take sections of the manuscript are as follows: Frank Ammerman, Rhynchophora; T. H. Hubbell and Irving Cantrall, Orthoptera; J. H. Newman Macrolepidoptera except butterflies; David Shappirio, Mutillidae; George Steyskal and Curtis Sabrosky, Diptera; Henry Townes, Ichneumonidae, Stephanidae, Gasteruptiidae, Evaniidae, Trigonalidae, and Roproniidae; W. Miller, Staphylinidae, Heteroceridae; Roy Shenefelt, Braconidae; Richard Bohart, Vespidae, Sapygidae; Floyd Werner, Meloidae, Anthicidae, Aderidae (= Englenidae, Xylophilidae, Hydrophilidae); Richard Selander, Rhipiphoridae; Paul Kannowski, Formicidae; Lewis Stannard, Thysanoptera; Warren Atyeo, Mites (Bdellidae); William Bickley, Chrysopidae; Herbert Ruckes, Pentatomidae, Scutelleridae, Cydnidae; M. Nielson, Butterflies; Justin and Fannie Leonard, Ephemeroptera, Plecoptera and Trichoptera; R. Crabill, Centipedes, Millipedes; T. J. Spilman, Tenebrionidae.

R. R. Dreisbach is general editor of the list and responsible for all groups not assigned to others. Address all general communications to Mr. Dreisbach, 301 Helen Street, Midland, Michigan; communications concerning special groups to the responsible specialists.

R. R. DREISBACH, ROLAND FISHER, J. H. NEWMAN, GEORGE STEYSKAL, and HENRY TOWNES (*Steering Committee*).

A STUDY OF THE DIAGNOSTIC CHARACTERS OF TWO NORTH AMERICAN SPECIES OF THE GENUS *Diplocheila* BRULLE, WITH NOTES ON THEIR ECOLOGY (CARABIDAE, LICININI)

By ALY ALY EL-MOURSY and GEORGE E. BALL[1]

The taxonomy of the North American species of *Diplocheila* has been recently reviewed by the second author, (Ball, 1959). Only small series of specimens of each species were available for that study and the amount of material from any one locality was, in general, very small, so that statements about geographical variation were based on composite samples of specimens from adjacent localities rather than samples from single localities. For example one of the largest groups of specimens of *Diplocheila striatopunctata* treated as a unit for purposes of analysis was from Ontario (Canada), and was composed of specimens from four different localities within this province. Of course, the most meaningful statements about variation are derived from series of samples consisting of large numbers of individuals, each group of which is collected in a single locality over a relatively short period of time.

Series large enough to permit further evaluation of the diagnostic characters and of the statements relating to geographical variation have now become available. Within the last four years, the second author has been able to accumulate material of two very similar and seemingly closely related species of *Diplocheila* which occur in south-central and western Canada, namely *striatopunctata* LeConte and *oregona* Hatch. It was decided to use these as the basis for a re-investigation of their supposedly diagnostic characters. This paper includes a summary and analysis of the data obtained, and information on the ecology and the feeding habits of the two species.

Measurements and spine counts were made by the first author, who also determined the statistical parameters, prepared the illustrations and the first draft of this paper. The second author directed the program, provided the ecological data and is responsible for the preparation of the manuscript.

ACKNOWLEDGMENTS

The material described was obtained on three collecting trips in southern Canada, two of which were financed by a grant in aid of research from the National Research Council of Canada (NRC Grant No. 194). We gratefully acknowledge the assistance of the following biologists in obtaining specimens: ROBERT LISTER, Department of

[1]Department of Entomology, University of Alberta, Edmonton, Canada.

Zoology, University of Alberta, whom the second author accompanied to the Albertan prairies in 1955; EVELYN and STUART CRIDDLE, whose knowledge of the natural history of southern Manitoba and whose hospitality are unrivalled; J. B. WALLIS, who introduced the second author to the Manitoba insect fauna and to the Criddles in the summer of 1956; CARL H. LINDROTH, the Swedish biologist, whose knowledge of Canadian carabids both in the field and in the museum is without parallel; and GORDON STACE-SMITH, the foremost authority on the beetles of British Columbia, who took the second author to a number of excellent collecting localities in the vicinity of Creston.

MATERIALS AND METHODS.—This study is based on 279 specimens. The areas in which they were collected are indicated in Figure 1, and the localities are listed below. Two variates of taxonomic importance require

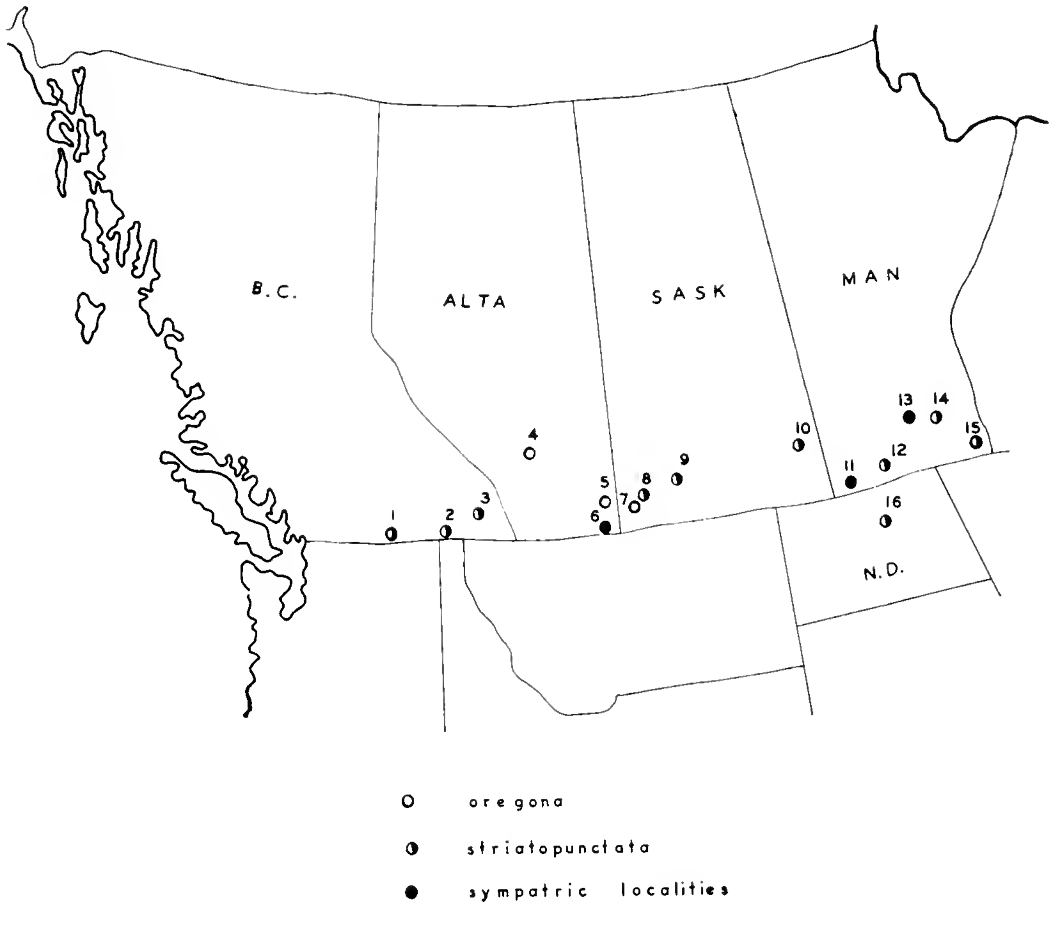


FIG. 1

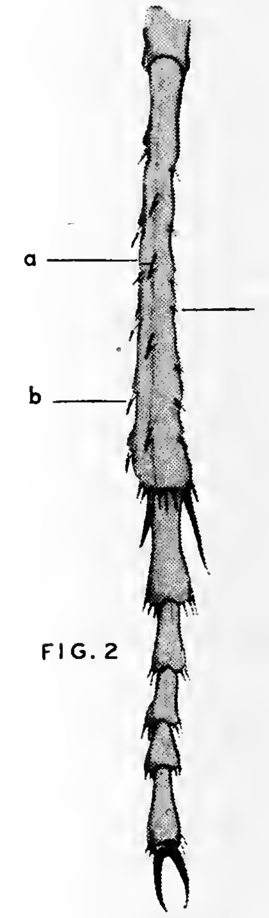


FIG. 2

FIGURE 1. Distribution of *D. striatopunctata* and *oregona*. 1. Osoyoos, Oliver. 2. Atbara. 3. Island Pond, Wasa Lake. 4. Keoma. 5. Ralston, Cypress Hills, Elkwater, Route 48. 6. Manyberries Range Station. 7. Cypress Hills Park, route 21. 8. Gull Lake. 9. Reed Lake. 10. Percival. 11. Whitewater Lake. 12. Glenboro, Baldur, Aweme. 13. Shoal Lake. 14. Selkirk, Little Stony Mountain. 15. White Houth Lake. 16. York.

FIGURE 2. Part of the hind leg of *D. striatopunctata*: a, posterior median row of spines; b, posterior external row; c, posterior internal row.

explanation, namely total length of body and tibial spine counts. The total length of the body was taken as the sum of three measurements: The linear distance from the base of the clypeus to the posterior margin of the compound eye (taken on the left side); the linear distance from the apex to the base of the pronotum, along the mid-line; and the linear distance from the basal transverse groove of the left elytron to the elytral apex.

If the hind tibia is viewed from the posterior aspect, a longitudinally directed groove bearing a row of spines can be seen on each side. Between these rows on the median convex surface there is another row of spines, referred to here as the posterior median row (Figure 2, a). The number recorded for each specimen is the sum of the spines in the posterior median row of both hind tibiae.

Ball (1959) used the total body length and the presence or absence of a low dorsal tubercle on the left mandible to separate *striatopunctata* from *oregona*. The number of spines in the posterior median row of the hind tibiae was useful as a subsidiary character, and it appeared that this character would be useful at least in identifying population samples, even though it is somewhat too variable to determine individual specimens. The same was thought to be true of variation in color of elytra, the presence or absence of a puncture in the third elytral interval, and the relative convexity of the elytral intervals.

Using the mandibular character (tubercle present in *striatopunctata*, absent in *oregona*), the specimens were segregated into two groups. Each specimen was measured, scored for elytral color and presence or absence of a puncture in the third elytral interval, and the tibial spine counts were made. Statistical parameters were determined for total lengths and spine counts in those samples which consisted of 10 or more specimens. These are summarized in Figures 3 and 4 using Hubbs-Hubbs diagrams (1953). Graphs were prepared showing the relationship between spine count and total length for each specimen examined (Figures 5 and 6).

The median lobe of the male genitalia of five specimens of each species was studied. The basal bulb was found to vary considerably in shape, but no constant differences between the two species could be found.

Diplocheila striatopunctata LeConte, 1844

Specimens of this species numbering 106 males and 66 females, were collected in the following localities:

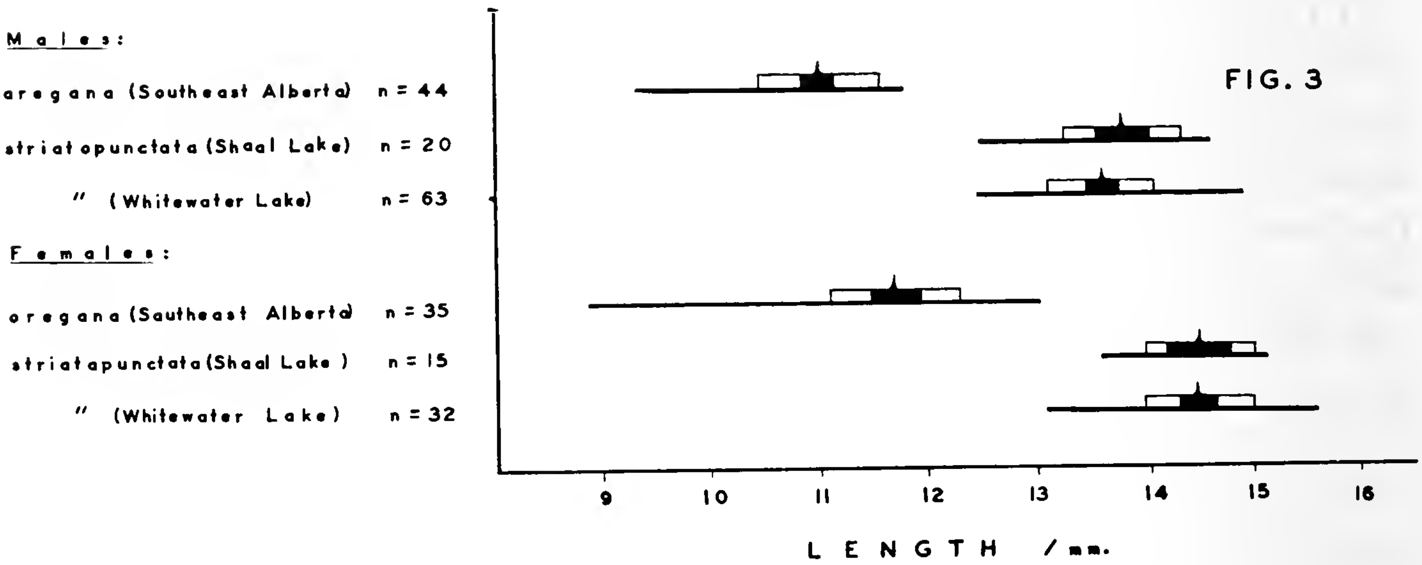
ALBERTA: Southeast Alberta 49° 04′ 20″ north, 110° 25′ 24″ west, [Manyberries Range Station]. (2 females).

BRITISH COLUMBIA: Atbara near Creston (6 males, 6 females); Island Pond 35 miles north Kimberly route 95 (one male); Wasa Lake, nr. Wasa (3 males, 3 females); Spotted Lake near Osoyoos (2 males); Okanagan River near Oliver (one female).

MANITOBA: Whitewater Lake (63 males, 32 females); Glenboro (2 females); Shoal Lake near Woodlands (20 males, 15 females); Little Stony Mountain near

Winnipeg (one male and one female); Whitemouth Lake (one male); Baldur (one female); Assiniboine River near Aweme (one male); Selkirk (one male).
NORTH DAKOTA: 11.9 miles west York (4 males, one female).
SASKATCHEWAN: One mile east Percival on route 1 (2 males, one female); 1.5 miles east Gull Lake (one female); Reed Lake near Morse (one male).

The series of specimens collected at Shoal Lake vary in total length as follows: males, 12.5-14.6 mm.; females 13.6-15.1 mm. The Whitewater



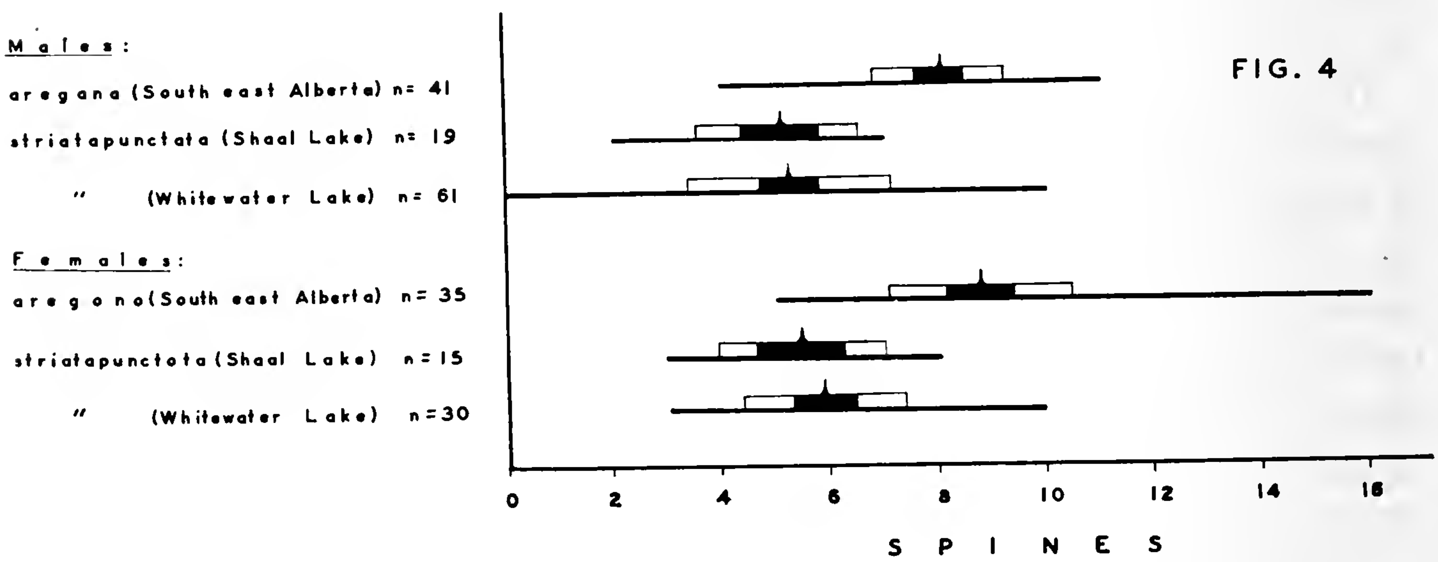


FIGURE 3. Body length of *D. striatopunctata* and *oregona*. Heavy horizontal line = the range of variation. Apex of the small narrow triangle = the mean. The blackened part of each bar = two standard errors of the mean on either side of the mean. One half of each black bar plus the white bar at either end = one standard deviation on either side of the mean.

FIGURE 4. Number of spines on the posterior median row of the hind tibiae in *D. striatopunctata* and *oregona*: The explanation of lines as in Figure 3.

Lake specimens exhibit these extremes: males, 11.3-14.9 mm.; females, 13.3-15.6 mm. The specimens collected from the remaining localities fall within these ranges, except for one female collected at Atbara (B.C.), which measures 13.0 mm. The specimens examined by Ball (1959) vary as follows: males, 12.5-15.9 mm.; females 14.1-17.9 mm. These values are higher than those reported in the present study. The mean values given by Ball were based on composite samples, and therefore cannot be directly compared with the mean values given in the present study. They are higher than the values reported here but not significantly so.

Data on variation in the total number of spines in the posterior median row of the hind tibiae are presented in Figure 4. The maximum range of variation is seen in male specimens from Whitewater Lake, Manitoba, (0-10). This range exceeds by one unit that reported by Ball, 1959 (1-10 spines).

The elytra are bicolored in 66 per cent of the Shoal Lake, Manitoba specimens; and in 63 per cent of the Whitewater Lake, Manitoba specimens, with the even intervals reddish brown and the odd intervals black. Bicolored individuals were taken in all of the prairie localities listed below, except at Percival, Saskatchewan. In this locality only one specimen was found. The nineteen specimens collected in British Columbia are concolorous, black. According to Ball (1959) the percentage of bicolored individuals varies from 11 to 83 per cent, the highest values occurring in populations in the Great Plains area, decreasing both eastward and westward. The data reported here are not contrary to this statement.

In all specimens, at least some of the elytral intervals are noticeably convex (usually 6 and 7), and the elytral striae are deeply impressed, as compared with specimens of *oregona*. Interval 3 of at least one elytron per specimen bears a puncture in 77 per cent of the Whitewater Lake sample, in 75 per cent of the Shoal Lake sample, and in 75 per cent of the Atbara sample. The remaining specimens in each of these samples have all elytral intervals impunctate. The specimens from nine additional localities have impunctate elytral intervals. According to Ball (1959), the percentage of impunctate specimens varies from 100 to 58.3 per cent, depending upon the locality. Of the Manitoba-Saskatchewan sample, 72 per cent were reported as having punctate elytra, and the figures given above for the Manitoba samples are close to this value.

Diplocheila oregona Hatch, 1951

Specimens of this species numbering 56 males and 51 females, were collected in the following localities:

ALBERTA: Southeast Alberta 49° 04′ 20″ north, 110° 25′ 24″ west, [Manyberries Range Station]. (44 males, 35 females); Manyberries Range Station near One-Four (2 males); North Keoma route 9 (2 males, 4 females); North Ralston 50° 16′ north, 111° 34′ west (7 males, 4 females); Route 48, 49° 14′ 20″ north, 110° 15′ 00″ west (3 females); Elkwater (one female).

MANITOBA: Whitewater Lake (one male); Shoal Lake (one female).

SASKATCHEWAN: Cypress Hills Park (one female); 16 miles south Cypress Hills Park route 21 (2 females)

Specimens of this species collected in southeastern Alberta at the Manyberries Range Station, vary in length as follows: males, 9.3-11.8 mm.; females, 8.9-13.0 mm. (Figure 3). Specimens collected in the localities listed above fall within this range, except for two males from near Ralston, Alberta that were only 9.0 mm. The range of variation given by Ball for this species is: males, 10.5-12.6 mm.; females, 10.7-13.3 mm. Thus the values as reported by him are slightly higher than those given here.

The eyes are not as convex and therefore not as prominent as in *striatopunctata*, and the posterior angles of the pronotum are not sharply angulate. These differences are readily appreciated when series of these two species are available for comparison.

The number of spines in the posterior median row of the hind tibiae varies from 3 to 16 in the southeastern Alberta sample (Figure 4), and specimens from the other localities fall within this range of variation. Ball (1959) recorded a range of variation of 4 to 10 spines.

The elytra are concolorous in all the specimens examined. The striae are shallower and the intervals are less convex than in *striatopunctata*. Only three specimens have a puncture in interval 3 on a single elytron only. Ball (1959) did not report any specimens having punctate elytral intervals.

Field notes.—The specimens discussed above were collected along or near the margins of bodies of alkaline or fresh water, on clay or sandy soil. The Shoal Lake, Manitoba specimens were found under dried mats of algae, within ten feet of the water's edge. Although the mats were dry, the ground under them was saturated. Those taken at Whitewater Lake were collected on wet ground, within a few feet of the water, in a dense growth of prairie grasses. The specimens from Atbara, British Columbia were found in grassy vegetation at the margin of a small pond, within a short distance of the eastern margin of Kootenay Lake. They were driven out of their hiding places by treading on the soft, wet clay soil. The Wasa Lake specimens were found under boards on wet sand, within a few feet of the water. The single specimen collected along the Okanagan River at Oliver, B. C. was under a stone on moist, bare sand. Ball (1959) recorded a specimen taken in a similar area in northern Alberta. We believe the riparian habitat to be marginal for this species because specimens are found here infrequently. The large series of *oregona* taken at the Manyberries Range Station, in southeastern Alberta, was collected under stones at the edge of a temporary prairie pond. When this area was revisited during the following year, a rather dense growth of prairie grasses was found to occupy the depression which had previously been filled with water, and no specimens of *Diplocheila* could be found. These observations seem to indicate that the species dealt with are hygrophilous. That both species live in a similar if not identical habitat is indicated by the fact that they have been taken together in three different localities. However, they did not occur in equal abundance: out of 81 specimens of *Diplocheila* taken at Manyberries Range Station, 79 were *oregona,* and 2 only were *striatopunctata;* out of 93 specimens collected at Whitewater Lake, 92 were *striatopunctata* and one was *oregona;* and out of 36 specimens found at Shoal Lake, 35 were *striatopunctata* and one was *oregona.* Each of these samples was random in the sense that all specimens found were taken, and the same sort of area was sampled in each case, that is, close to the margin of a body of water. Possibly the dates of collection are of importance in evaluating the relative abundance, as the Manyberries sample was obtained early in May and the Manitoba collections were made in July.

As other licinine Carabidae are known to feed on snails, i.e. *Dicaelus* and *Licinus,* the second author decided to find out if *Diplocheila* also would eat molluscs. Captive specimens of *oregona* were offered small aquatic snails, obtained at a small pond near Edmonton. The reaction of each beetle was instantaneous. Each immediately attacked a snail, biting right through the shell with the mandibles. The soft parts were then consumed, and an empty, broken shell was left behind. It was not determined if this species would accept food other than snails. We presume that the other North American *Diplocheila* will feed on snails also, because they possess the same kind of mouthparts as *oregona,* and all are generally so similar that it would be very surprising if they did not have about the same habits.

Discussion.—Statistical analysis of the data shows that the body length and the number of spines on the hind tibiae are significant characters in separating the two species (Figures 3 and 4). The scatter diagrams (Figures 5 and 6) indicate that no linear relationship exists between these two characters, and so they may be regarded as the manifestations of independent sets of alleles. Further, it is apparent that the mandibular tubercle is a character of considerable diagnostic importance, for the statistically distinct populations were distinguished initially on the basis of the presence or absence of this protuberance.

Specimens typical of both of these forms (Figures 5 and 6) have been collected in the same habitat literally within inches of one another. This fact suggests that they are reproductively isolated, and so can be regarded as specifically distinct. Additional support for this contention is obtained from the variation in color of elytra and in the punctation of

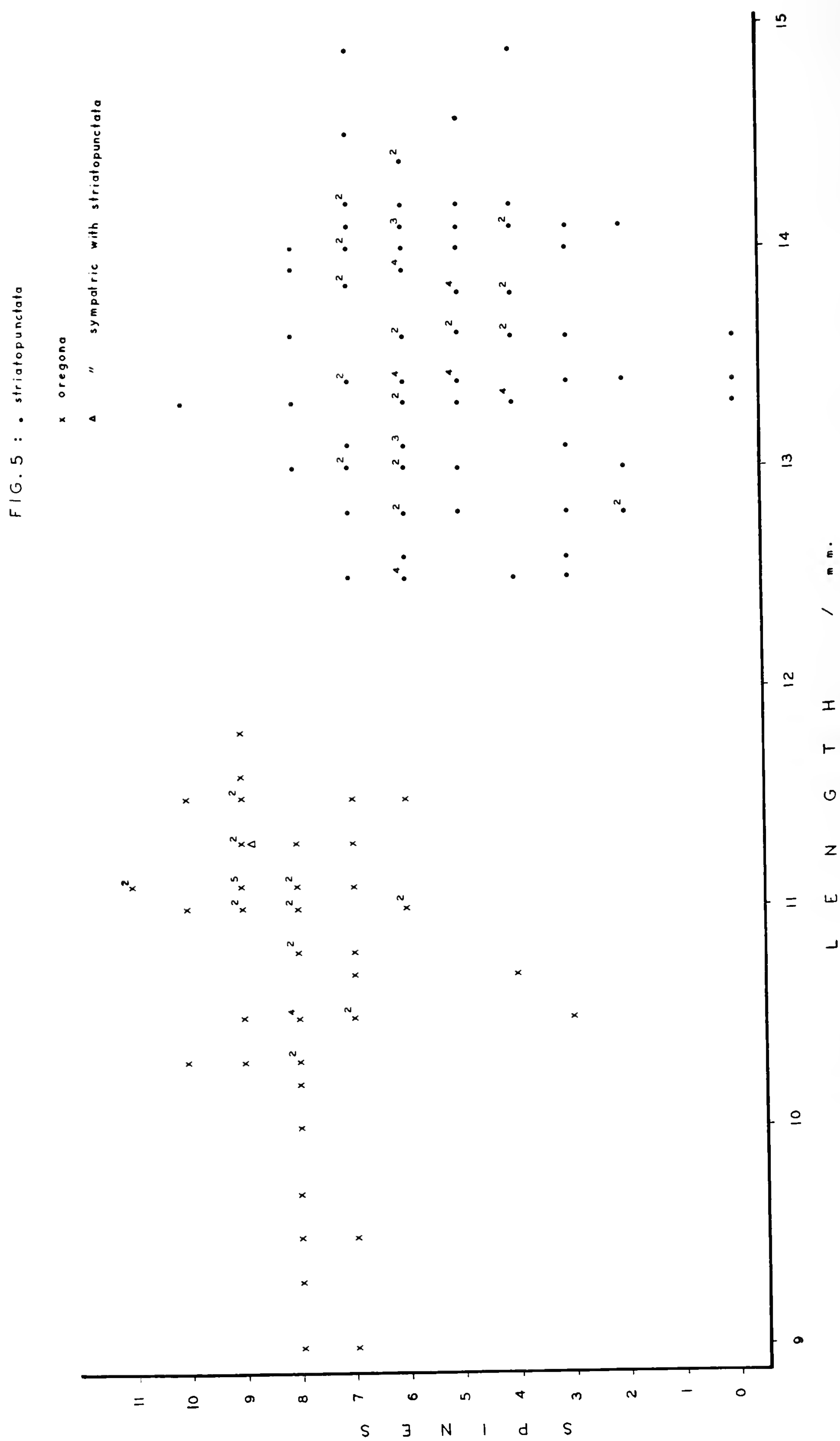


FIGURE 5. Scatter diagram showing the relationship between body length and the number of spines on the posterior median row of the hind tibiae in males of *D. striatopunctata* and *oregona*.

the third elytral interval as no specimen referable to the species *oregona* on the basis of the above characters has bicolored elytra, while substantial percentages of some samples of *striatopunctata* have bicolored elytra. The great majority of *oregona* lack a puncture in the third interval, whereas most of the specimens of *striatopunctata* have a puncture on each elytron.

The nature of the reproductive isolating mechanism, the postulation of which seems to be required by the morphological facts, is not known at present. Although the species are sympatric in the prairie provinces at least, it is possible that they are largely allochronic, so that when the adults of *striatopunctata* are abundant the adults of *oregona* are scarce and *vice versa* (see above). If this were the case, the possibility of interbreeding would be slight. On the other hand, the frequency of encounters between individuals of the two species may be restricted by microecological differences which can be appreciated only by careful experimental studies, not by casual field observations.

As mentioned above and in Ball (1959), *striatopunctata* exhibits dimorphism in elytral color, and the frequency of the two color types varies geographically. The pattern seems to be a central-peripheral one, with the bicolored condition predominating at the geographical center of the species range, and the opposite condition predominating at the eastern and western periphery. Brown (1958) gives a discussion of this type of pattern. Neither the cause nor the significance of this dimorphism in *striatopunctata* is understood at present.

These data substantiate the conclusions arrived at by Ball (1959) concerning the taxonomic status of *striatopunctata* and *oregona*.

Summary

1. Data are presented on variation in morphological characters and in geographical distribution of several population samples collected in south-central Canada and north-central United States which show that *Diplocheila striatopunctata* LeC. and *D. oregona* Hatch are specifically distinct.
2. It is suggested that color dimorphism in the elytra of *striatopunctata* exhibits a so-called ''central-peripheral'' pattern of geographical variation.
3. Ecological observations show that *striatopunctata* and *oregona* are pronouncedly hygrophilous, living under cover near the margins of bodies of water.
4. It is noted that *oregona* eats aquatic snails, and gets at the meat by breaking the mollusc shell with its mandibles. It is not known if this species takes other food.

Literature Cited

Ball, G. E. 1959. A taxonomic study of the North American Licinini with notes on the Old World species of *Diplocheila* Brullé. Memoir 16, *American Entomological Society*. i-iv + 258 pp. Figs. 1-165.

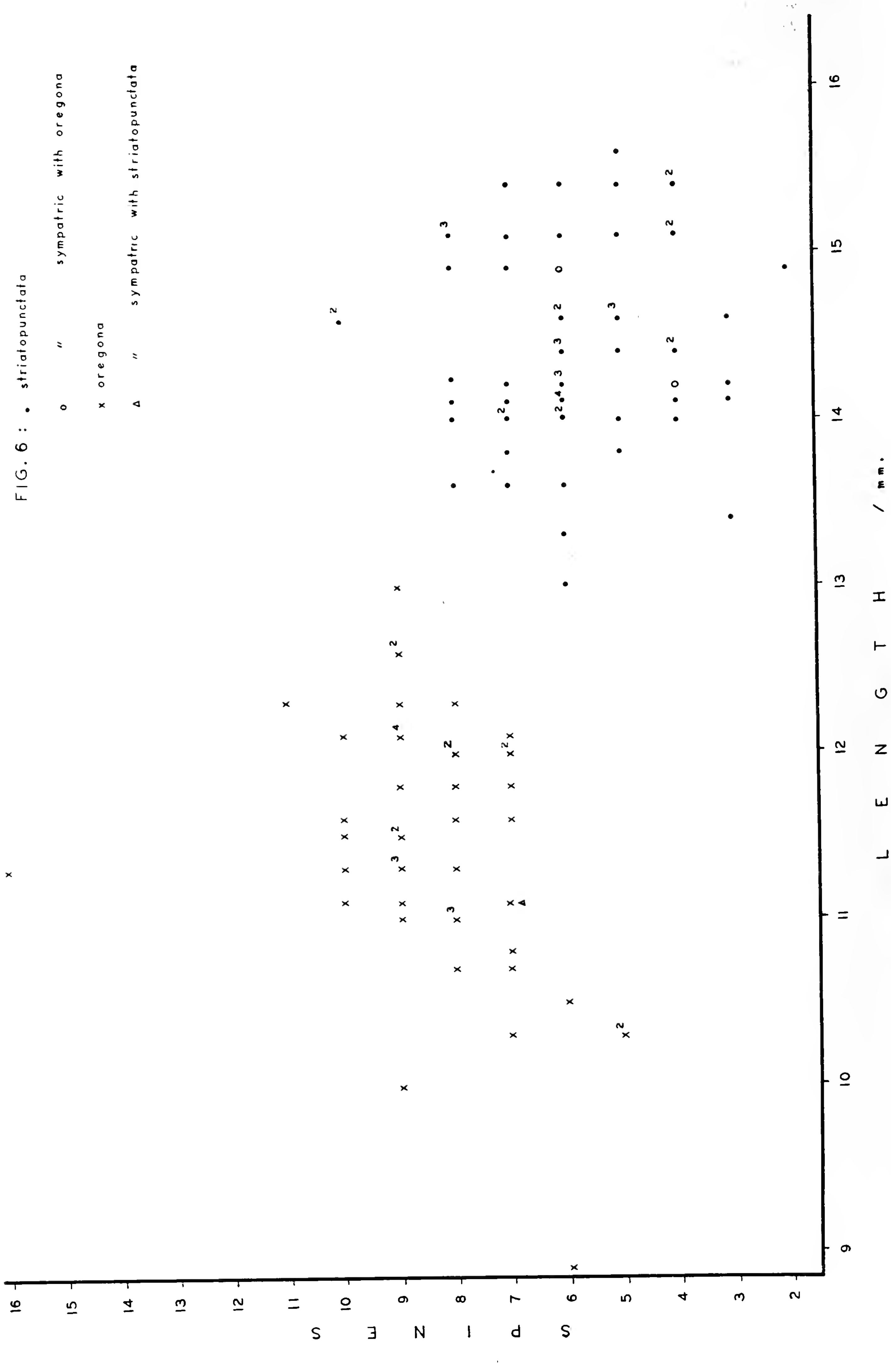


FIGURE 6. The same as Figure 5 for females.

Brown, W. L. 1958. Speciation: the center and the periphery. *Proceedings of the Tenth International Congress of Entomology.* 1: pp. 89-99.

Hubbs, C. L. and C. Hubbs. 1953. An improved graphical analysis. *Systematic Zoology* 2: pp. 49-56.

REVIEW

Coccinellidae of Poland

(Klucze do oznaczania owadów Polski. Czesc XIX. Chrzaszse *Coleoptera.* Zeszyt 76. Biedronki. Coccinellidae.) By Ryszard Bielawski. Warszawa 1959. Panstwowe Wydawnictwo Naukowe). 92 pages. 42 unnumbered plates, 266 numbered illustrations.

This is the 11th out of 100 proposed volumes covering beetles of the present territory of Poland. The order of appearance of these volumes has nothing to do with the taxonomic sequence, and publications appear as there are available taxonomists, willing to work on their particular specialties.

Bielawski in this volume covers not only forms actually taken on the present Polish territory (23 genera and 69 species) but also a number of species found in adjacent areas which may occur in Poland, thus bringing the total under the discussion to 38 genera and 80 species. Most numerous of these is *Scymnus* here represented by 19 and 16 species respectively.

The author synonymizes several species and contrary to the common European practice almost completely ignores the nomenclature of the color varieties for each species.

The work follows pretty much established tradition of the detailed studies carried out on the beetles in Central Europe of which Polish publications represent one of the best examples. A multitude of illustrations of numerous characters enable to identify species even to those unfamiliar with the language. (The text is entirely in Polish without any foreign summaries).

There are good accounts of general biology and ecology of the Coccinellids and for each species there are given biological, distributional and ecological data in great detail. One may wish that this last practice would be followed in our own country. Unfortunately our coleopterists tend to ignore such data all too often, even when the information is present on the labels or can be readily provided by the collectors.

On the other hand, the author seems not too familiar with the North American literature if one may judge from some of the comments he makes concerning the use of Coccinellids in the biological control in U. S. and from his ignoring the establishment of *Coccinella undecimpunctata* in the eastern part of this continent. Just the same, it is the sort of work the example of which we may well follow.—Borys Malkin, *University of Minnesota, Minneapolis, Minn.*

NOTES ON EDROTES, LEICHENUM, PALORUS, EUPSOPHULUS, ADELIUM, AND STRONGYLIUM (TENEBRIONIDAE)

By T. J. SPILMAN[1]

NEW LOCALITY RECORDS FOR *Edrotes arens* LARIVERS

Edrotes (*Odrotes*) *arens* LaRivers (1947:320) was described from three individuals collected at the Yuma sand dunes, Yuma Co., Arizona. This odd species has since been collected in numbers (more than thirty being in the University of California Collection) from these places in California—*Riverside Co.:* Hopkins Well; *San Diego Co.:* Borego. The Californian specimens exhibit quite a range in size: length 5.2 to 8.5 mm.; width 3.7 to 5.8 mm. In the collection of J. N. Knull, of Ohio State University, I have seen three specimens from Mexico—*Baja California:* 60 miles south of Mexicali, on sand dunes at night.

DISTRIBUTION OF *Leichenum canaliculatum variegatum* IN THE U. S. A.

The only form of this genus that occurs in the United States is *Leichenum canaliculatum variegatum* (Klug), presumably introduced from Madagascar. The status of subspecies was given to *variegatum* by Gridelli (1939:233), the most recent reviser of the genus. Leng (1920: 232) listed this form in his first catalogue, but I have been unable to find the literature citation on which his record was based. However, there is one specimen in the U. S. National Museum Collection that was donated by Charles Dury in 1934 and collected in Mobile in 1906. All information available to me on *variegatum* is herein presented to give some indication of its distribution and biology, in the hope that its biology will be studied more closely.

The actual date of introduction will almost certainly never be known, nor will the rate of dispersion to other areas, but we can get some indication of dispersion from collecting dates. It was taken in northern Florida, Alachua Co., by 1920; in southern Florida, Palm Beach Co., by 1927; and in South Carolina, Oconee Co., by 1933. The habits of *variegatum* are poorly known, or else it is rather ubiquitous in those habits. Loding stated that it was found in sand on the beach, and St. George (1930:122) reported on a larva that is possibly this subspecies as being associated with the roots of Bermuda grass as Mobile. Four other species or subspecies of *Leichenum* live in soil or sand near water, according to Gridelli (1939:209). It is likely that the preferred habitat of *variegatum*

---

[1]Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture.

is in soil. Nevertheless, I have listed below all the biological data available, except for the many occurrences at light, no matter how improbable they may seem. Its occurrences throughout the year, as determined by labels, are June through July in Mississippi and Alabama, September in North and South Carolina, and March through October in Florida with most of the specimens being taken June through August. The range of distribution at present seems to be below 200 feet in the Coastal Plains Province from Mississippi to southern North Carolina, except that it extends into the upper limits, 850 feet, of the Piedmont Province in South Carolina. The following list of collecting data on *variegatum* is made up from specimens in the U. S. National Museum (USNM), Cornell University (CU), the Florida State Plant Board (FSPB), and from data at the University of Florida Experiment Station (UFES).

ALABAMA—*Baldwin Co.*: no further locality (CU); Daphne (CU USNM); on Bay shore, from roots of Bermuda grass, larva tentatively identified by St. George (USNM). *Mobile Co.*: Mobile (CU USNM). FLORIDA—*Alachua Co.*: no further locality (CU FSPB); Gainesville (CU FSPB USNM). *Dade Co.*: no further locality (USNM); Miami (FSPB); Route 27 and Miami Canal (USNM. *Duval Co.*: Jacksonville, on grass (FSPB). *Escambia Co.*: Pensacola (USNM). *Hendry Co.*: Clewiston (CU). *Highlands Co.*: Venus (FSPB). *Lake Co.*: Leesburg, damaging cotton (UFES). *Levy Co.*: no further locality, at *Arachis hypogaea* L. (FSPB). *Manatee Co.*: Bradenton (UFES). *Marion Co.*: no further locality, at *Zea* (FSPB); *Citra*, infesting ground among young turnips and rutabagas (UFES). *Orange Co.*: no further locality (USNM); Oakland, reported to be feeding on nap of rugs (UFES); Orlando, in greenhouse (FSPB); Winter Park (FSPB). *Palm Beach Co.*: Belle Glade (CU, USNM), bait trap (FSPB), larva from soil tentatively identified by St. George (USNM); Canal Point (CU); West Palm Beach (CU). *Polk Co.*: Lakeland (FSPB); Winterhaven, on Juniper (FSPB). *Putnam Co.*: Huntington, supposed to be killing peach trees (UFES). *Santa Rosa Co.*: Avalon, on grass (FSPB). *Wakulla Co.*: no further locality (USNM). *Washington Co.*: Chipley, in gin trash machine (USNM). GEORGIA—*Charlton Co.*: no further locality, fragments from stomach of *Bufo quericus* (USNM); Chesser Is., Okefenokee Swamp, fragments from stomach of toad (USNM). MISSISSIPPI—*George Co.*: Lucedale (CU). *Jackson Co.*: Horn Is. (USNM); Ocean Springs (CU). *Stone Co.*: Wiggins (CU). NORTH CAROLINA—*New Hanover Co.*: Carolina Beach, under boards (FSPB). SOUTH AROLINA—*Barnwell* Co.: Edisto Exp. Sta., Blackville (USNM). *Oconee Co.*: Clemson College (USNM).

New distributional and biological data for *Palorus foveicollis* Blair, with a key to the species of *Palorus* of the U. S. A.

This species has recently been discovered in three widely separated places, one of which is in the United States. *Palorus* (*Coelopalorus*) *foveicollis* was described by Blair (1930:135, 136, fig. 1) and was based on specimens from Burma, Andaman Is., Ceylon, India, Cocos Keeling Is., Philippine Is., and what is now the Malayan Federation. Corbett, Yusope and Hassan (1937:67, pl. 6, figs. 13-17) occasionally found the species associated with copra, i.e., dried coconut meal, in Malaya. Adults and larvae feed very sparingly on the moulds of copra, but they seem to avoid eating good copra. It is not considered to be of importance in its association with copra. The authors illustrated and briefly described all four stages of life. Kulzer (1957:219) recorded it from Guam Is., and Usman and Puttarudraiah (1955:101) recorded it as *Coelopalorius foveicollis,* collected from mill sweepings, at Bangalore, Mysore, India.

Now the Hawaiian Islands must be added to the distribution. Mr. E. J. Ford, Jr., has brought to my attention material collected in light traps at the following places on the island of Oahu: Iroquois Point, Nov. 1947; Ewa, Aug. 1949 and July 1957; Waipio, Sept. 1952 and July 1957; Damon Tract, Feb. 1953; and Barber's Point, 1949. The specimen from Iroquois Point was reported by Zimmerman (1949:323) as a "genus near *Palorus.*" On Oahu Mr. Ford has recently found *foveicollis* in the tunnels and powdery frass of the Lyctid *Lyctus curtulus* Casey and the Bostrichid *Sinoxylon conigerum* Gerstäcker in monkeypod, *Samanea saman* Merrill. Then, with another great leap eastward, we add Trinidad. Three individuals in the U. S. National Museum are labeled as follows: Government Stock Farm, St. Augustine, Trinidad, B.W.I., 24 April 1952, M. H. Breeze, in floor sweepings (maize). Finally, the southern United States is included. Two specimens were collected by W. T. Seibels at a commercial grain company in Mobile, Alabama, in October 1956, in wheat shorts, and two more were collected from the same establishment in November 1956 without host data. Mr. Seibels, investigating the possibility of the species' having been imported into Mobile, found that the grain company has received, directly or indirectly, many materials from South America. Even so, the true origin of the Mobile population is still a mystery, and we do not yet know whether the population has become established in the United States. There is no real indication that *foveicollis* is a pest, but it must be under suspicion at present because of the performance of two of its congeners, *ratzeburgi* and *subdepressus,* and because the American specimens were found in grain products.

Palorus foveicollis is quite distinctive. The pronotal depressions mentioned in the following key are very deep, extend the length of the pronotum, and widen posteriorly; the lateral carina of each elytron is situated on the anterior two-thirds of the seventh interval and is prominent. Like all *Palorus* species, *foveicollis* is small, but it is larger than our other two species; the ten specimens in the U. S. National Museum from Guam, Hawaii, Trinidad and Mobile range in length from 3.7 to

4.0 mm. and in width from 1.2 to 1.4 mm. The following key will differentiate the species of *Palorus* in the United States.

1. Pronotum with a deep, broad, long depression on each side of the midline; each elytron with a distinct carina on the seventh interval .... **Palorus (Coelopalorus) foveicollis** Blair
   Pronotum evenly convex, without depressions; each elytron evenly convex transversely, without carina 2
2. Head with supra-antennal border extending over eye for a short distance and continuous with the supra-orbital carina, obscuring part of the eye in dorsal view .... **Palorus (Circomus) subdepressus** (Wollaston)
   Head with supra-antennal border ending at the anterior margin of the eye, not continuous with the supra-orbital carina, not obscuring any part of the eye in dorsal view .... **Palorus (Palorus) ratzeburgi** (Wissmann)

THE SPECIES OF *Eupsophulus* COCKERELL

In the original description of *Eupsophulus brevipennis,* Casey (1924: 323) mentioned the relatively large, erect elytral setae, but it is surprising that he did not put more emphasis on them as a distinguishing characteristic. These setae are arranged in nine longitudinal rows and are the only evidences of elytral striae in the genus. The punctures from which these setae originate are slightly larger than the much more numerous confused punctures, but the difference is so slight that the serial arrangement of the larger punctures would be hardly noticeable without their setae. In the other two species, *castaneus* (Horn) and *horni* (Champion), slightly larger punctures are seen, but they are not serially arranged. In all three species many of the punctures on the dorsal surface contain very minute appressed setae, which are slightly larger on the apex of the elytra, but these can not possibly be confused with the erect serial setae of *brevipennis.* In addition, the punctures of the elytra and especially of the pronotum are coarser and denser in *brevipennis* than in *castaneus,* though the difference is rather difficult to describe. The difference in over-all outline is not so great as Casey would have us believe, especially if we take into account the variation of form in *castaneus.*

Champion (1885:122) said of his new species *Eupsophus horni,* "prothorax finely, closely, and confluently punctured," and gave Mexico as the type locality. A specimen before me from Baja California matches Champion's description in all respects except that it has very coarse pronotal punctures. I have tentatively labeled that specimen as *horni* and have written the key that follows to include coarsely and finely punctate forms under *honi.* A comparison of the male genitalic structures of the two included forms of *horni* will undoubtedly resolve this question, for adequate specific differences are present in the genitalia of the other species of *Eupsophulus*. Bypassing for the present the coarseness of the punctures of the pronotum of *horni,* we may say that these punctures are very close or contiguous. The punctures of the elytra are also coarser than in the other two species. Finally, the broader prothorax and the heavily wrinkled elytra are conspicuous.

In describing *brevipennis,* Casey (1924:323) cited two specimens from Benson, Arizona. However, in the Casey Collection there is one specimen labeled Tucson, Ariz., USNM Type No. 46798, and another labeled Benson, Ariz., USNM Paratype No. 46798. The Tucson specimen was labeled as holotype by Buchanan because it also held the specific name label; this method of labeling holotypes in the Casey Collection is discussed by Buchanan (1935:7). Casey might originally have had two specimens from Benson, one of which was later replaced. A more plausible explanation is that Casey did not read the Tucson label correctly; the label is small, and Casey's keenness of observation was probably failing him in his last years. Then, too, we must question all the specimens labeled ''holotype'' in the Casey Collection that were not definitely designated by Casey at the time of the original descriptions. Buchanan did an excellent piece of work in assembling the Casey material for study, but his mass selection of lectotypes—for that is what it certainly was—is contrary to the rules of nomenclature, even if Casey did indicate that such a thing should be done. The rules state that a selector of a lectotype should publish all pertinent data on the specimen for each species; this was not done for the Casey species. Thus, in the interest of consistency, I am now designating the specimen in the Casey Collection that is labeled Benson, Ariz., USNM Paratype No. 46798, as USNM Lectotype No. 46798 for *Eupsophulus brevipennis* Casey and am so labeling it.

This study is based on specimens in the U. S. National Museum (USNM) and the California Academy of Sciences (CAS). Even though I have many specimens of *castaneus* at hand, I will refrain from listing localities until a more complete distribution pattern is evident. The other two species are rare in collections, and all records of capture are worth citing. Nine specimens of *brevipennis* were collected from the following localities in Arizona— *Cochise Co.:* Benson (USNM), Palmerlee (USNM); *Pima Co.:* between Gunsight and Covered Wells (CAS), Tucson (USNM). The only available specimen of *horni,* which is tentatively identified, is from Mexico—*Baja California:* Coyote Cove, Conception Bay (CAS). The ensuing key can be used to distinguish the three known species of *Eupsophulus.*

1. Elytra with obvious, erect, serially arranged setae .... **brevipennis** Casey
   Elytra without setae or with very minute, confusedly arranged setae 2

2. Pronotum with punctures dense, often confluent.................................**horni** (Champion)
   Pronotum with punctures not dense, not confluent.................................**castaneus** (Horn)

Rues Casey, 1891, a synonym of the Australian *Adelium* Kirby, 1818

Rues was erected by Casey (1891:66) for his previously described Californian species *Helops ovipennis.* It has remained in the Helopini to this day without discussion in the literature, save for catalogues, and without additional specimens having been found or reported. After an examination of the holotype of *ovipennis,* I am convinced that *Rues* is a junior synonym of *Adelium* Kirby of the tribe Adeliini. Except for two species described from South America, *Adelium,* with more than seventy species, occurs only in the Australian Region. Many of the genera of Australian Tenebrionids are restricted to the Australian or Indo-Australian Regions. Because of this and because no specimens of *ovipennis* have been found in seventy years, there is a strong probability that Casey's specimen accidentally entered the United States. The holotype of *ovipennis* is labeled "Cal.", but in the original description Casey (1890:487) gave the Mohave Desert of California as the type locality and then added, ". . . found dead by Mr. Dunn in a decaying stump." One immediately wonders how a specimen from Australia could have occurred accidentally in a stump in the then relatively isolated Mojave Desert. It is quite possible that the specimen came from Australia and was mislabeled. This might have happened during Casey's handling of the individual. On the other hand, almost anything might have happened, either accidentally or wilfully, while it was in the hands of the eccentric George W. Dunn, if we believe the information concerning him as reported by Essig (1931:605).

Because the specimens of *Adelium* available to me are poorly or not at all identified to species, I have not been able to correlate *ovipennis* with described species. However, in the U. S. National Museum there are six specimens from Victoria, Australia, labeled *Adelium* sp. which are similar to the holotype of *ovipennis.* In summation, *Rues* should be considered a junior synonym of *Adelium, ovipennis* should stand in *Adelium* as a good species until its proper relationships are known, and it should be stricken from the North American lists.

Reminius Casey, a synonym of *Strongylium* Kirby

Reminius was described by Casey (1924:321) for his new species *ocularis* (1924:322) from Keokuk, Iowa. He placed the genus in the Tenebrionini by discussing its similarities to *Xylopinus.* The holotype and only specimen is certainly *Strongylium terminatum* Say, a common species which Casey did not otherwise have. Accordingly, *Reminius* is a junior synonym of *Strongylium* Kirby, 1818.

ACKNOWLEDGMENTS

To the following gentlemen I express sincere appreciation for their time, study, and specimens used in this work: Paul D. Hurd, Jr., of University of California, and Josef N. Knull of Ohio State University for the loan of specimens of *Edrotes;* Henry Dietrich of Cornell University, Robert E. Woodruff of the Florida State Plant Board, and Stratton H. Kerr of the University of Florida Experiment Station for information on *Leichenum;* E. J. Ford, Jr., of the U. S. Department of Agriculture at Hawaii, and W. T. Seibels of the U. S. Department of Agriculture at Mobile for specimens and information on *Palorus;* and Hugh B. Leech of the California Academy of Sciences for the loan of specimens of *Eupsophulus.*

LITERATURE CITED

BLAIR, K. G. 1930. The Indian species of *Palorus* (Coleoptera: Tenebrionidae) and some associated beetles. Indian Forest Records 14(5):133-152, illus.

BUCHANAN, L. L. 1935. Thomas Lincoln Casey and the Casey Collection of Coleoptera. Smithsonian Misc. Col. 94(3):iii-iv, 1-15, 1 pl.

CASEY, T. L. 1890. Coleopterological Notices II. Ann. New York Acad. Sci. 5(9-12):307-504, illus.

———— 1891. Coleopterological Notices III. Ann. New York Acad. Sci. 6(1):9-56; 6(2-4):57-214.

———— 1924. Additions to the known Coleoptera of North America. Memoirs Coleop. 11:1-347.

CHAMPION, G. C. 1885. Biologia Centrali-Americana, Ins., Coleop. 1884-1893, 4(1);i-xxxii, 1-572, 23 pls. (p. 122 is dated 1885).

CORBETT, G. H., and M. YUSOPE, and A. HASSAN. 1937. Insects associated with copra in Malaya. Dept. Agr. Straits Settlements and Federated Malay States Sci. Series No. 20:1-91, 9 plates.

ESSIG, E. O. 1931. A history of entomology. pp. v-vii, 1-1029, illus. New York.

GRIDELLI, E. 1939. Coleotteri dell'Africa orientale italiana. 10 contributo revisione delle specie del genre *Leichenum* Blch. (Coleopt. Tenebrionidae). Atti Mus. Civ. Stor. Nat. Trieste 14(15):207-242. illus.

KULZER, H. 1957. Coleoptera: Tenebrionidae. Insects of Micronesia 17(3):185-256, illus.

LARIVERS. I. 1947. A synopsis of the genus *Edrotes* (Coleoptera: Tenebrionidae). Ann. Ent. Soc. America 40(2):318-328.

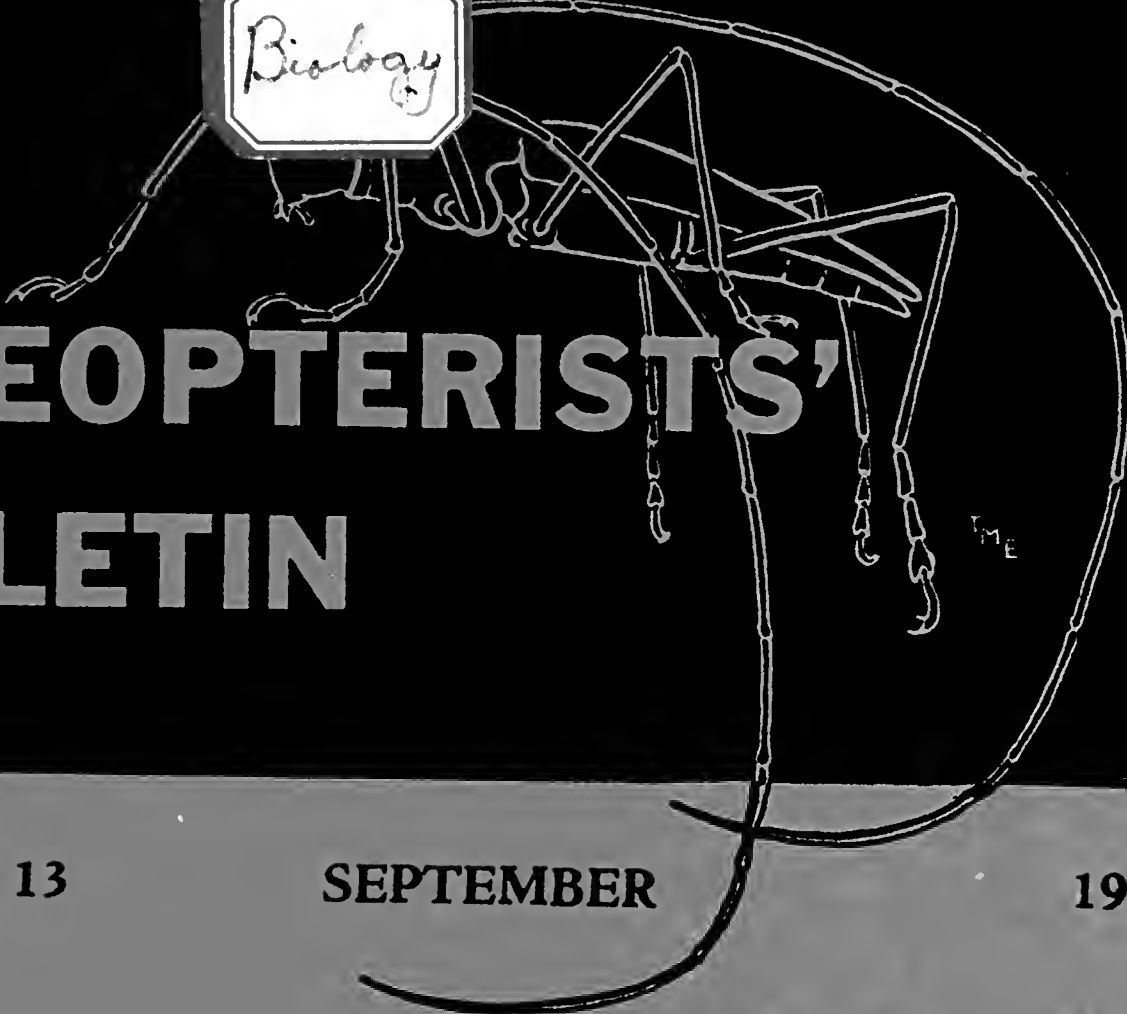
LENG, C. W. 1920. Catalogue of the Coleoptera of America, north of Mexico. pp. v-x, 1-470. Mount Vernon, N. Y.

LODING, H. P. 1934. New and rare beetles on a sand beach. Bull. Brooklyn Ent. Soc. 29(1):43.

ST. GEORGE, R. A. 1930. The discovery of what is possibly the larva of an introduced Tenebrionid, *Leichenum variegatum* Küst. Proc. Ent. Soc. Washington 32(7): 122-123, illus.

USMAN, S. and M. PUTTARUDRAIAH. 1955. A list of the insects of Mysore including the mites. Dept. Agr. Mysore State, Ent. Ser. Bull. No. 16:i-vi, 1-194.

ZIMMERMAN, E. C. 1949. Two new Tenebrionids [in minutes of meeting]. Proc. Hawaiian Ent. Soc. 1948[1949] 13(3):323.



THE COLEOPTERISTS' BULLETIN

VOLUME 13 SEPTEMBER 1959

TABLE OF CONTENTS

SEEVERS, C. H. North American Staphylinidae associated with Army Ants 65

GREEN, J. W. Revision of the species of Microphotus, with an emendation of the Lampyrini (Lampridae) 80

NEW PUBLICATIONS 96

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: Vol. 4, $5.00; Vol. 5, $4.50; Vol. 6 (4 nos. only published), $2.50; Vols. 7 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid.

Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five copies of the issue containing the article will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the Bulletin will be considered. Articles with illustrations are particularly desired, and in all cases, descriptions of new species must be illustrated. Descriptions of new species or genera must contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XIII September (No. 3) 1959

NORTH AMERICAN STAPHYLINIDAE ASSOCIATED WITH ARMY ANTS

By CHARLES H. SEEVERS[1]

The army ants (Dorylinae) are primarily a tropical group and relatively few species occur within the United States. Twenty or more North American species of army ants are recorded in recent works (Smith, 1942; Creighton, 1950; Borgmeier, 1955), but many of these are poorly known and some of dubious validity.

This paper is concerned with some taxonomic problems involving Staphylinidae that live with two widespread species, *Neivamyrmex nigrescens* (Cresson), and *Neivamyrmex opacithorax* (Emery). Inasmuch as the species of *Neivamyrmex* are subterranean in nesting habits and frequently in raiding habits as well, they are not well known to most entomologists. In a recent publication dealing with the two species named above, Schneirla (1958) has done much to clarify the behavior and ecology of these species.

The staphylinid genera herein discussed belong to the tribe Myrmedoniini of the subfamily Aleocharinae. Inasmuch as the Myrmedoniini of existing catalogues and taxonomic works are a large, heterogeneous assemblage, it is extremely difficult to determine the positions of genera within the tribe as this time. For years the tribe Myrmedoniini has served as a catch-all for most Aleocharinae that have a 4, 5, 5 tarsal segmentation, and as a result is now a polyphyletic collection of myrmecophiles, termitophiles, and free-living genera. When many of the myrmedoniine genera are ultimately reassigned to new categories, the tribe in a more limited sense will include *Drusilla* Samouelle (= *Myrmedonia* Erichson), *Zyras* Stephens, and many closely allied genera, including those of this paper.

---

[1]Roosevelt University, Chicago, Illinois; and research associate, Chicago Natural History Museum.

It is advisable at this time to call attention to some genera of Aleocharinae other than Myrmedoniini that are associated with *Neivamyrmex* in the United States. Two species, *Beyeria vespa* Fenyes and *Beyeria pulex* Sanderson, have been collected only at lights but are evidently guests of *Neivamyrmex*. A species closely related to *Beyeria pulex* was recently collected by Drs. T. C. Schneirla and Mont Cazier from a colony of *Neivamyrmex opacithorax* in Arizona. This new species and *Beyeria pulex* belong to a new genus that I shall describe in a later paper. *Beyeria vespa* is closely allied to *Acamatoxenus suavis* Mann of Jalisco, Mexico, a species that lives with *Neivamyrmex agilis* Borgmeier. Another related genus, *Pulicomorpha* Mann, was recorded with *Neivamyrmex peninsulare* Mann in Baja California, Mexico. *Beyeria, Pulicomorpha,* and the undescribed genus may be distinguished from the genera of Myrmedoniini by the basally constricted abdomen, the second and third segments of which form a petiole.

Holotypes of the species described in this paper are deposited in the Chicago Natural History Museum. Paratypes are to be deposited in the Chicago Natural History Museum, American Museum of Natural History, and the Snow Museum of the University of Kansas.

The host ants were determined by T. C. Schneirla (Arizona specimens), Carl Rettenmeyer (Kansas specimens), E. O. Wilson (Alabama specimens), and Merle Wing (North Carolina specimens).

ACKNOWLEDGEMENTS. This study was completed during the tenure of research grants from the National Science Foundation; during the course of more comprehensive studies on the Aleocharinae I was able to examine Wasmann types in Maastricht, the Netherlands, and Casey types in the United States National Museum. For making available the material upon which this report is based I am indebted to Drs. T. C. Schneirla and Mont Cazier (American Museum of Natural History), Dr. W. O. Wilson (Harvard University), Mr. Carl W. Rettenmeyer (The University of Kansas), and Mr. Merle Wing (Raleigh, North Carolina).

HOSTS OF NEARCTIC ECITOPHILOUS MYRMEDONIINI

Neivamyrmex carolinensis (Emery)

Dinocoryna bisinuata Casey	Florida, North Carolina
Ecitonusa foreli Wasmann	

Neivamyrmex nigrescens (Cresson)

Dinocoryna carolinensis n. sp.	North Carolina
Ecitonidia wheeleri Wasmann	Texas, Arkansas, Kansas, Colorado, Arizona
Ecitoxenidia brevicornis n. sp.	North Carolina
Ecitoxenidia brevipes (Brues)	Texas

Microdonia kansana n. sp.	Kansas
Microdonia laticollis (Brues)	Texas
Microdonia occipitalis Casey	Texas, Arizona
Microdonia retrusa Casey	
Ecitopora tenella Wasmann	
Microdonia sulcatula Borgmeier	Kansas

Neivamyrmex opacithorax (Emery)

Dinocoryna arizonensis n. sp.	Arizona
Dinocoryna schmitti (Wasmann)	North Carolina, Alabama
Dinocoryna tibialis n. sp.	Kansas
Ecitoxenidia alabamae n. sp.	Alabama
Microdonia kansana n. sp.	Kansas
Microdonia occipitalis Casey	Arizona
Microdonia sulcatula Borgmeier	Arizona, Kansas, Costa Rica

Labidus coecus (Latreille)

Ecitopora nitidiventris Brues	Texas

MICRODONIA Casey

Microdonia Casey, 1893, Ann. New York Acad. Sci., 7, p. 318.

Casey was not aware of the myrmecophilous habits of the species of *Microdonia* and the genus has never been listed among those associated with army ants. Casey described *occipitalis* in 1893 and *retrusa* in 1911 but I find no basis for retaining the latter name. Wasmann (1900), not aware of the habits of *occipitalis,* described this species as *tenella* Wasmann and assigned it to his neotropical genus *Ecitopora.*

The genus *Ecitopora,* to which *Microdonia* is probably most closely related, occurs with *Eciton* and *Labidus* from Central America to Brazil and possibly in the Nearctic Region as well. I am unable to determine the generic position of *Ecitopora nitidiventris* Brues, a Texan species, as material has not been available.

Until I have had an opportunity to study the species of *Ecitopora* and to define the genus more accurately I shall make no attempt to contrast *Microdonia* and *Ecitopora* in detail. The species of *Microdonia* are small, slender, and dorsoventrally compressed as illustrated in fig. 1.

A Key to the species of *Microdonia* Casey

1. Pronotum more than one-half broader than long .... **laticollis** (Brues)
   Pronotum less than one-half broader than long 2
2. Apical margin of tergites 3-6 with 8 or 9 long dark setae (figs. 1, 4); tergites 4-7 subglabrous, almost impunctate; spermatheca distinctive (fig. 7) .... **culcatula** Borgmeier
   Apical margins of tergites 3-6 with 12-16 light-brown setae fig. 5); tergites 4-7 pubescent 3

3. Pronotum two-fifths broader than long on the average (three-tenths to almost one-half); spermatheca distinctive (fig. 8) .... **kansana** n. sp.
Pronotum one-fifth broader than long on the average (one-sixth to one-fourth); spermatheca distinctive (fig. 6) .... **occipitalis** Casey

Microdonia occipitalis Casey

Microdonia occipitalis Casey, 1893, Ann. New York Acad. Sci., 7, p. 319 (Austin, Texas; no host cited; United States N. M.).

Ecitopora tenella Wasmann, 1900, Zool. Jahrb. Syst., 14, p. 284 (Austin, Texas; *Eciton schmitti* Emery; Wasmann coll.); Brues, 1902, American Nat., 36, p. 267. *New Synonym.*

Microdonia retrusa Casey, 1911, Memoirs Coleopt., 2, p. 74 (Walnut, Arizona; no host cited; U.S.N.M.). *New Synonym.*

Material examined.—TEXAS: Austin (types of *M. occipitalis* and *E. tenella*; 2 additional specimens). ARIZONA: Walnut (type of *M. retrusa*). 15 specimens, S. W. Research Station, 5 miles west of Portal, Cochise Co., from 4 colonies of *Neivamyrmex*, August 14—September 2, 1956; collected by T. C. Schneirla and Mont Cazier.

Hosts.—*Neivamyrmex nigrescens* (Cresson)—Austin, Texas and S. W. Research Station (2 colonies). *Neivamyrmex opacithorax* (Emery)—S. W. Research Station, Arizona (2 colonies).

Similar to *sulcatula* (fig. 1), except broader. Coloration varying from uniform testaceous (Texas) to testaceous with head, elytra, and several tergites brown (Arizona).

Head with dense medium-coarse umbilicate punctation except for a smooth median area. Pronotum and elytra with a fine dense punctation and a fine recumbent pubescence. Tergites densely, finely punctate and with a vestiture of fine pale recumbent hairs. Tergites (fig. 5) with 4 semi-erect dark setae on disk and one near each apical angle, and an apical row of 12-16 longer light-brown setae. Sternites densely pubescent.

Antennal length two and one-half times head width; segment 3 twice as long as segment 4; segments 4-10 incrassate, but not increasing in length; segment 4 three-fourths as long as broad and four-fifths as broad as segment 10; segment 10 three-fifths as long as broad, about one third as long as segment 11.

Maxilla and labium as in fig. 2; the large maxillary sinus and the elongated galea and lacinia are characteristic of the tribe.

Pronotum one-fifth broader than long on the average (the pronota of 18 measured specimens vary from 1.18 to 1.27 times broader than long); pronotal disk relatively weakly impressed on each half. Meso- and metasternal processes between middle coxae broad (fig. 3).

Spermatheca distinctive (fig. 6).

Length, 2.5-3 mm.

Remarks.—Most of the diagnostic characters given by Casey (1911,

p. 75) to distinguish *retrusa* from *occipitalis* are either exaggerated or incorrect. Casey had a single specimen of each of his species and attached too much significance to the small differences he recorded. Casey stated that *retrusa* is different in having denser sculpture, duller luster, smaller eyes, eyes farther removed from base, less stout antennae, darker antennae, less transverse pronotum, and in having an incised transverse basal line on pronotum.

The type specimen of *retrusa* does differ from the type of *occipitalis* in having the head punctures a little closer together, the eyes a trifle smaller, the antennae very slightly darker, and the eyes a trifle farther from base, but a series of specimens shows that these are only individual variations. The antennae of *retrusa* are doubtfully less stout and the pronotum is not less transverse than in *occipitalis*. The basal pronotal line referred to by Casey is not a surface impression at all but a dark reddish discoloration; it is present in the type of *occipitalis* as well.

Microdonia kansana Seevers, NEW SPECIES

Type from Lawrence, Kansas, collected April 5, 1957, by Carl W. Rettenmeyer, from a colony of *Neivamyrmex nigrescens*. 39 paratypes, Lawrence, Kansas, collected by Carl Rettenmeyer; 20 of which are from two colonies of *N. nigrescens* (E-101, June 28—July 7, 1955; E-261, April 5, 1957), and 21 from two colonies of *N. opacithorax* (E-262, October 18, 1957; E-263, June 6, 1958).

Coloration rufo-testaceous; head and some abdominal segments darker. Head with a dense, medium-coarse, umbilicate punctation, except for a narrow median strip. Pronotum and elytra with a fine, dense punctation and recumbent pubescence. Tergites densely, finely punctate and with a vestiture of fine, pale, recumbent hairs; apical margin with a row of 12-16 long, light-brown setae (fig. 5). Sternites densely pubescent.

Antennae two and one-fifth times the width of head; segments 4-10 transverse, incrassate (segment 10 one-fourth broader than segment 4 and a little longer); segment 4 about seven-tenths as long as broad; segments 7-10 three-fifths as long as broad; segment 11 three times as long as 10.

Pronotum relatively broad, about two-fifths broader than long on the average (the pronota of 21 specimens vary from 1.35 to 1.44 times broader than long); anterior margin straight to feebly sinuate; disk feebly impressed near lateral margins but not conspicuously so.

Spermatheca distinctive (fig. 8).

Length, 2.75-3.75 mm.

Remarks.—This species is distinguished from *occipitalis* by the broader pronotum, that averages two-fifths broader than long, the larger average body size (the size ranges of the two species overlap), and the distinctive spermatheca.

Microdonia sulcatula (Borgmeier), NEW COMBINATION

Ecitopora sulcatula Borgmeier, 1958, Studia Ent. 1, p. 229 (San Jose, Costa Rica; *Neivamyrmex opacithorax*, Borgmeier coll.)

Material examined.—KANSAS: Lawrence; Carl Rettenmeyer; 19 from 3 colonies of *N. opacithorax* (April 10, 1957, October 18, 1957, June 6, 1958), and 4 from colonies of *N. nigrescens* (June 28-30, 1955, May 4, 1957). ARIZONA: S. W. Research Station, Cochise Co.; 21 specimens from a colony of *N. opacithorax,* August 14, 1956, T. C. Schneirla and Mont Cazier.

Form (fig. 1) more slender than in the other species. Coloration from flavo-testaceous to light rufo-testaceous; head and antennae usually darker, sometimes a dark reddish-brown.

Head and pronotum with a dense, coarse, umbilicate punctation. Elytra densely, more finely punctured. Tergite 3 with a moderately dense pubescence but tergites 4-7 subglabrous, with a very sparse, minute punctulation and a few fine hairs. Tergites with 8 or 9 long, dark apical setae (fig. 4). Sternites with a dense, pale pubescence.

Antennal length two and two-fifths times the width of head; segments 4-10 transverse, incrassate (segment 10 one-fourth broader than segment 4, but subequal in length); segment 4 about five-eighths as long as broad; segments 7-10 one-half to three-eights as long as broad; segment 11 three times as long as 10.

Pronotum (fig. 1) about one-fourth broader than long on the average (varying from 1.2 to 1.29 times broader than long); disk relatively strongly biimpressed.

Spermatheca distinctive (fig. 7).

Length, 2-3 mm.

Remarks.—My determination of the Nearctic specimens as *sulcatula* has recently been confirmed by comparison with a Costa Rican paratype that was kindly sent to me by Dr. T. Borgmeier.

The pronotum of *sulcatula* is more coarsely and less densely punctured than in *kansana* and *occipitalis;* the pronotal proportions are nearly as in *occipitalis* and different from those of *kansana;* the pronotal disk generally has more conspicuous impressions, the body form is generally more slender and the coloration paler than in the other species; the spermatheca is distinctive; tergites 4-7 are subglabrous and almost impunctate; tergites 3-6 have only 8 or 9 long setae in their apical row.

Microdonia laticollis (Brues), NEW COMBINATION

Ecitopora laticollis Brues, 1902, American Nat., 36, p. 368 (Austin, Texas, *Eciton schmitti* Emery, type not known).

Material examined.—Texas: Austin (one specimen labelled cotype, Chicago Natural History Museum).

This species is distinguished by its relatively broad pronotum, which is seven-tenths broader than long.

Ecitopora Wasmann

Ecitopora Wasmann, 1887, Deutsch. Ent. Zeitschr., 31, p. 408.

Borgmeier (1949) listed ten species of this ecitophilous genus and added a species in a later paper (Borgmeier, 1958). The genus was recorded from Brazil to Texas. Three species are transferred to *Microdonia* in this paper and the generic position of the Texan species, *nitidiventris,* is uncertain.

Ecitopora nitidiventris Brues

Ecitopora nitidiventris Brues, 1904, Psyche, 11, p.

The location of the type specimen of this species is not known, and even the late Dr. Brues did not know what had happened to it. The original material was collected at Austin, Texas in a colony of *Labidus coecus* Latreille.

Dinocoryna Casey

Dinocoryna Casey, 1893, Ann. N. Y. Acad. Sci., 7, p. 319.

Ecitonusa Wasmann, 1897, Deutsch, Ent. Zeitschr., p. 218, pl. 2, fig. 4. *new synonym.*

Casey was not certain of the habits of *Dinocoryna* and stated that "the only known species is evidently myrmecophilous or still more probably termitophilous." There has been no discussion of the genus since that time and Wasmann was of course unaware that *Ecitonusa foreli* is the same as Casey's *Dinocoryna bisinuata.*

Dinocoryna belongs to the Myrmedoniini in a restricted sense, and is most closely related to *Ecitonidia* Wasmann; in fact it may be difficult eventually to justify two genera. It is difficult to establish the limits of *Dinocoryna* at this time. Two of the new species included in the genus broaden the concept of the genus somewhat.

Borgmeier (1958) recently described a Costa Rican genus *Typhlonusa* that is doubtless very closely allied to *Dinocoryna;* its single known species is interesting in that it lacks eyes.

A Key to the Species of *Dinocoryna* Casey

1. Vertex of head bi-impressed (fig. 11); head from base to apical margin of clypeus longer than broad; distance from base of head to eye about two-thirds greater than eye length; head, pronotum, and elytra distinctively punctate (see description); tergites distinctively sculptured .... **carolinensis** n. sp.

 Vertex of head not impressed; head from base to apical margin of clypeus shorter than head width or subequal to the width; distance from base of head to eye equal to eye length or at most one-third greater; head, pronotum, and elytra with medium-coarse, umbilicate punctation; head, thorax and abdomen without reticulation 2

2. Pronotum very slightly broader than long; pronotum with only a faint indication of a median impression; head subequal in length and width; distance from base of head to eye about one-third greater than eye length; hind tibiae almost as broad as femora but strongly compressed medio-laterally........ **tibialis** n. sp.

Pronotum at least one-third broader than long; pronotum with a distinct median impression; head one-tenth to one-fifth broader than long; distance from base of head to eye about equal to eye length; hind tibiae somewhat narrower than femora and only moderately compressed 3

3. Pronotum almost one-half broader than long; anterior pronotal margin strongly bisinuate; pronotal sides converging appreciably so that the pronotal base is only three-fourths as broad as pronotum .... **bisinuata** Casey

Pronotum one-third to two-fifths broader than long; anterior pronotal margin feebly bisinuate; pronotal sides converging feebly so that the pronotal base is five-sixths as broad as pronotum; head distinctly less than one-fifth broader than long 4

4. Antennal segments 4-10 robust, not incrassate and not increasing in length and width .... **arizonensis** n. sp.

Antennal segments 4-10 incrassate and increasing in length, the tenth segment about one-third longer and broader than fourth segment .... **schmitti** Wasmann

Dinocoryna bisinuata Casey

Dinocoryna bisinuata Casey, 1893, Ann. N. Y. Acad. N. Y. Acad. Sci., 7, p. 320 (Florida; no host cited; U. S. N. M.).

Ecitonusa foreli Wasmann, 1899, Deutsch. Ent. Zeitschr., p. 410. (Faisons, North Carolina; *Eciton carolinense* Emery; Wasmann coll.). *New synonym.*

Material examined.—FLORIDA: Florida state (type of *D. bisinuata*). NORTH CAROLINA: Faisons (type series of *Ecitonusa foreli*).

Coloration pale rufo-flavate.

Head one-fifth to one-fourth broader than long; with a neck about one-half as broad as head; base slightly emarginate; vertex without impressions. Head coarsely and sparsely punctate; integuments smooth.

Antennae robust, length about one-third greater than head width;scape stout, somewhat spindle-shaped; segments 3-10 cylindrical, slightly telescoped; segment 3 obtrapezoidal; segments 4-10 transverse, scarcely increasing in width and very little in length; segment 11 subequal to the three preceding segments combined.

Pronotum almost one-half broader than long; anterior margin strongly bisinuate; disk with a shallow median impression somewhat oval in outline and not sharply delimited from the general surface (impression is about two-fifths as long as pronotum and one-fifth as broad); pronotum broadest subapically, its sides converging to the base which is only three-fourths as broad as the pronotum. Pronotum coarsely, umbilicately punctate, and with medium-fine hairs of moderate length; integuments smooth; pronotum with a moderate number of erect setae in a pattern found throughout the genus.

Tergites and sternites conspicuously beset with many long semi-erect setae, often longer than the tergite or sternite, and numerous shorter semi-erect hairs.

Dinocoryna schmitti (Wasmann), NEW COMBINATION

Ecitonusa schmitti Wasmann, 1897, Deutsch. Ent. Zeitschr., p. 281 (Gaston, North Carolina; *Eciton opacithorax* Emery; Wasmann coll.)

Materials examined.—NORTH CAROLINA: Gaston (type series in Wasmann coll.). ALABAMA: 1, Hurricane Creek, near Peterson, Tuscaloosa Co., October 26, 1947, E. O. Wilson, with *Neivamyrmex opacithorax.*

Coloration testaceous.

Head about one-sixth broader than long; its base feebly emarginate. Head sparsely, umbilicately punctate; with sparse fine hairs becoming dense on postgenae.

Antennae more loosely organized than in *bisinuata,* the segments not telescoped, the pedicels visible. Antennae moderately stout; total length is only one-fourth greater than head width. Antennal segments 4-10 transverse, increasing in length and width; segment 10 one-third longer and broader than segment 4; segment 11 scarcely longer than the two preceding segments combined.

Pronotum one-third to two-fifths broader than long; apical margin feebly bisinuate; sides not converging strongly, the base about five-sixths the maximum pronotal width; median impression of the disk shallow, oval, not sharply delimited (its length about one-half that of pronotum and its width about one-fourth pronotal width). Pronotum coarsely, umbilicately punctate.

Tergites very sparsely punctate except moderately densely punctate near apex of segments 3-6; tergites with an apical row of long pale setae and shorter subapical hairs. Sternites with a conspicuous vestiture of very long pale setae on disk as well as on apical margin (these setae are frequently as long as the sternites).

Hind femora only moderately robust; hind tibiae relatively slender and subcylindrical, only about two-thirds as broad as femora.

Length, 2 mm.

Dinocoryna arizonensis Seevers, NEW SPECIES

Type from Wickenberg, Maricopa Co., Arizona; collected June 14, 1950, by H. K. Gloyd; in light trap. One paratype, Cavecreek P. O., Maricopa Co., Arizona, collected June 11, 1952, by H. K. Gloyd; in light trap. One paratype, S. W. Research Station, Cochise Co., Arizona, collected August 14, 1956, by T. C. Schneirla; with *Neivamyrmex opacithorax.*

Coloration flavate to testaceous.

Head one-tenth broader than long; coarsely, sparsely, umbilicately punctate. Antennae robust (fig. 9); segments 4-10 uniform in form and size, subequal in length and width.

Pronotum one-third broader than long; apical margin feebly bisinuate; base four-fifths as broad as maximum width; disk with medium impression nearly as long as pronotum and about one-fourth as broad; the impressed area impunctate except peripherally. Pronotum coarsely and sparsely punctate; the intervals smooth; with sparse hairs of moderate length and longer setae in the pattern of the genus.

Tergites 3-6 with an apical row of 14-16 moderately long, pale setae and with shorter subapical hairs. Sternites with a very conspicuous vestiture of long, fine, pale setae on apical margin as well as elsewhere; these setae are nearly as long as the sternites and appreciably longer than the tergal setae.

Hind femora relatively stout; hind tibiae about five sevenths as broad as femora, strongly compressed mediolaterally.

Length, 2 mm.

Dinocoryna tibialis Seevers, NEW SPECIES

Type and one paratype from Lawrence, Kansas, collected May 26 and June 4, 1958, by Carl W. Rettenmeyer, from a colony of *Neivamyrmex opacithorax* (Emery).

Coloration rufo-testaceous, head darker.

Head, excluding labrum, subequal in length and width. Vertex without impressions. Sides of head behind eyes straight for a short distance and then converging slightly, the posterior angles distinct; distance from base of head to eye one-third greater than eye length.

Antennae robust, very similar to those of *arizonensis;* segment 3 obtrapezoidal, segments 4-10 cylindrical, uniform in size, segment 10 very little broader than segment 4; segment 11 slightly longer than the two preceding segments combined.

Head and pronotum sparsely, umbilicately punctate, and sparsely setulose; postgenae behind eyes more densely setose. Elytra sparsely and finely punctulate and pubescent. Pronotum and elytra with a moderate number of medium-length setae in the pattern of the genus. Head, pronotum, elytra, and tergites without reticulation; the integuments smooth and shining.

Pronotum only slightly broader than long; anterior margin feebly bisinuate; sides of pronotum converging moderately toward base, basal angles almost obsolete, the base strongly arcuate; pronotal disk very shallowly and inconspicuously impressed medially.

Tergites very sparsely and minutely punctulate and pubescent. Tergites 3-6 with about 14 very fine, medium-length setae on apical margin and with shorter subapical hairs.

Sternites with sparse, fine punctulation and with the intervals almost smooth; sternites with a conspicuous vestiture of numerous long, pale, semi-erect setae, mostly in apical and subapical rows, and with several rows of darker erect setae.

Hind tibiae a little shorter than femora and with their broadest diameter only a little less than that of the femora; hind tibiae and tarsi very strongly compressed.

Length, 3 mm.

Remarks.—This species seems to be the most generalized species of *Dinocoryna* yet discovered. In several respects it is intermediate between two species lines within the genus, one line including *bisinuata, schmitti,* and *arizonensis,* the other including *carolinensis* and probably *Ecitonidia wheeleri. D. tibialis* has a very feeble pronotal impression; all other species have pronounced pronotal impressions. *D. tibialis* has a subquadrate head and pronotum; in the *bisinuata* line the head and pronotum are transverse; in the *carolinensis* line these structures are elongated. *D. tibialis* resembles the *bisinuata* group of species in the sparse punctation and pilosity, and in having smooth, non-reticulate integuments. All species of the genus have robust, cylindrical antennae and a conspicuous vestiture of very long sternal setae.

Dinocoryna carolinensis Seevers, NEW SPECIES

Type and 10 paratypes from Southern Pines, North Carolina, collected April 16, 1949, by Merle Wing; with *Neivamyrmex nigrescens* (Cresson).

Coloration light reddish-brown.

Head slightly longer than broad; sides behind eyes straight, basal angles truncate; base straight; vertex conspicuously impressed medial to each eye (fig. 11). Surface of head with a rough texture resulting from a close-meshed reticulation and about 14 very coarse, umbilicate punctures on each half; the accompanying hairs short and inconspicuous.

Antennae very robust, similar to those of *arizonensis* (fig. 9); segments 4-10 not incrassate nor increasing in length; segments 4-10 uniform in size; segment 11 slightly shorter than the two preceding segments combined.

Pronotum one-fifth broader than long, broadest about two-thirds distance from base to apex; base about five-sixths as broad as maximum width; apical margin bisinuate, anterior angles prominent. Medial pronotal impression (fig. 11) long, moderately deep near apex, shallower basally; varying in width from one-fourth as broad as pronotum to one-fifth as wide basally.

Pronotum and elytra with a moderate number of very coarse, umbilicate punctures that are rosette-like due to fine radiating lines within the bounds of each puncture. The pronotum has a rough texture resulting from these punctures and the irregularly reticulated intervals. Each elytron has 40-50 of the same type of umbilicate punctures, but the intervals are smooth.

Tergites and sternites with a distinctive ground sculpture which appears to consist of numerous fine punctures and associated longitudinal strigulations; a fine recumbent pubescence is present. Tergites with about 6 long setae on the apical margin and about 4 slightly darker diskal setae. Sternites with a relatively dense pilosity of pale, recumbent hairs and numerous pale, apical and subapical setae; the latter are very long and are drawn out to extremely fine apical ends.

Hind tibiae more slender than femora, subcylindrical, not at all compressed.

Length, 2.5-3 mm.

Ecitonidia Wasmann

Ecitonidia Wasmann, 1900, Zool. Jahrb. Syst., 14, p. 283.

Ecitonidia is closely related to *Dinocoryna* and may have to be combined with it eventually. *Dinocoryna carolinensis* in particular shows affinities with *Ecitonidia wheeleri*. I believe that it is advisable to retain *Ecitonidia* until more is known about its tropical relatives. Bruch's

Gallardoia argentina is probably congeneric with *wheeleri* and there are doubtless other neotropical species to be considered.

Ecitonidia wheeleri Wasmann

Ecitonidia wheeleri Wasmann, 1900, Zool. Jahrb. Syst., 14, p. 284 (Austin, Texas; *Eciton nigrescens* Cresson; Wasmann coll.); Brues, 1904, Psyche, 11, p. 21.

Materials examined.—TEXAS: Austin (type series in Wasmann coll.). ARKANSAS: 2, Arkadelphia, April 4, 1937, A. E. Emerson. KANSAS: 2, Lawrence, July 12, 1955, May 5, 1957, Carl W. Rettenmeyer. COLORADO: 1, Salida, July 24, 1906, W. M. Wheeler (MCZ). ARIZONA: 27, S. W. Research Station, Cochise Co., June 14, 1956—September 2, 1956 (with 7 colonies of *N. nigrescens*).

Host.—The records all indicate that this species is restricted to societies of *Neivamyrmex nigrescens,* but whether it occurs throughout the range of the host is not known; to date this species has not been collected east of the Mississippi River although its host ranges from the Atlantic to Pacific coasts.

Ecitonidia wheeleri is easily recognized by the very deep median sulcus of the pronotum (fig. 10).

Ecitoxenidia Wasmann

Ecitoxenidia Wasmann, 1909, Psych. Fähig. Ameisen, 2nd edit., p. 179. Type species: *Ecitoxenidia brevipes* (Brues).

This genus is easily recognized by the distinctively carinate head and pronotum (figs. 12-15). Its closest ally is *Ecitocolax* Borgmeier (1949), known from Brazil and Costa Rica in societies of *Neivamyrmex.*

A Key to the Species of Ecitoxenidia Wasmann

1. Antennae relatively short, segments 2-11 combined shorter than pronotal width .... **brevicornis** n. sp.
   Antennae relatively long, segments 2-11 combined one-fourth to three-fifths longer than pronotal width 2
2. Antennal segments 2-11 combined one-fourth longer than pronotal width **alabamae** n. sp.
   Antennal segments 2-11 combined three-fifths longer than pronotal width .... **brevipes** (Brues)

Ecitoxenidia brevipes (Brues)

Ecitoxenia brevipes Brues, 1902, Ent. News, 13, p. 185, 2 figs.
Ecitoxenidia brevipes (Brues), Wasmann, 1909, p. 179.

Material examined.—TEXAS: Austin; three topotypes collected by W. M. Wheeler; in collections of California Academy of Sciences, Chicago Natural History Museum, and Illinois Natural History Survey. The location of the type of this species is unknown. The host is *Neivamyrmex nigrescens* (Cresson).

Coloration reddish-brown.

Head subequal in length and width. Vertex (fig. 13) with a strong median carina from clypeus to a point behind the middle; occipital region with an oblique carina on each side, forming with the median carina an inverted Y. Head with a tubercle above each eye (the eye is almost invisible from above), from which a supra-orbital carina extends caudally to join a vertical postgenal carina.

Antennae relatively long; segments 2-11 combined three-fifths longer than pronotal width; antennal scape longer than broad; segment 2 subequal in length and width; segments 2-9 subequal in length, incrassate, segment 9 only about one-fourth broader than segment 2; segments 3-9 one-fifth to one-fourth broader than long; segment 10 longer and broader than any of segments 2-9; segment 11 only one-third longer than segment 10.

Pronotum three-fifths to two-thirds broader than long; form and surface contours distinctive (fig. 14); disk divided by two undulating carinae into three areas, the median area somewhat elevated above the lateral areas which are broadly concave.

Elytra broader than pronotum; their lateral margins elevated somewhat and sharply carinate; apical margins of elytra moderately deeply incised near apical angles.

Head, pronotum, and elytra appearing granulose due to a coarse, fine-meshed reticulation. Head and pronotum with short, sparse, feebly clavate setae. Elytra more densely setulose than head and pronotum, and with distinctly clavate setae.

Tergites shining, reticulation obsolescent; tergites 3-7 with fine recumbent hairs near base and with thicker, slightly clavate hairs apically; tergite 3 with a row of clavate hairs; tergite 4 with two irregular rows, tergite 5 with three irregular rows and tergites 6 and 7 with about four irregular row of clavate setae. Sternites densely clothed with fine, moderately long, recumbent hairs and a few erect hairs.

Length, 3 mm.

Ecitoxenidia alabamae Seevers, NEW SPECIES

Type from Hurricane Creek, near Peterson, Tuscaloosa Co., Alabama, collected October 26, 1947, by E. O. Wilson, from a colony of *Neivamyrmex opacithorax* (Emery).

Coloration light-brown.

Head subequal in length and width; its carinae similar to those of *brevipes*.

Antennae long; in fact as long as those of *brevipes*, but due to the relatively broad pronotum of this species, the antennal segments 2-11 combined are only one-fourth longer than the pronotal width. Antennal scape longer than broad; segment 2 slightly longer than broad; segments 2-9 subequal in length but increasing in width so that segment 9 is about one-third broader than segment 2; segments 3-9 only slightly broader than long (one-fifth broader at the most and in some cases subequal in length and width); segment 10 very little longer and broader than any of segments 2-9; segment 11 about one-half longer than segment 10.

Pronotum nine-tenths broader than long (relatively broad for the genus); with distinctive carinae (fig. 15).

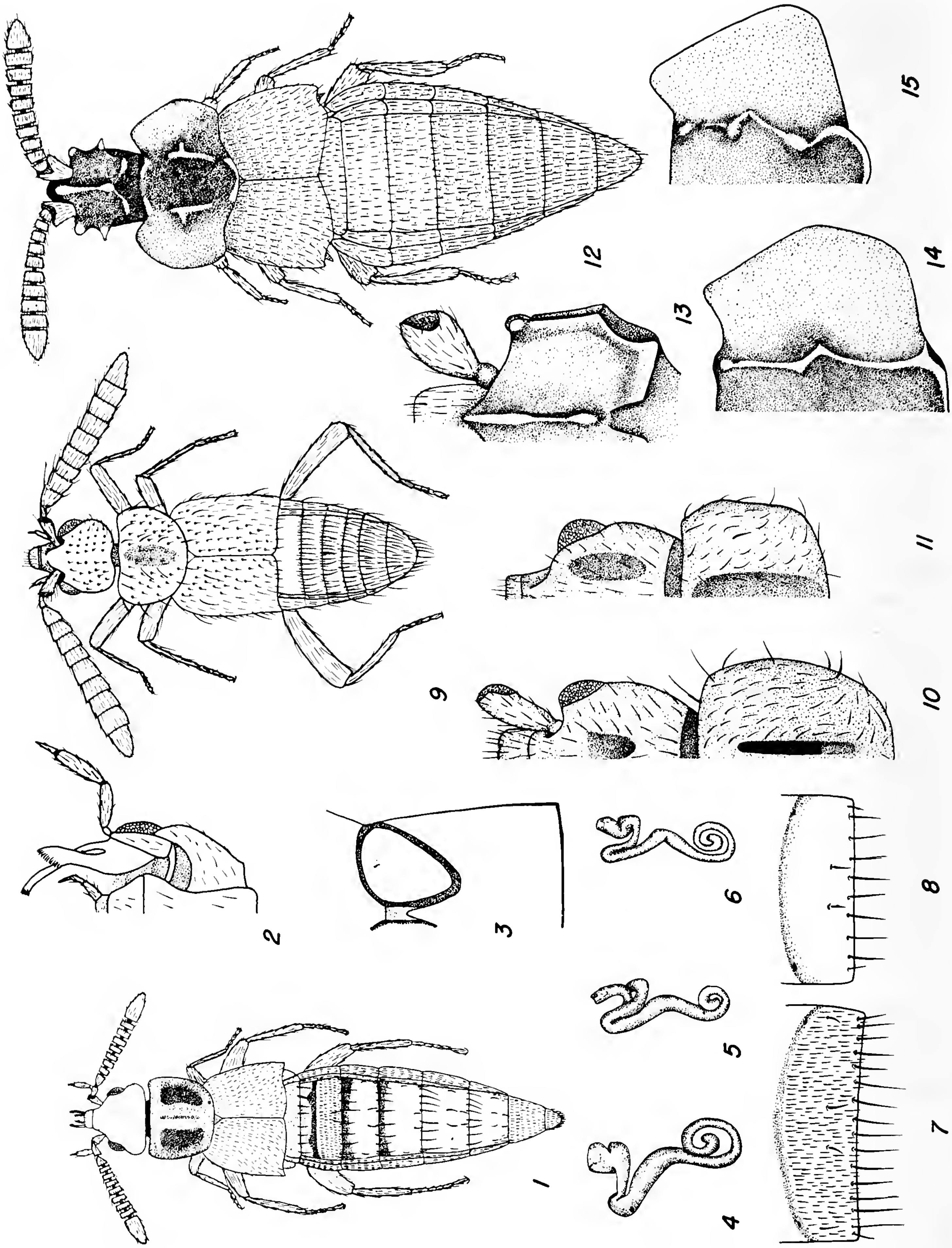


FIGURE 1. *Microdonia sulculata.* FIGURE 2. *M. occipitalis,* ventral view of head. FIGURE 3. *M. occipitalis,* meso- and metasternal processes. FIGURE 4. *M. occipitalis,* spermatheca. FIGURE 5. *M. sulculata,* spermatheca. FIGURE 6. *M. kansana,* spermatheca. FIGURE 7. *M. kansana,* fourth tergite. FIGURE 8. *M. sulculata,* fourth tergite. FIGURE 9. *Dinocoryna arizonensis.* FIGURE 10. *Ecitonidia wheeleri,* head and pronotum. FIGURE 11. *Dinocoryna carolinensis,* head and pronotum. FIGURE 12. *Ecitoxenidia brevicornis.* FIGURE 13. *E. brevipes,* head. FIGURE 14. *E. brevipes,* pronotum. FIGURE 15. *E. alabamae,* pronotum.

Surface sculpture and pilosity of head, thorax, and abdomen similar to *brevipes*.

Length, 3 mm. Although this species is of the same length as *brevipes*, it is a broader species, averaging about one-sixth broader in most of its parts.

Ecitoxenidia brevicornis Seevers NEW SPECIES

Type from Southern Pines, North Carolina, collected April 16, 1949, by Merle Wing, from a colony of *Neivamyrmex nigrescens* (Cresson).

Coloration flavo-testaceous.

Head (fig. 12) with distinctive carinae; the eyes almost completely hidden from dorsal view. Antennae (fig. 12) short and stout; segments 2-11 combined are shorter than pronotal width. Antennal scape short and stout, broader at apex than long; segments 2-10 cylindrical, subequal in length but increasing in width so that segment 9 is three-fourths broader than segment 2; segment 10 longer than any of the preceding segments; segment 11 a little more than twice as long as segment 10.

Pronotum seven-tenths broader than long; its surface contours distinctive (fig. 12).

Surface sculpture and pilosity similar to the other species of the genus.

Length, 2.6 mm.

Literature Cited

Borgmeier, T. 1949. Neue Arten und Gattungen ecitophiler Staphyliniden, nebst einem Katalog aller bisher beschriebenen Arten. Revista Ent., 20, pp. 93-158, 119 figs., 8 pls.

———— 1955. Die Wanderameisen der Neotropischen Region. Studia Ent., no. 3, 720 pp., 87 pls.

———— 1958. Neue Beiträge zur Kenntnis der ecitophilen Staphyliniden. Studia Ent., 1, pp. 225-246, 30 figs.

Brues, C. T. 1902. Two new Texan ant and termite guests. Ent. News, 13, pp. 184-187, 1 pl.

———— 1902. New and little-known guests of the Texas legionary ants. Amer. Nat., 36, pp. 365-378.

———— 1904. A new species of *Ecitopora*. Ent. News, 15, p. 250.

Casey, T. L. 1893. Coleopterological Notices, V. Ann. New York Acad. Sci., 7, pp. 281-606.

———— 1911. New American species of Aleocharinae and Myllaeninae. Memoirs on the Coleopt., 2, pp. 1-245.

Creighton, W. S. 1950. The ants of North America. Bull. Mus. Comp. Zool., 104, 585 pp., 57 pls.

Schneirla, T. C. 1958. The Behavior and Biology of Certain Nearctic Army Ants. Last Part of the Functional Season, Southeastern Arizona. Insectes Sociaux, 5, pp. 215-255, figs. 1-6.

Smith, M. R. 1942. The legionary ants of the United States belonging to *Eciton* subgenus *Neivamyrmex* Borgmeir. American Mid. Nat., 27, pp. 537-590.

Wasmann, E. 1887. Neue brasilianische Staphyliniden bei *Eciton hamatum* gesammelt von Dr. W. Müller. Deutchs. Ent. Zeitschr., 31, pp. 403-416.

———— 1897. Ein neuer *Eciton*—Gast aus Nord-Carolina. Deutchs. Ent. Zeitschr., 1897, pp. 280-282, 2 figs.

———— 1900. Neue Dorylinengäste aus dem neotropischen und dem aethiopischen Faunengebiet. Zool. Jahrb. Syst., 14, pp. 215-289.

———— 1909. Die psychischen Fähigkeiten der Ameisen. Second Edition, 190 pp.

REVISION OF THE SPECIES OF MICROPHOTUS, with an emendation of the Lampyrini (Lampyridae)

By JOHN WAGENER GREEN[1]

Microphotus is a small genus of inconspicuous Lampyrids occurring in the southwestern United States and adjacent parts of Mexico. Nine specific and subspecific names have been published by LeConte, Fall, and Ernest Olivier. A tenth name is added in the present analysis, and three corrections in the synonymy are announced, the male genitalia being used as the principal criterion for species segregation. In a supplementary discussion a new and precise definition of the tribe *Lampyrini* is proposed, with notes on the allocation of the American components of this and related tribes.

This investigation was made possible by the generous cooperation of the following institutions and individuals, to whom the author wishes to convey his sincere thanks and appreciation. The abbreviations in parentheses preceding the names are used in the text to indicate the present location of certain specimens.

(ANSP) Acedamy of Natural Sciences of Philadelphia, James A. G. Rehn and H. J. Grant.
(AMNH) American Museum of Natural History, Mont A. Cazier and J. C. Pallister.
(CAS) California Academy of Sciences, E. S. Ross and H. B. Leech.
(CM) Carnegie Museum, George Wallace.
Chicago Museum of Natural History, R. W. Wenzel and H. S. Dybas.
(CU) Cornell University, Henry Dietrich.
(INHS) Illinois Natural History Survey, M. W. Sanderson.
(MCZ) Museum of Comparative Zoology, P. J. Darlington
Ohio State University, J. N. Knull.
Rockerfeller Foundation, Mexico City, W. W. Gibson.
University of Arizona, Floyd Werner.
University of California at Berkeley, P. D. Hurd.
University of California at Davis, A. T. McClay.
University of Kansas, G. W. Byers.
University of Michigan, T. E. Moore.
(U. Minn) University of Minnesota, E. F. Cook.
(USNM) U. S. National Museum, T. J. Spilman.
Owen Bryant.
J. M. Burns.
G. H. Nelson.
(Parker) Frank Parker.
(Rotger) Rev. Bernard Rotger, C. R.

California Academy of Sciences

MICROPHOTUS LeConte

Microphotus LeConte, 1866, Smiths. Misc. Coll., number 167, 6:89.

MALE. Form elongate, parallel-sided. Eyes very large, contiguous beneath or nearly so, separated above, head concave between them. Antennae approximate, shorter than pronotum, not compressed, with less than eleven segments, segment 1 short and stout, its apex strongly oblique, 2 nearly as stout and about as long as the short outer side of 1, its apex much wider than base of 3, 3 elongate and subtriangular, distal segments more or less subquadrate, terminal segment with minute tubercle-like appendix near edge of subtruncate apex Clypeus connate with front, extending to tips of mandibles and largely concealing them from above, sparsely granulate punctate and with coarse setae directed anteriorly, apex narrowly rounded; membraneous labrum small, usually deflexed and not visible from above. Mandibles stout, subporrect, feebly curved, coarsely pubescent; tips rounded externally, inner apical angle extended in a glabrous spine-like process directed obliquely inward and variable in length, sometimes reduced (by abrasion?) to a minute denticle. Maxillary palpi short and stout, last three segments forming a compact mass longer than wide and divided obliquely, terminal segment subtriangular, its tip glabrous. Labial palpi very small, with two distinct segments, the terminal longer than wide, somewhat compressed, subtriangular, inner side very short, outer side and apex subequal.

Pronotum feebly transverse, broadly rounded in front, lateral margins subparallel or converging basally, base truncate or feebly emarginate; disk strongly convex over eyes in a circular outline, anterior margin narrowly reflexed, sides broadly explanate; surface with sparse decumbent pubescence and shallow irregular punctation, granulate-punctate on narrower basal part of median convex area, this area also with minute secondary pubescence.

Elytra somewhat dehiscent, not extending to tip of abdomen, surface more or less rugose; primary pubescence not dense, regularly distributed, directed posteriorly, the setae arcuate with tips approaching elytral surface; minute secondary pubescence present, sometimes very sparse basally; epipleurae narrow, not attaining apex.

Ventral surface, except prothorax, sparsely granulate-punctate. Prosternum very short before coxae, truncate in front or with feeble median emargination. Abdominal tergites not foliate, ventral segment 8 with apical process; spiracles located near base and slightly exterior to lateral margins of ventral segments 2 to 8, visible laterally unless abdomen is completely collapsed; light organs not apparent. Legs short, femora not extending beyond margin of body; tarsi slender, fourth segment small, subequal in length to third, not bilobed, terminal segment long, extending for most of its length beyond apex of fourth; claws simple.

FEMALE. Larviform, without wings or elytra. Head small, elongate, eyes vestigial; antennae similar to male, with fewer segments. Prosternum long before coxae, head completely retractile. Abdomen with eight segments, ventral segment 1 fully visible and subequal to second; light organs not apparent.

All the species of Microphotus are quite similar in coloration. The pronotum is pale flavate with the convex median area usually darker. The scutellum and adjacent areas are pale flavate. The elytra are some shade of brown, varying from quite pale to rather dark. In *M. dilatatus* the elytra and the convex area of the pronotum are normally dark brownish piceous, and paler individuals are exceptional. The other species are usually of a more dilute color, although dark examples may occur. In several species the elytra are more or less infuscate at tip. The ventral surface is pale fulvous, varying with the metasternum and median areas of the ventral segments brownish. The legs are uniformly pale.

The pygidium and preceding tergite usually have the hind angles somewhat produced posteriorly. These sclerites are, however, subject to variability and of little value in the definition of species. All measurements of length in the descriptions that follow are from the anterior margin of the pronotum to the elytral apices.

A number of elongate African species are very close to *Microphotus* having similar appendiculate antennae with less than eleven segments, but differing by the absence of the apical process of ventral segment 8, and in having the abdominal spiracles truly ventral. Examples of these sent to Dr. Basilewsky, of the Congo Museum, were said by him to approach closely to certain species placed in *Lampyris,* notably *L. tinantae* Pic, *L. acuminata* Pic, and *L. mozambica* Kolbe. It is noted that in most of these African species the protarsi are short and somewhat dilated, with segments 1 to 3 each strongly transverse, and the claws and terminal segment of all tarsi perceptibly enlarged. An exception to this is a small species from Southern Rhodesia (U. Minn., 2 examples) having normally slender and elongate tarsi.

Key to males of Microphotus

1. Elytra less than three times as long as pronotum, averaging about two and one-half times 2
   Elytra more than three times as long as pronotum 3
2. Antennae with eight or nine segments. Pronotum posteriorly most prominent at hind angles, base shallowly emarginate throughout its width. Size larger, elytra uniformly dark brown .... **Microphotus dilatatus** LeConte
   Antennae with eight segments. Pronotum truncate at base. Size smaller, elytra pale brown with darker tips.......... **Microphotus octarthrus** Fall
3. Antennae with more than eight segments 4
   Antennae with eight segments. Median longitudinal line of pronotum not impressed 6
4. Antennae with nine or ten segments. Median longitudinal line of pronotum not impressed. Aedeagus as in figure 3 .... **Microphotus angustus** LeConte
   Antennae with ten segments. Median longitudinal line of pronotum strongly impressed. Aedeagus as in figure 4 5
5. Eyes smaller, briefly contiguous beneath posteriorly. Pronotum with circular convex area over eyes usually extending not more than half way from apex toward base .... **Microphotus decarthrus** Fall
   Eyes larger, broadly contiguous beneath posteriorly. Pronotum with circular convex area over eyes extending from apex more than half way to base .... **Microphotus fragilis** E. Oliver

6. Aedeagus as in figure 5. Scutellum usually narrowly rounded at apex .... **Microphotus pecosensis** Fall
Aedeagus as in figure 6. Scutellum usually with apical notch .... **Microphotus chiricahuae** Green, new species

Microphotus dilatatus LeConte

Microphotus dilatatus LeConte, 1866, Smiths. Misc. Coll., number 167, 6:90.

Microphotus rinconis Fall, 1912, Canadian Ent., 44:44 (new synonymy).

MALE. Form broader than usual. Antennae with eight or nine segments. Eyes beneath broadly contiguous posteriorly. Pronotum relatively larger than in any other species, about one-fourth wider than long, lateral margins subparallel, base arcuately emarginate throughout, emargination about one-tenth as deep as wide, rarely lacking; median longitudinal line not impressed, convex area usually rather dark piceous brown. Elytra usually dark piceous brown, about two and one-half times as long as pronotum, sides rather widely explanate, lateral margins broadly arcuate; secondary pubescence distinct except near base, gradually longer and denser distally. Genitalia as in figure 1. Length 5-8 mm.

DISTRIBUTION. ARIZONA: Agua Caliente; Baboquivari Mts.; Badger; Benson; Ft. Grant; Gila Bend Mts.; Gila County; Globe; Nogales; Patagonia; Rincon Mts.; Sabino Canyon, S. Catalina Mts.; Santa Rita Mts.; Santa Cruz Village, Cobabi Mts.; Sierritas; Superior; Tanque Verde; Tucson; Tucson Mts.; Wickenburg. July and August. SONORA: Minas Nuevas, Alamos; Guaymas. July and August. BAJA CALIFORNIA: Triunfo; San Bartolo; El Taste. July.

This is our most abundant species, and also the one most easily recognized. It is distinguished from all other species except *M. octarthrus* by the short elytra; and it is the only known species in which the base of the pronotum is emarginate and posteriorly most prominent at the hind angles. There are no perceptible differences between Arizona specimens (*rinconis*) and those from Baja California. It is the type species of the genus, the type locality being Cape San Lucas, Baja California. Fall's type was taken in the Rincon Mountains, Arizona.

Microphotus octarthrus Fall

Microphotus octarthrus Fall, 1912, Canadian Ent., 44:45.

Microphotus abbreviatus E. Olivier, 1912, Ent. Soc. Belg., Ann., 56:26.

MALE. Form narrow, parallel-sided. Antennae with eight segments. Eyes beneath broadly contiguous posteriorly. Pronotum slightly wider than long, lateral margins converging posteriorly, rarely parallel, base truncate; median longitudinal line not impressed. Elytra pale brownish piceous with infuscate tips, short, about two and one-half times as long as pronotum; secondary pubescence distinct except near base, gradually longer and denser distally, very short in about basal half. Genitalia as in figure 2. Length 4.25-6.25 mm.

FEMALE. Similar to female of *M. angustus.* Antennae with six segments. Tarsi with five segments.

DISTRIBUTION. TEXAS: Alpine; Brewster County; Chisos Mts., Big Bend Park; Davis Mts.; Marathon; 65 mi. S. of Marathon; Presidio; 12 mi. S. of Presidio. April, May, June, July, September. NEW MEXICO: Ima; Jemez Mts.; Jemez Springs; Organ; Pecos. July. ARIZONA: Ft. Grant; Pinal Mts.; Prescott; Rincon Mts.; Santa Rita Mts.; Yarnell Hill. June, July. UTAH: Bellevue; Hurricane; St. George; Zion County. May, June, July. CHIHUAHUA: Canon Prieto, nr. Primavera; 25 mi. SW. of Camargo. July. COAHUILA: Sierra de Tlahualilo, 4,000 ft., Ojo de Agua, July.

This is our smallest species, easily recognized by its short elytra with infuscate tips, together with the truncate base of the pronotum. Only *M. dilatatus* has similarly short elytra. It differs from *M. octarthrus* externally in having the base of the pronotum shallowly emarginate; and in its larger size, broader form, and darker coloration, the elytra being uniformly dark piceous brown. Fall's type is from the Rincon Mountains, Arizona; Olivier's from Fort Grant, Arizona.

Microphotus angustus LeConte

Microphotus angustus LeConte, 1874, Amer. Ent. Soc., Trans., 5:58.
Microphotus robustus E. Olivier, 1911, Revue Sci. du Bourbonnais, 24:80 (new synonymy).

MALE. Antennae usually with nine segments, sometimes ten. Eyes beneath briefly contiguous, or nearly so, posteriorly. Pronotum one-third to one-fourth wider than long, lateral margins subparallel or slightly diverging posteriorly, base truncate; median longitudinal line not impressed. Elytra about three and one-third times as long as pronotum, secondary pubescence sparse and extremely minute in basal half or more, gradually longer and denser distally. Genitalia as in figure 3. Length 6.5-11 mm.

FEMALE. Larviform, without wings or elytra. Integuments granulate-punctate throughout, with sparse decumbent primary pubescence and dense extremely minute secondary. Color pale reddish testaceous, varying to somewhat darker except at sides. Head small, elongate, horizontal; eyes vestigial, with very few facets. Antennae similar to male, with six or seven segments. Mouth not deflexed; clypeus and labrum similar to male; mandibles stout, straight, terminal tooth horizontally compressed, elongate triangular, extending anteriorly in line with basal part of mandible and more than half as long, tip acute. Palpi similar in structure to male, the maxillary shorter and much stouter, segments all transverse.

Pronotum variable, usually more or less semi-elliptic. Mesonotum slightly shorter than pronotum, lateral margins regularly arcuate, hind angles broadly rounded. Metanotum similar to mesonotum, slightly wider. Abdomen with eight tergites, widest at tergite 3, thence tapering to apex; lateral margins of tergites feebly arcuate, hind angles narrowly rounded, pygidium with hind angles somewhat produced posteriorly.

Prosternum before coxae about one-third as long as pronotum, narrowing anteriorly, apical margin truncate or emarginate, parapleurae not definitely separated from prosternum. Abdomen with eight ventral segments, the first extending well behind coxae and only slightly shorter than second, each segment with spiracles located near lateral margins. Light organs not apparent. Tarsi with five segments.

DISTRIBUTION. CALIFORNIA: Bear Lake; Berkeley; Blocksburg; Burbank; Claremont; Dulzura; Fort Seward; Humboldt County; Kaweah; Keddie; Los Angeles; Mokel. Hill; Mt. Wilson; Oakland; Pine Hills; Pinon Flat, San Jacinto Mts.; San Diego; San Jose; Santa Barbara; Santa Clara County; Santa Cruz; Santa Cruz Mts.; Seneca; Sherwood; Shasta County; South Fork Feather River, Butte County; Sylvania; Tanbark Flat, San Gabriel Mts.; Tulare County; Tuolumne County; Trinity County; Waterman Canyon; Yosemite. March, May, June, July, November. OREGON. Klamath (CM)

Variation in the number of antennal segments has been noted only in this species and in *M. dilatatus*. Olivier undoubtedly described *M. robustus* from a large specimen of *M. angustus* with ten-segmented antennae. His description consists otherwise of generalities applying equally as well to most of the other species of the genus.

LeConte records *M. angustus* from Mariposa, Oregon, which is evidently an error for Mariposa, California. In his descriptions of other species following in the same paper, he cites specimens from Mariposa, California, several times. All his Mariposa material was collected by Dr. Thevenet. The Oregon record listed above is the only one seen from that state and may be dubious.

Microphotus decarthrus Fall

Microphotus decarthrus Fall, 1912, Canadian Ent., 44:45.

MALE. Antennae with ten segments. Eyes beneath briefly contiguous, or nearly so, posteriorly. Pronotum nearly as long as wide, lateral margins somewhat converging posteriorly, varying to subparallel, base truncate; median longitudinal line strongly impressed anteriorly; circular convex area over eyes usually extending not more than half way from apex to base, with coarse irregularly confluent punctures medially, becoming finer and sparser laterally, sometimes leaving a smooth transparent spot each side over eyes. Scutellum broadly rounded or subtruncate at apex, varying to slightly notched. Elytra about three and one-fourth times as long as pronotum; tips sometimes lightly infuscate; secondary pubescence distinct except near base, gradually longer and denser distally, very minute in basal half or more. Apical process of ventral segment 8 sublinear except at base. Genitalia as in figure 4. Length 6-8 mm.

DISTRIBUTION. ARIZONA: Chiricahua Mts., Fall type (MCZ); Pinal Mts., Ingham, 3 males (Parker); S. Catalina Mts., Summerhaven, 8000 ft., O. Bryant, 1 male (CAS).

The identity of this species was determined by an examination of Fall's type and only specimen. It closely resembles *M. angustus,* in which the antennae are sometimes 10-segmented. The strongly impressed median longitudinal line of the pronotum readily distinguishes *M. decarthrus,* as does also its more eastern habitat.

In the following species, M. fragilis E. Olivier, the mendian longitudinal line of the pronotum is also strongly impressed and the genitalia are similar to *M. decarthrus,* but in the former the eyes are larger and very broadly contiguous beneath posteriorly. Other distinguishing characters, more or less variable, of *M. fragilis* are: the larger size and broader form; the circular convex area of the pronotum extending distinctly more than half way from apex to base; the narrowly rounded apex of the scutellum; and the broader subtriangular process of ventral segment 8.

Microphotus fragilis E. Olivier

Microphotus fragilis E. Olivier, 1912, Soc. Ent. Belgique, Ann., 56:26.

MALE. Antennae with ten segments. Eyes beneath broadly contiguous posteriorly. Pronotum about one-tenth wider than long, widest near middle, lateral margins more or less converging posteriorly, base truncate; median longitudinal line strongly impressed, sometimes nearly reaching apex; circular convex area over eyes extending more than half way from apex to base, shining, unusually smooth, impunctate and transparent each side, punctures elsewhere smaller and sparser than usual, denser medially. Scutellum narrowly rounded at apex. Elytra about three and one-fourth times as long as pronotum, tips sometimes slightly infuscate; secondary pubescence distinct except near base, gradually longer and denser distally, very minute in basal half or more. Ventral segment 8 with apical process elongate triangular. Genitalia similar to figure 4. Length 8.5-9 mm.

DISTRIBUTION. ARIZONA: Santa Rita Mts., 12/5, Hubbard & Schwarz, Olivier cotype (USNM); no definite locality, 2 males (ANSP), 1 male (INHS).

Fall (1928) considered this species to be a synonym of his *M. decarthrus.* The present identification is based on a specimen in the National Museum collection bearing labels as follows: "Santa Rita Mts., Ar., 21/5," "Coll. Hubbard & Schwarz," "Cotype No. 19297," and "M. fragilis Oliv." the last one not in Olivier's handwriting. A second cotype No. 19297 from "Chiric. Mts., Ar., Hubbard & Schwarz" (USNM) is a specimen of *M. chiricahuae* Green, an unaccountable error considering its 8-segmented antennae. It is possible that Olivier's type may prove to be an example of *M. decarthrus,* in which case the present species would be without a name.

Both *M. decarthrus* and *M. fragilis* are exceedingly rare, only five examples of the former and four of the latter having been available for study. At present it seems that two species are involved, but more abundant material may not uphold this conclusion.

Microphotus pecosensis Fall

Microphotus octarthrus pecosensis Fall, 1912, Canadian Ent., 44:45.

MALE. Antennae with eight segments. Eyes beneath briefly contiguous, or nearly so, posteriorly. Pronotum slightly wider than long, lateral margins subparallel, varying to divergent or convergent posteriorly, base truncate; median longitudinal line not impressed. Scutellum usually rounded at apex. Elytra about three and one-half times as long as pronotum, tips more or less infuscate; secondary pubescence distinct except at base, gradually longer and denser distally. Genitalia as in figure 5. Length 6-8 mm.

FEMALE. Similar to female of *M. angustus*. Antennae with six segments. Tarsi with four segments. In some Colorado examples (Rotger), probably of this species, the tarsi are 3-segmented.

DISTRIBUTION. TEXAS: Valentine, Presidio County, IV-30-27, J. O. Martin, 1 male (CAS), with atypical genitalia. NEW MEXICO: Jemez Mts.; Pecos, Fall types. June, July. COLORADO: Royal Gorge, July. Junction Creek; San Luis Valley; Stollsheimer; all females, June and July, identity not certain (Rotger). UTAH: Cedar City, Iron County; Eureka; Navajo Lake; Zion Canyon, Wylie Camp; Zion County. June. ARIZONA: Flagstaff; Globe; Oak Creek Canyon, 16 mi. S. of Flagstaff; Navajo Nat. Mon., Betatkin Canyon; Pinal Mts.; Prescott Nat. Forest, Indian Creek Camp; Santa Rita Mts.; Williams. June, September. CALIFORNIA: San Diego, H. Klages coll'n., 1 male (CM), a most unlikely record and probably erroneous. CHIHUAHUA: San Jose Babicora. July.

Fall described *M. pecosensis* as a variety of *M. octarthrus*, stating that he did not accord it specific rank because one specimen in his series of four had short elytra, as in *M. octarthrus*. The odd specimen was actually an *M. octarthrus*, whose wide distribution was unknown to Fall. Attention is called to Fall's table of measurements on page 47 (1912), and his inadvertent transposition of the names *octarthrus* and *pecosensis* in the first column.

The present species seems to be our most variable one, and may be in the process of splitting into several different forms of which only the next species is well defined. One example, from Valentine, Texas, has the apices of the lateral lobes of the aedeagus very broad and slightly notched, as viewed from the side. This could indicate a valid species or it may be only a deformity, although both lateral lobes are of the same structure. The scutellum is rounded at apex in all except a specimen from Chihuahua, where it is broader and slightly notched.

Microphotus chiricahuae Green, new species

HOLOTYPE. MALE. Chiricahua Mts., Arizona, 8-9000 ft., VII-3-1927, Rustler Park, Cochise County, J. A. Kusche. In collection of California Academy of Sciences.

Form similar to *M. pecosensis*. Antennae with eight segments. Eyes beneath briefly contiguous, or nearly so, posteriorly. Pronotum as long as wide, widest near middle, lateral margins slightly converging posteriorly, base truncate; median longitudinal line not impressed; convex area over eyes punctate throughout, punctures irregularly confluent medially, finer and sparser laterally, without transparent spots. Scutellum with small apical notch. Elytra about three and one-half times as long as pronotum, tips not infuscate; secondary pubescence distinct except near base, gradually longer and denser distally, very short in about basal half. Genitalia as in figure 6. Length 7 mm.

VARIATIONS. The lateral margins of the pronotum may be parallel, the scutellar notch varies from quite deep to nearly obsolete, and the tips of the elytra are sometimes definitely infuscate. Length 6-7 mm.

DISTRIBUTION. All records following are from the Chiricahua Mts., Cochise County, ARIZONA: Rustler Park, 8-9000 ft., VII-3-27, J. A. Kusche, holotype and 3 paratypes (CAS); Cave Creek, 7000 ft., VI-24-27, J. A. Kusche, 5 paratypes (CAS); Cave Creek, 8000 ft., VI-29-27, J. A. Kusche, 1 paratype (CAS); Cave Creek, VI-20-29, J. O. Martin, 3 paratypes (CAS); Flys Peak, 9500 ft., VII-9-27, J. A. Kusche, 1 paratype (CAS); SW. Research Station, 5 mi. W. of Portal, VI-15-58, C. D. McNeill, 2 paratypes (CAS); SW. Research Sta., VI-17-55, M. Statham, 1 paratype (AMNH); no precise locality, all collected by Hubbard and Schwarz, 2 paratypes of which one is a cotype of *M. fragilis* Olivier, and 2 females (USNM).

This species is closely related to *M. pecosensis,* from which it differs greatly in the much broader median lobe of the aedeagus and the non-sinuate ventral inner margins of the lateral lobes. Externally it is not distinguishable with certainty from *M. pecosensis.* Differences of some value between the two species are the usually notched scutellum, and the shorter secondary pubescence in the basal half of the elytra of *M. chiricahuae.* Probably the locality labels will serve to identify this species, which seems to be confined to the Chiricahua Mountains of southern Arizona. No examples of *M. pecosensis* have been seen from that region. The two females listed above have the antennae and tarsi with six and four segments respectively.

EMENDATION OF THE TRIBE LAMPYRINI

The standard definition of the tribe *Lampyrini* has heretofore been the largely inaccurate statement that the terminal segment of the antennae is appendiculate. A too literal acceptance of this tradition led the author into an error in erecting a new genus for two American representatives of *Lampyris,* previously unknown from the Western Hemisphere. In the following discussions, all statements apply to males only unless otherwise indicated.

In the subfamily Lampyrinae (Green, 1948), two types of mandibular structure occur, which for convenient reference may be called normal, and modified. In the normal type the mandibles are arcuate and regularly narrowing to the tips, which are not differentiated in any way from the basal part. In the modified type the mandibles are more or less porrect, coarsely pubescent externally, and with quite slender glabrous tips variably discontinuous in curvature with the stout basal part. It is proposed to redefine the tribe *Lampyrini* to include only those genera in which the mandibles are modified, very small, and largely concealed from above by the elongale clypeus, which extends nearly or quite to their tips.

American Lampyrinae—partial table of tribes

1. Mandibles modified (see preceding paragraph) 2
   Mandibles normal, prominently exposed above. Abdominal spiracles dorsal .... Tribe **Photinini** (and others?)
2. Clypeus elongate, extending nearly or quite to tips of mandibles and largely concealing them from above. Mandibles small, glabrous tips often reduced to minute denticles. Abdominal spiracles variable .... Tribe **Lampyrini**
   Clypeus basal, mandibles prominently exposed above 3
3. Tarsi slender, terminal segment extending for at least half its length beyond lobes of fourth. Sexes dissimilar, females flightless. Abdominal spiracles ventral .... Tribe **Pleotomini**
   Tarsi stout and compact, terminal segment extending only slightly beyond lobes of fourth. Sexes similar, alate 4
4. Abdominal spiracles ventral .... Tribe **Limprocerini**
   Abdominal spiracles dorsal .... Tribe **Cratomorphini**

It may be noted that the last three tribes of the above table were formerly considered by the author to be subtribes of the *Photinini.* They must now be advanced to tribal rank because of the increased importance assigned to the mandiular structure.

TRIBE LAMPYRINI

The composition of the *Lampyrini* is not greatly altered by the proposed emendation. In the American fauna, *Phausis* and *Phosphoenus* are excluded because of their normal manibles, while *Alecton* and

Petalacmis are added. No representatives of the South American *Lucernuta, Calotrachelum,* and *Olivierus* have been available for study. The oriental species assigned to *Pyrocoelia* by Gorham belong to this tribe. Olivier considered *Pyrocoelia* to be a synonym of *Lucernuta,* but this is in need of re-examination.

The antennal appendix is plainly evident in *Microphotus* as a non-setigerous tuberculiform addition to the terminal segment, from which it differs in texture. It is not to be confused with the setigerous granules of varying sizes that beset the apex of the terminal segment in other Lampyrini. A true appendix is also present in the American species of *Phausis,* but not in the Palearctic *P. splendidula.* The appendix has also been noted in the larviform female of *Cladodes ater* Solier, indicating its lack of any major taxonomic significance.

North American Lampyrini—key to genera

1. Eyes large, contiguous beneath or nearly so 2
   Eyes smaller, distant beneath. Abdominal spiracles dorsal 3
2. Antennae with eleven segments, terminal segment (of American species) not appendiculate. Ventral segment 8 without apical process. Abdominal spiracles ventral .... **Lampyris** Linne
   Antennae with less than eleven segments, terminal segment with distinct tuberculiform appndix. Ventral segment 8 with apical process. Abdominal spiracles situated just exterior to lateral margins of segments, sometimes visible ventrolaterally .... **Microphotus** LaConte
3. Antennae normal, with eleven segments. Ventral segment 8 with apical process .... **Paraphausis** Green
   Antennae modified. Ventral segment 8 without apical process 4
4. Antennae with 11 or 12 segments, eccentrically perfoliate, segments 3 to 10 each somewhat produced internally (Cuba) .... **Alecton** Laporte
   Antennae with nine segments, terminal segment greatly enlarged and much longer than 1 to 8 combined. (So. Amer.) .... **Petalacmis** E. Olivier

LAMPYRIS is represented by two rare Florida species originally described under the generic name of *Pleotomodes,* which for the present should be regarded as a synonym of *Lampyris.* As it now stands, *Lampyris is* a composite mixture of various generic types, not all of which lack the antennal appendix, nor do they all have 11-segmented antennae. A recapitulation of the distinguishing characters of the two American species, which were announced in separate papers, is given below. No genitalic differences have been noted.

Lampyris—key to American species

Eyes narrowly separated beneath. Form more elongate, parallel-sided. Primary elytral pubescence inclined, less dense. Pygidium usually with apex subtruncate and bisinuate .... **L. needhami** Green

Eyes contiguous beneath. Form shorter and broader, sometwhat narrowing posteriorly. Primary elytral pubescence decumbent. Pygidium usually rounded at apex ---------- **L. knulli** Green

PARAPHAUSIS. The apical spine of the mandibles was not noted in the original description, and was no doubt missing in the holotype. It is a fragile structure easily damaged by the manipulations the of the investigator, and probably also by its normal usage during the life of the insect. The only known species, *P. eximia* Green (1949) occurs in Arizona. The genitalia are so similar to those of *Microphotus* that they could well belong to a species of that genus.

ALECTON has been recorded only from Cuba. The three species recognized by Lang and Mutcheler may be readily identified by the following compiled color key.

Alecton—key to species

1. Entirely pale yellow ---------- **A. flavum** Leng and Mutchler
   Elytra partly black ---------- 2
2. Pale lateral border of elytra extending anteriorly to basal third. Antennae with three apical segments dusky ---------- **A. discoidalis Castelnau**
   Pale lateral border of elytra extending anteriorly nearly to base. Antennae with six apical segments dusky ---------- **A. improvisus** E. Olivier

PETALACMIS. The only species, *P. praeclarus,* is listed from Brazil and Bolivia, and has recently been taken in Peru.

TRIBE PLEOTOMINI

In this tribe the mandibles are comparatively large and prominent, and fully visible from above, the glabrous tips being well developed and only feebly discontinuous in curvature with the pubescent basal part. The membraneous labrum is very conspicuous between the mandibles. Four genera are known from the American fauna, one of them at present probably undescribed.

American Pleotomini—key to genera

1. Clypeus small and poorly deflned, not extending forward beyond base of mandibles, its anterior margin arcuately emarginate. Abdominal spiracles prominent. Antennae biflabellate ---------- 2
   Clypeus well defined, extending forward somewhat beyond base of mandibles, its anterior margin subtruncate or rounded. Abdominal spiracles small and inconspicuous. Antennae uniflabellate (Peru) ---------- UNDESCIBED (?) GENUS
2. Antennae with 13 or 14 segments, the branches short and stout ---------- **Pleotomus** LeConte
   Antennae with 11 segments, the branches long and slender ---------- 3
3. Legs long and slender, femora extending beyond sides of body. Elytra dehiscent ---------- **Calyptocephalus** Gray
   Legs short, femora extending only to sides of body. Elytra not dehiscent ---------- **Phoenolis** Gorham

The undescribed genus indicated above is represented in the California Academy of Sciences collection by two Peruvian species keying to *Vesta* in Olivier's classification (1907). The ventral abdominal spiracles are small and inconspicuous, and would easily have escaped notice were it not for the modified mandibles indicating their probable presence. Antennal segments 3 to 10 each have the inner apical angle extended in a process as long as the segment. The two species are quite similar in appearance: black, the pronotum fulvous with, or without, narrow black borders.

The species of *Pleotomus* are probably more numerous than is indicated in the list, but at present only two species, or species groups, can be defined. LeConte described *P. davisi* from a single female collected in Kentucky. It is generally assumed that males from the Eastern States, having the elytra dark with pale borders, are conspecific with LeConte's female. A pale form occurring in Texas, *P. pallens* LeConte, is variable in color, some examples having the elytra as dark as the eastern specimens. No structural characters have been found for separating the eastern and western specimens, and it is uncertain whether more than one species is involved. Examples from Sinaloa, Nayarit, Tamaulipas, and San Luis Potosi are at hand, also variable in color and not definitely separable from the Texas specimens. All have the head concave between the eyes. The rare *P. nigripennis* LeConte, from the Southwestern States, is without doubt a distinct species. The eyes are smaller and more widely separated beneath, the head not concave between them, and the elytra are entirely black. The color of the ventral surface and legs is variable.

TRIBE LAMPROCERINI

The heterogeneous assemblage placed by Olivier in his subfamily *Lamprocerinae* has been reduced to four homogeneous neotropical genera. The species are mostly South American, and only one, *Tenaspis angularis* Gorham, enters the Nearctic fauna. These appear to be the only Lampyrids with ventral abdominal spiracles in which the females are known to be alate and similar to the males. They are characterized by their above average size, broad scutate form, firmly sclerotized integuments, and stout compact tarsi with the terminal segment extending only slightly beyond the lobes of the fourth. In the scanty material available it is noted that the terminal segment of the labial palpi is broadly securiform.

Lamprocerini—key to genera

1. Antennae biflabellate 2
   Antennae uniflabellate or simple 3

2. Outer ramus of antennal segments shorter than inner ramus .... **Lucio** Castelnau
   Outer and inner rami of equal length .... **Lamprocera** Castelnau
3. Ventral segment 9 of male exposed .... **Hyas** Castelnau
   Ventral segment 9 not exposed .... **Tenaspis** LeConte

TRIBE CRATOMORPHINI

Four genera are recognized in this tribe, but it seems certain that this number is too small to indicate correctly the relationships of the numerous species involved. All are confined to the Western Hemisphere.

Cratomorphini—key to genera

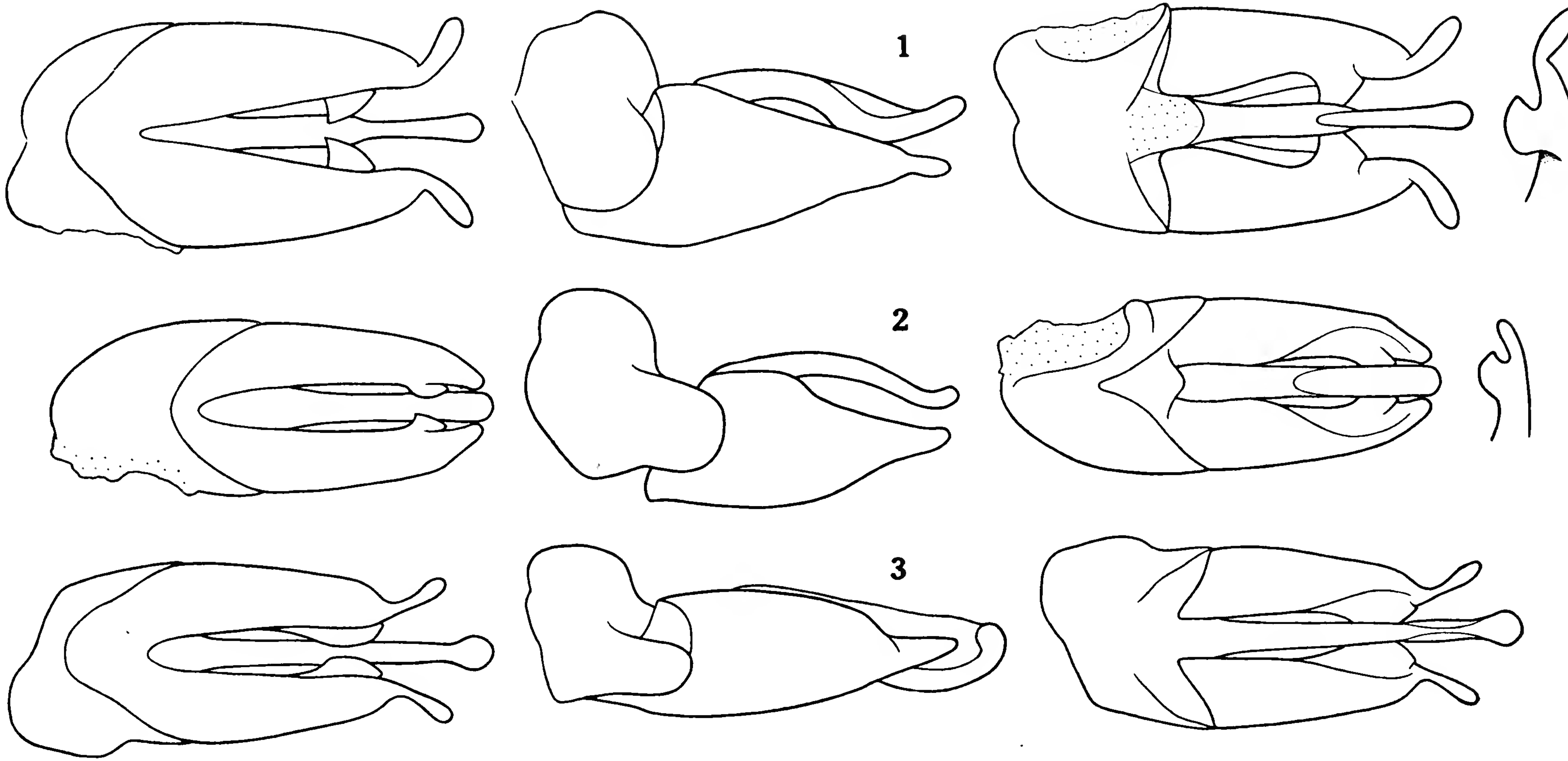
1. Pronotum with two anterior vitreous spots. Eyes very large, head concave between them. Abdomen foliate .... **Cratomorphus** Motschulsky
   Pronotum without vitreous spots. Eyes moderate, head not concave. Abdomen not foliate 2
2. Form broad, usually narrowing posteriorly. Epipleurae very wide .... **Aspisoma** Castelnau
   Form elongate, parallel-sided. Epipleurae narrow 3
3. Pronotum in part alutaceous and with a more or less distinct median longitudinal carina. Prosternum truncate in front. Clypeus connate with front .... **Pyractomena** LeConte
   Pronotum not alutaceous, without median carina. Prosternum distinctly emarginate medially. Clypeus not connate with front .... **Micronaspis** Green

TRIBE PHOTININI, and others

After removing the preceding four tribes, there remains in the *Lampyrinae* a vast aggregation of species for which many more genera will be required than the comparatively small number currently recognized. They present a problem in taxonomy for which no easy solution is apparent. Such genera as *Lucidota* (not the complex of Olivier), *Ellychnia, Pyropyga, Photinus, Pyractonema, Lucidina,* and perhaps *Aethra,* constitute a homogeneous group—the tribe *Photinini. Phausis* and *Phosphoenus,* excluded from the *Lampyrini* by their normal mandibles, do not fit well in the photinid series, nor with each other. *Cladodes, Dodacles, Ledocas, Dryptelytra, Psilocladus,* and *Vests* possibly should form another major division. Olivier limited *Vests* to those species having uniflabellate antennae. A number of neotropical species with simple antennae, such as *Lucidota discolor* Gorham, are more properly placed in *Vesta* because of having genitalia of the peculiar type found in that genus. In *Vesta* each lateral lobe of the aedeagus is provided wih a slender and fragile appendage arising externally, a structure known to occur elsewhere in the *Lampyridae* only in *Photuris.*

Literature Cited

Fall, Henry C. 1912. New Coleoptera chiefly from the Southwest, V. Canadian Entomologist, vol. 44, pp. 40-48.



Male genitalia; showing from left to right, dorsal, lateral and ventral aspects.
Male genitalia; showing from left to right, dorsal, lateral, and ventral aspects.

FIGURE 1. *Microphotus dilatatus* LeConte, 6 mi. N. of Triunfo, Lower California, VI-15-38, Michelbacher & Ross (CAS). Tip of lateral lobe with subapical process.

FIGURE 2. *Microphotus octarthrus* Fall, Davis Mts. Texas, VI-28-46, Van Dyke coll'n. (CAS). Tip of lateral lobe with subapical process.

FIGURE 3. *Microphotus angustus* LeConte, San Diego, Calif., L. E. Ricksecker (CU).

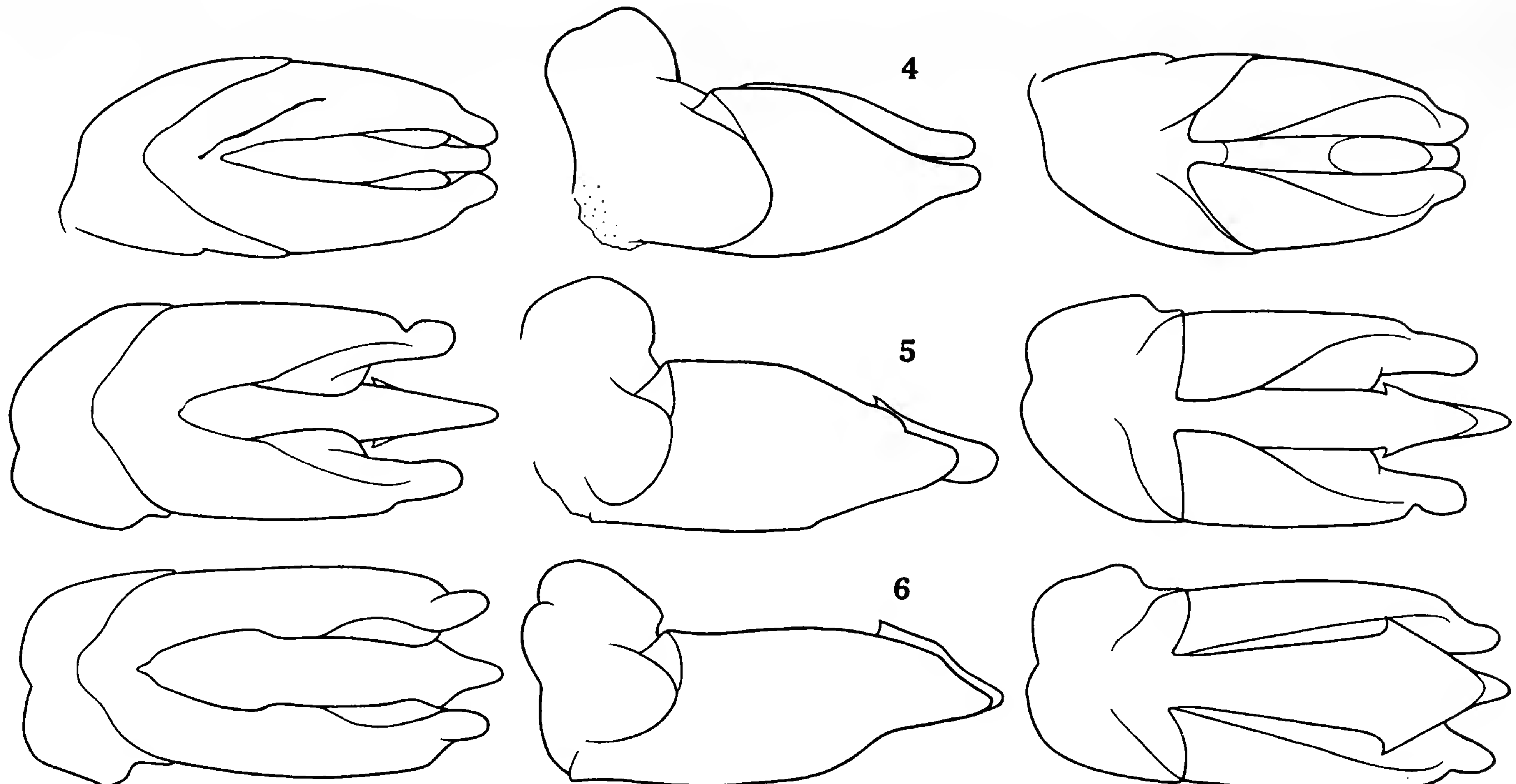


FIGURE 4. *Microphotus decarthrus* Fall, Santa Catalina Mts., Arizona, Summerhaven, 8000 ft., VI-15-33, Owen Bryant (CAS).

FIGURE 5. *Microphotus pecosensis* Fall, Eureka, Utah, VI-9, Tom Spalding, Van Dyke coll'n. (CAS).

FIGURE 6. *Microphotus chiricahuae* Green, new species, holotype, Chiricahua Mts., Arizona, Rustler Park, 8-9000 ft., VII-3-1927, J. A. Kusche (CAS).

————. 1928. Miscellaneous notes and descriptions (Coleoptera). Brooklyn Entomological Society, Bulletin, vol. 23, pp. 236-240.

GREEN, JOHN WAGENER. 1948. Two new species of Lampyridae from Southern Florida, with a generic revision of the Nearctic fauna. American Entomological Society, Transactions, vol. 74, pp. 61-73.

————. 1949. A new genus and new species of American Lampyrini, and other notes. American Entomological Society, Transactions, vol. 75, pp. 1-6.

LECONTE, JOHN L. 1866. New species of North American Coleoptera, Part 1. Smithsonian Miscellaneous Collections, 2nd ed., vol. 6, no. 167, pp. 1-177.

————. 1874. Descriptions of new Coleoptera chiefly from the Pacific Slope of North America. American Entomological Society, Transactions, vol. 5, pp. 43-72.

LENG, CHARLES W. and MUTCHLER, ANDREW J. 1922. The Lycidae, Lampyridae, and Cantharidae of the West Indies. American Museum of Natural History, Bulletin, vol. 46, pp. 413-499.

OLIVIER, ERNEST. 1907. Fam. Lampyridae. Genera Insectorum, 53me fascicule, pp. 1-74.

————. 1911. Revision des Lampyrides. Revue scientifique du Bourbonnaise et du centre de la France, vol. 24, pp. 63-85.

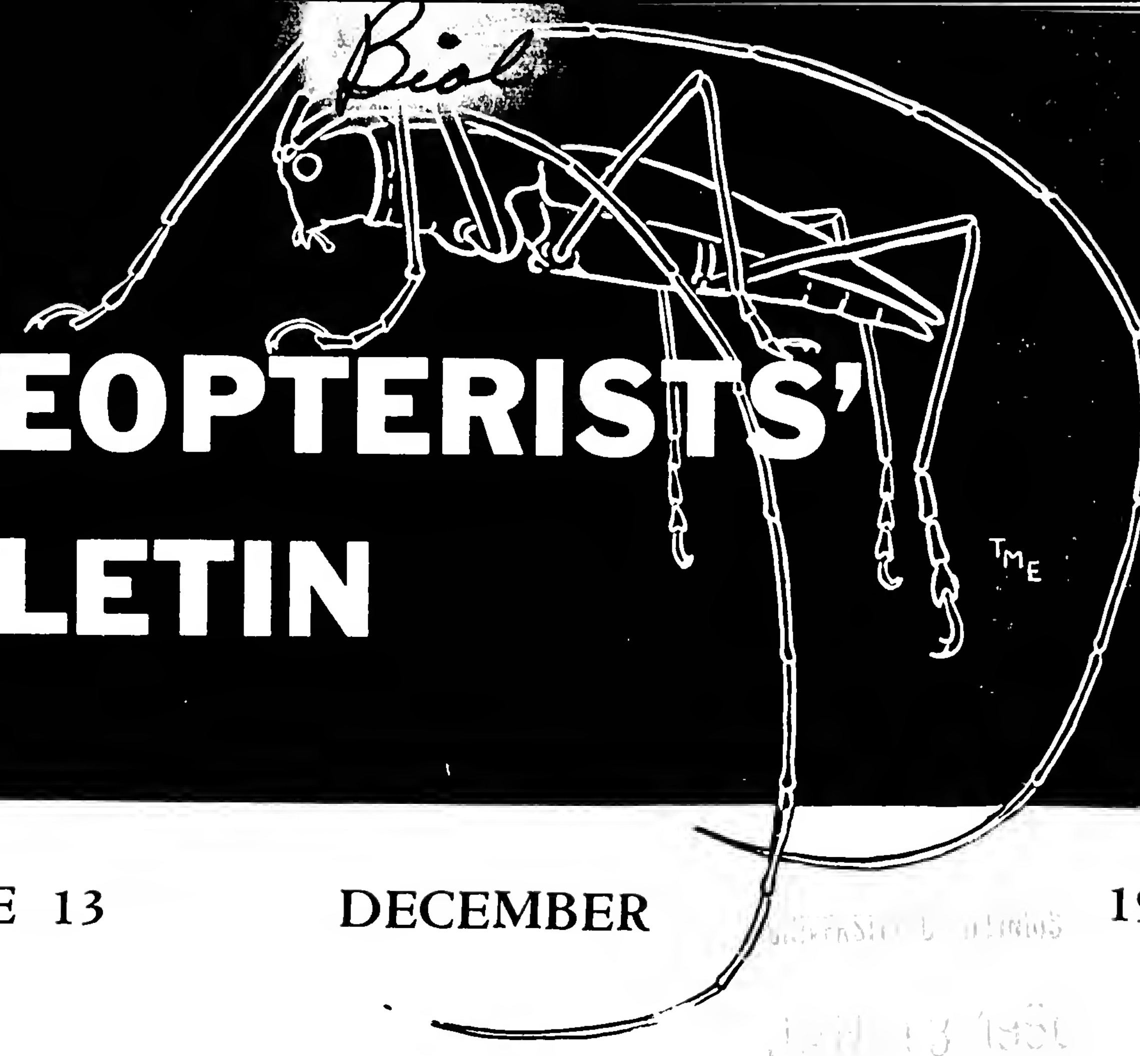
————. 1912. Lampyrides faisant partie des collections du musee de Washington. Society Entomologique de Belgique, Annales, vol. 56, pp. 24-27.

NEW PUBLICATIONS

MEMOIRS OF THE AMERICAN ENTOMOLOGICAL SOCIETY, Number 16, A Taxonomic Study of the North American Licinini with Notes on the Old World Species of the Genus Diplocheila Brulle (Coleoptera) *by* GEORGE E. BALL, 258 pages of text, 75 tables, 3 diagrams, 15 plates, table of contents and index. This monograph considers the geographical variation, relationships, evolution and taxonomy of the carabid tribe Licinini. A general treatment, explaining the taxonomic approach used, definition of terms, criteria for delimiting species and subspecies, etc., precedes the systematic position. The genera *Diplocheila* (subgenera *Diplocheila, Neorembus, Isorembus*), *Dicaelus* (subgenera *Paradicaelus, Dicaelus, Liodicaelus* and *Badister* (subgenera *Badister, Trimorphus, Baudia*) are each treated in some detail. Keys to the genera and species are given throughout as well as a description (or diagnostic notes), variation, distribution and frequently locality records for each of the forms treated. The phylogeny and zoogeography of each genus is discussed in a separate section. Variation of mensurable characters is treated in the 75 tables. Fifteen plates depict structural (including genitalia) and variational features of the species discussed. Price $10.00 postpaid. Available from: The American Entomological Society, 1900 Race Street, Philadelphia 3, Penna., U.S.A. EDITOR.

COLEOPTERORUM CATALOGUS, Supplementa, Pars 35, fasc. 2, 2nd ed., Chrysomelidae: Hispinae, by Erich Uhman. Junk, The Hague, 398 pp., 1958. 75 Guilders (= $19.94.)

This is a continuation of the supplements to the Junk Catalogue. There are now 11 *pars* completed, or at least several facsimiles issued. Fifty pars are now in preparation. The original catalogue is still available, with the exception of three *pars* (157, 169, and 170) which we assume will eventually be reissued. The price for the complete catalogue is 2,000 Guilders, or $531.60. EDITOR.



THE COLEOPTERISTS' BULLETIN

VOLUME 13 DECEMBER 1959

TABLE OF CONTENTS

SOKOLOFF, A. The Habitat-niche of American Nosodendridae 97
BEAL, R. S., Jr. A key to the Nearctic genera of Dermestidae 99
YOUNG, F. N. Fossil beetles from the Vero Pleistocene 103
SLEEPER, E. L. On Bufomicrus Sharp (Curculionidae: Brachyderinae). 107
SPILMAN, T. J. A study of the Thaumastodinae, with one new genus and two new species (Limnichidae) 111
JOHNSTON, D. E. On the status of Casey's species of Proculus (Passalidae) 124

NOTES:

Earliest record of Carabus nemoralis in San Francisco, California—Leech. 98
Review: Hispine beetles from the South Pacific—Anderson 101
A note on flight emigrations of water beetles from a temporary pond—Zimmerman 102
Occurrence of Ladybird beetles biting humans—Rogers 102
Determiners needed—Post 106
Necrodes surinamensis (Silphidae) in Western Washington—Knudsen 110
Literature notices—Anonymous 123

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: Vol. 4, $5.00; Vol. 5, $4.50; Vol. 6 (4 nos. only published), $2.50; Vols. 7 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid.

Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five copies of the issue containing the article will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and in all cases, descriptions of new species must be illustrated. Descriptions of new species or genera must contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume XIII December (No. 4) 1959

THE HABITAT-NICHE OF AMERICAN NOSODENDRIDAE

By ALEXANDER SOKOLOFF[1]

In an attempt to learn more about the ecology of several species of *Drosophila,* the slime fluxes (i.e., bleeding wounds of trees which become infected with microorganisms) of *Quercus kelloggii,* the California black oak, and *Abies concolor,* the white fir, have been examined for adults and larvae of various insects in the Yosemite region of California. A more detailed list of forms utilizing these sites for feeding and breeding will soon appear in ECOLOGY. Suffice it to say for the present that among the Coleoptera the chief exploiters of this microhabitat are the nitidulid *Calopterus truncatus* (Rand), the staphylinids *Aliochara sensu latu,* and three species of *Atheta,* and the nosodendrid *Nosodendron californicum* Horn. All of these have been found in oak slime fluxes. *Nosodendron* also has been found in white fir exudations.

Taken at face value, this information may not appear significant. However, a companion study has been made of forms occurring in fluxes of trees such as *Ulmus americana* on the campus of the University of Chicago, and *Acer saccharum* at Davis Woods, Smith, La Porte County, Indiana. Among the beetles, again the family Nosodendridae is represented, in this case by *Nosodendron unicolor* Say, the only other species of this family known to occur in the United States. Vogt[1] has reported the occurrence of this species in sapflows of *Quercus alba,* the white oak, on the University of Maryland campus.

It is evident that the habitat-niche of this family of beetles is the slime flux. Observations of *Nosodendron* reveal that this is a gregarious beetle: Wherever adults are found, usually several adult specimens can be obtained at once, and all are clustered within a very small area.

---

[1]The William H. Miner Agricultural Research Institute, Chazy, New York.

[2]Vogt, G. B. Occurrence and Records of Nitidulidae. The Coleopterists' Bull., Vol. 4, No. 6, 81-91. 1950.

Furthermore, larvae of these insects, if present, occur near their parents, especially in the older instars. Both adults and larvae can be found only in very wet areas of the wound, suggesting the need for a highly humid environment.

Beetles of this family are reported to be carnivorous. If this is so, the diet of *N. californicum* must consist of larvae of Drosophilidae, Sciaridae, Phoridae, Psychodidae, Heleidae, Tendipedidae and Aulacigastridae, larvae of which can be found in abundance at these sites. In addition, it is possible that Nematodes and mites as well as other small Arthropods (Collembola, Corrodentia, etc.), may be used as food, particularly by very young instars. Similar food is probably consumed by *N. unicolor.*

Nosodendron californicum serves as one of the hosts of a parasitic mite belonging to the family Canestriniidae. Mites of this family are known to parasitize beetles.

I am indebted to Mr. Henry Dybas, Chicago Natural History Museum for classifying the nosodendrids and nitidulids; Dr. D. H. Kistner University of Rochester, and Dr. C. H. Seevers, Chicago Natural History Museum, for identification of staphylinids; Dr. M. R. Wheeler, University of Texas, for classifying Aulacigastridae and Drosophilidae; Dr. A. Stone, USDA, for identifying Sciaridae and Psychodidae; Dr. W. W. Wirth, USDA, for naming the Heleidae, Phoridae, and Tendipedidae; and Dr. E. W. Baker for identifying the mites.

EARLIEST RECORD OF CARABUS NEMORALIS IN SAN FRANCISCO, CALIFORNIA

In his 1945 review (Entomologica Americana, N.S. 24 (3): 128) Van Dyke gave 1923 as the earliest record for *C. nemoralis* Müller in San Francisco. This overlooks his own statement of 1924 (Pan-Pacific Entomologist, 1 (2): 78) that it had been found ''. . . about five years ago. . . .'' This was taken as a definite record for 1919 by Essig (1931. A History of Entomology, p. 285) and by Hatch (1933. Pan-Pacific Entomologist, 9 (3): 118).

However, there is an overlooked factual record for 1919 or earlier by J. C. Huguenin in Volume 1 of the two separately published volumes of the Proceedings of the Pacific Coast Entomological Society. On an unnumbered page, chronologically page 159, which carries the last part of the Minutes of the 71st meeting, held on March 1, 1919, there is the following: ''Mr. Van Duzee exhibited two boxes of Peruvian Coleoptera recently secured by the California Academy of Sciences; Mr. Huguenin, a specimen of *Carabus Nemoralis* taken in Golden Gate Park, and. . . .''

The actual dates of publication of the parts of this Volume 1 are not known (see J. W. MacSwain, 1951. Pan-Pacific Entomologist, 27 (3): 106-109. Also the cited Proceedings, Minutes of the 75th and 79th meetings), but the part of six unnumbered pages which includes the Minutes of the 71st meeting may be presumed to have appeared in 1919, and certainly came out before February, 1921.—Hugh B. Leech, *California Academy of Sciences, San Francisco.*

A KEY TO THE NEARCTIC GENERA OF DERMESTIDAE

By R. S. Beal, Jr.[1]

The following new key to the tribes and genera of adult Nearctic Dermestidae is submitted at this time to make it available for inclusion in the forthcoming book on the beetles of North America by Dr. Ross H. Arnett, Jr.

The subfamilies of the Dermestidae recognized by Rees[2] and other recent students of the family are treated in the key as tribes. In the existing classification of the family only the Anthreninae are divided into tribes. I have shown in a publication which is now in press[3] that this tribal division is invalid. It might be possible to find some other basis for arranging the genera of the Anthreninae into tribes, but as the genera now stand, I do not believe this would serve any useful purpose. This leaves the Dermestidae with a number of subfamilies, none of which is divided into tribes. Since the tribe is usually considered a more basic taxonomic unit than the subfamily, there is no other course than to reduce these units in rank.

The group formerly known under the family name Thorictidae is included in the key as the dermestid tribe Thorictini. Both Anderson[4] and Crowson[5] have shown the essential relationship of these beetles to the Dermestidae. I see no reason for not including them here, unless it is just pure deference to tradition. The group is represented in the United States by the single species *Thorictodes heydeni* Reitter, of which the synonym *Thaumaphrastus karanisiensis* Blaisdell is perhaps better known.

Several genera are included here which have not previously been reported from North America. Each of these genera is represented by one on more species found in the United States, and notice of them is being given elsewhere.

1. Antenna with an apical club; abdomen with five externally visible sternites; elytra present in both sexes 2
   Antenna filiform, without an apical club; abdomen with seven externally visible sternites; female larviform (without elytra or hind wings) (Thylodriini) .... **Thylodrias**

---

[1]Arizona State University, Tempe, Arizona.

[2]U. S. Dept. Agric. Misc. Pub. No. 511, pp. 1-18.

[3]Dermestidae. Coleoptera. Insects of Micronesia. Bernice P. Bishop Museum, Honolulu.

[4]1949. Bull. Brooklyn Ent. Soc., 64:121-129.

[5]1955. Natural Classification of the Families of Coleoptera. London. Pp. 1-187

2. Compound eyes present; legs more or less retractile; hind femora received in groove in coxae; large or small beetles 3
---- Compound eyes absent; legs not retractile; hind coxae not grooved for reception of femora; minute beetles (less than 2 mm. long) with general appearance of a Dermestes (Thorictini) .... **Thorictodes**

3. Dorsal surface covered with long or short hair or scales; front legs in repose not covering antennae in antennal fossae; metacoxal laminae not extending to sides of body 4
---- Dorsal surface glabrous; front legs in repose completely covering antennae within antennal fossae; metacoxal laminae extending to sides of body (Orphilini) .... **Orphilus**

4. Pronotum without sublateral carinae; small or large beetles with suberect or subrecumbent hair or scales 5
---- Pronotum with sublateral carinae extending from base nearly to anterior margin with mesal side of each carina depressed or somewhat sulcate; small (less than $2\frac{1}{2}$ mm. long), strongly convex beetles covered with moderately long, erect hair (Trinodini) .... **Apsectus**

5. Head with median ocellus (except in a few rare species less than 4 mm. in length); species less than 5.5 mm. long; procoxae not contiguous at apices 6
---- Head without an ocellus; species 5.5 mm. to 12 mm. long; procoxae large and contiguous at apices (Dermestini) .... **Dermestes**

6. First segment of hind tarsus much shorter than second segment; metacoxal lamina bearing a distinct tooth or distinctly broadened laterad to insertion of femur (Attagenini) 7
---- First segment of hind tarsus as long as or longer than second segment; metacoxal laminae with margins subparallel or gradually narrowed laterally (Anthrenini) 8

7. Segments of antennal club compact; in male the length of the ultimate segment greatly exceeds the combined length of the two preceding segments .... **Attagenus**
---- Segments of antennal club loosely joined; in male the length of the ultimate segment shorter than the combined length of the two preceding segments, or all three segments greatly elongate, the penultimate segment twice as long as wide .... **Novelsis**

8. Vestiture of hairs (some of which may be slightly ensiform but never scale-like) 9
---- Vestiture of flat, conspicuously colored scales .... **Anthrenus**

9. Antennal fossa partially or completely closed behind 10
---- Antennal fossa broadly open behind, posterior margin of fossa with or without a medial tumescence but never with a distinct carina 14

10. Pronotum with a small, short, diagonal, impunctate area on either side of basal lobe; male antennae with eleventh segment immensely enlarged, subtriangular, approximately twice as wide as length of preceding segments combined; female with eleventh segment of antennae small, about as long as length of ninth and tenth segments combined .... **Thaumaglossa**
---- Pronotum without impunctate areas on either side of basal lobe; antennal club composed of two or more segments 11

11. Club of antenna composed of two segments 12
---- Club of antenna composed of three or more segments 13

12. Club of antenna elongate or oval in outline; penultimate segment longer than terminal segment .... Cryptorhopalum
— Club of antenna nearly circular in outline; penultimate segment equal to or shorter than terminal segment .... Orphinus

13. Club of antenna composed of three large, subtriangular segments, the length of the club in the male more than twice the length of the preceding eight segments combined .... Ctesias
— Club of antenna composed of three to eight segments, the length of the last three segments in the male shorter than the length of the preceding eight segments combined; segments of club symmetrical, pectinate, or flabellate, but if club of three or four segments then segments always more or less symmetrical .... Trogoderma

14. Antenna composed of nine segments; dorsal integument and pubescence uniformly dark brown .... Dearthrus
— Antenna composed of eleven segments; dorsal integument sometimes with light maculations; dorsal pubescence uniform in color or of hairs of two or three colors .... Megatoma

REVIEW

Hispine beetles from the South Pacific (Coleoptera:Chrysomelidae).

J. Linsley Gressitt, Nova Guinea, n.s., vol. 8, pt. 2, pp. 205-324, Dec. 20, 1957, (Leiden).

The hispine beetles form one of the more distinct and striking groups of chrysomelid beetles. In a concise introductory section devoted to zoogeography, Dr. Gressitt concludes that it is obvious that the fauna of the New Guinea area is Oriental in origin. Rather interesting is the fact that this group of insects is not represented in the fauna of Hawaii, Southeastern Polynesia and New Zealand. It is probable that these beetles can be dispersed only when there is available, in transit, a supply of living plant tissue. For this reason dispersion over large bodies of water is not to be expected.

Of the 145 species treated in the publication, some 38 are endemic to single islands or island groups. The island of New Guinea has some 60 species, 50 of them being endemic. However, New Guinea has only 1 endemic genus whereas the Solomons, with 21 endemic species, has 4 endemic genera.

The paper contains conventional keys to tribes, genera and species of the Pacific fauna. The 32 genera are arranged in 10 tribes. There are described 38 new species and 4 new genera. The new species are illustrated by fine drawings by Dorothy Rainwater and, in most cases, the genitalia (aedeagus) have been drawn by Gressitt himself. Information is given on biology and immature stages, when known, the discussion of biology being either included, or referred to when previously published.

This fine treatment of the hispine beetles is recommended to those interested in the subfamily or as a component of the fauna of the South Pacific.—W. H. Anderson, Entomology Research Division, U. S. Department of Agriculture.

A NOTE ON FLIGHT EMIGRATIONS OF WATER BEETLES FROM A TEMPORARY POND

An interesting observation on emigration of water beetles from a small pond was made on October 17, 1958 in Clinton County, Indiana. Collections had been made from this pond at weekly intervals for seven successive weeks during which time the water level had constantly fallen. The pond when first visited was about fifty by eighty feet across and about three feet deep, but on October 17, the pond was no more than twenty feet in diameter and less than six inches deep.

Air temperatures had averaged 4-5 degrees Centigrade above normal for the preceding week. At noon on October 17, the sun was shining and the water temperature was 19-20 degrees Centigrade with little evidence of thermal stratification. Several insects were seen to fly from the surface of the water at about 12:30 p.m., and in a period of approximately forty-five minutes more than fifty individuals were observed flying away from the pond by the writer and by Mr. J. C. Matthew. Further observation showed that some of these were passing directly from the water into the air without any preliminary drying-off period. This point was not established for some minutes since numerous decaying plant stalks projected above the water surface, and the beetles could have been resting on them before taking flight. Several of the larger individuals were captured and identified as *Tropisternus lateralis nimbatus* (Say). Some smaller forms which were captured as they began flight were identified as *Laccophilus fasciatus* Aubé. It was not definitely determined that this species took off directly from the water. During the seven weeks of collecting *T. l. nimbatus* had been the most common species taken in this pond. Its population density appeared to increase steadily each week and on this day was quite high—up to ten individuals per square foot. Stirring the water seemed to cause a more rapid emigration. In addition to the Coleoptera observed leaving the pond, some unidentified species of notonectids and corixids were also seen in flight. The following week, on October 24, the pond was completely dry, and no aquatic insects of any kind could be found in it.

The only nearby body of water is a permanent bog in which no *Tropisternus* or *Laccophilus* have been found. If the beetles fly to a body of water other than the bog, a flight of nearly a half-mile would be necessary. JAMES R. ZIMMERMAN, *Indianapolis, Indiana.*

OCCURRENCE OF LADYBIRD BEETLES BITING HUMANS

During the three week period, June 15 to July 6, 1958 several instances of campers being bitten by the Convergent Ladybird Beetle, *Hippodàmia convérgens* Guer. came to attention at Boy Scout Camp Pico Blanco in the southern Monterey County, California.

Most of the instances were reported as occurring during the warmer parts of the day when the beetles were flying in large numbers, a well known habit of this species. The bites were inflicted when the ladybirds lit on exposed portions of the body. Moisture on the skin, due to perspiration, may have induced the biting. Those bitten stated that the bites were not particularly painful, and left no marks or other aftereffects. It was not determined whether or not the same beetle would bite more than once if left unmolested.

The number of flying ladybirds was unusually large this year according to several local residents.—CALVIN ROGERS, *San Jose State College.*

FOSSIL BEETLES FROM THE VERO PLEISTOCENE[1]

By Frank N. Young

Recent work at Vero, Florida, by Robert D. Weigel has turned up a considerable number of insect remains associated with fossil vertebrate deposits in the Pleistocene and recent Pamlico sands. I am indebted to Dr. Weigel and to Pierce Brodkorb of the University of Florida for allowing me to examine this material and for permission to report upon it. I am also indebted to George B. Vogt, R. E. Warner, and W. H. Anderson of the U. S. Department of Agriculture, Entomology Research Division, for identifying or checking the beetle remains and to T. H. Hubbell of the University of Michigan and Kenneth W. Cooper of the University of Florida for help with other groups.

H. F. Wickham (1919) records a number of fragments of beetles collected by E. H. Sellards from the Vero deposits. These represent (1) four elytra or fragments of elytra of Carabidae from Stratum 3 (Pre-Columbian to recent?) : *Diplochila laticollis* LeC., *D. major* LeC., *Chlaenius aestivus* Say, and *C. tricolor* Dej.; (2) a left hind tibiae of a scarab, *Strataegus antaeus* (Fabr.), from Stratum 3; (3) an elytral fragment and a smaller fragment of *Copris inemarginatus* Blatchley from Stratum 2 (Pleistocene associated with extinct vertebrates); and (4) a pronotum of *Chlaenius* sp. and an elytron of *Oodes amaroides* Dej. of which the position in the deposit was not recorded. Wickham mentions minute differences between some of the remains and living forms, but in general he concludes (1) that there is no evidence from these beetle fossils of any change in climate and that the assemblage of genera is the same as might be expected in a stream valley in Florida to-day, and (2) that the nearest relatives of the forms are still characteristic members of the living fauna and many of them are apparently identical. There is doubt that the fragments from Stratum 3 are actually fossil. Stratum 2, however, at Sellard's site was apparently beneath a marlstone cap so that the material found in it is probably contemporaneous with fossil vertebrates and of considerable age.

The remains of beetle and associated other insects collected by Weigel at his Site 3a were found in various plots in the deposits in the following approximate vertical distribution:

The fossiliferous Pamlico sand deposits at Vero (Sellards, 1916) have

---

[1]Contribution No. 658 from the Zoological Laboratories of Indiana University, Bloomington.

Stratum	Depth	Fossil Insects
RECENT SPOIL	Total about 36″	Not investigated
STRATUM 3 (Pre-Columbian to recent)	Top 6″	none
	2nd 6″	1–fragment cicada
	3rd 6″	1–fragment scutellerid bug
		1–fragment CHRYSOMELIDAE: *Galerucella notulata* (F.)
		1–CURCULIONIDAE: *Epicaerus?* (larva)
	Total 18″	
STRATUM 2 (Pleistocene with remains of extinct vertebrates)	1st 3″	1–fragment pentatomid bug
	2nd 6″	none
	3rd 6″	2–fragments CHRYSOMELIDAE: *Galerucella notulata* (F.)
	4th 6″	Numerous fragments grouse locusts, TETRIGIDAE
		Numerous fragments CHRYSOMELIDAE: *Griburius equestris* Oliv.?[2]
		1–fragment CHRYSOMELIDAE: *Cryptocephalus binominus* Newn.
		1–fragment CURCULIONIDAE: *Rhynchophorus cruentatus* (F.) (nearly complete insect)
		7–fragments of wasps
	5th 6″	1–fragment of walking stick, PHASMIDAE: *Anisomorpha buprestoides* (Stoll)
		Numerous fragments of TETRIGIDAE
		1–fragment CHRYSOMELIDAE: *Galerucella notulata* (F.)
	Total 27″ to bottom	

[2]These specimens are being studied by George B. Vogt who is revising the genus *Griburius*. They are identical according to him with the species now called *equestris*, but the status of that name is in doubt.

been subject to several interpretations and at one time aroused considerable discussion and controversy because of the discovery of human remains and artifacts associated with extinct vertebrate remains. Sellards (1919) summarizes the controversies and gives a bibliography. The reservations in regard to the insect remains so far known from Vero are similar to those brought forward against the human remains. That is, the insect fragments may be merely intrusive in the fossil beds. It is true, that the remains do not look like fossils. The colors are bright and in the case of the beetles easily matched with cabinet specimens. I have, however, seen beetle fragments which are without any doubt from the Indiana Pleistocene which retain much of their color. Another possible argument against the antiquity of the Vero beetles is that several of the specimens collected by Weigel are partly articulated and even parts of legs are in place on some specimens of *Griburius* and the grouse locusts. Other fragments, however, are partially consolidated with some hard material which may explain the articulation and the excellent state of preservation.

The fragments of Hymenoptera found in the 4th 6″ of Stratum 2 have been examined by Kenneth W. Cooper of the University of Florida. He does not believe that these represent fossils because of the condition of preservation. He writes: "The cercerid wasp remains and the larrid look recent to me, and I think the chalcidid has little chance of having been in the deposit over a few years. The deposit gets very wet; if so, the grating responsible for the metallic green should have been deformed, and the specimen a deep red or black, or very brassy at the least. Further, all are dry ground forms, and the deposit is alleged to be that of a marsh. Pocket gophers perhaps worked critters from the modern layer down into the deposits."

Regardless of its age, however, the material collected by Weigel, presents positive evidence that some of the insect remains are not merely recent intrusions. This evidence is from the abundant fragments and partly articulated specimens of grouse locusts (Tetrigidae) found in the 4th and 5th 6″ of Stratum 2. Although these fragments look as if they were buried only a short time ago, Dr. T. H. Hubbell of the University of Michigan has found that some of them from both levels represent *Paratettix toltecus* (Saussure). This species is not now found in Florida, but is restricted to the coastal plain of Texas and Eastern Mexico. It is thought, however, to be close to the ancestral form of *Paratettix rugosus* (Scudder) which is now restricted to peninsular Florida and southernmost coastal Georgia. Fragments of *P. rugosus* are also abundant in the bottom two levels of Stratum 2 along with those of *toltecus* and several fragments of a more widely distributed species, *P. mexicanus* (Saussure). Hubbell writes: "There can be no doubt as to the identity of the Vero specimens of *toltecus,* which though allied to *rugosus* has distinctive features. The amount of collecting which has been done in the southeastern States and in Florida in the last thirty years would surely have turned up *toltecus* if it were still present in Florida."

Since the fragments of *Galerucella* and *Griburius* are abundant in Weigel's material and from the same general levels as the tetrigids, it seems logical to conclude that they are contemporaneous with each other and probably with the numerous fossil vertebrates.

Both Stratum 3 and 2 at Weigel's Site 3a represent some type of aquatic habitat, and fossils remains of numerous aquatic birds, mammals, and reptiles are found in them. They were probably deposited originally as were all facies of the Pamlico sands as dune or bar sands blowing or washing into shallow marshes. Such a situation seems ideal for the preservation of tetrigids and chrysomelids such as *Galerucella* which occur frequently on the edges of marshy situations.

The general conclusion is that the Vero deposits along with other facies of the Pamlico sands including the Melbourne Bone Beds were deposited along the inner edges and between barrier islands. The evidence from the insect remains checks with the concept of low islands covered with some xeric vegetation like the present day scrub. All species so far recorded could be expected along with the marshy inner edges of such islands. *Anisomorpha buprestoides* is a characteristic walking stick of the modern scrub and *Copris inemarginatus* a highly characteristic dung beetle of the same habitat. The evidence is still ambiguous and can be interpreted either way, but perhaps *Copris inemarginatus*, a sort of living fossil, did once utilize the dung of *Equus*, *Mammut* and *Mammuthus* which are also found as fossils with it at Vero.

References Cited

Sellards, E. H. 1916. Human remains and associated fossils from the Pleistocene of Florida. Eighth Ann. Rept. Florida State Geological Survey, 1916: 121-160, pls. 15-31, figs. 1-15.

————. 1919. Art. XXIII.—Literature relating to human remains and artifacts at Vero, Florida. American Journ. Sci., (4th series) 47 (281): 358-360.

Wickham, H. F. 1919. Art. XXII.—Fossil Beetles from Vero, Florida. American Journ. Sci., (4th series) 47 (281): 355-357.

DETERMINERS NEEDED

The North Dakota Agricultural College has accumulated material in several Coleoptera families and we would be pleased to send specimens to authorities for determination with the usual privilege of retaining desirable duplicates.

The major families now on hand in quantity are: various families of aquatic Coleoptera, Cicindelidae, Staphylinidae, Silphidae, and Trogidae. For details write to the undersigned, Department of Entomology, North Dakota Agricultural College, Fargo, N. D.—R. L. Post, Assoc. Entom. and Curator.

ON BUFOMICRUS SHARP (CURCULIONIDAE: BRACHYDERINAE)

21. A contribution to the knowledge of the Curculionoidea.

By Elbert L. Sleeper [1]

While making routine determinations of Curculionidae for several Entomological Agencies in Central America, the weevils collected by the author during the years 1945-46 in Central and South America were restudied. A new *Bufomicrus* was found in the undetermined material. The late Sir G. A. K. Marshall examined it and made the necessary comparisons with other members of the genus.

Bufomicrus Sharp closely resembles a rather rotund *Epicaerus*. The rostrum is short, not broader at apex; the scrobes are deep, curved, entirely lateral and sharply defined. The mentum is large and completely conceals the palpi. The eyes are strongly convex. The elytra broad and subcircular. The anterior coxae are located very near the anterior edge of the prosternum. The middle legs are but slightly separated and the metasternum is remarkably short. The corbels of the hind tibiae are closed.

With the exception of some examples of *Bufomicrus squamosus* Sharp, collected in British Honduras, all known examples of *Bufomicrus* have been collected on the Atlantic slope of Guatemala. Most of the examples *which have been seen* have been, at least in part, covered with a brownish clay-like material, which usually obscures the surface of the derm.

The terminology used in this paper is that of Buchanan (1939:10) and Sleeper (1953:113). Measurements of length are taken from a lateral view. Total length measured from front edge of eyes to apex of elytra. Other measurements are at widest or longest part of the structure. The following key will serve to separate the known species of *Bufomicrus*.

1. All femora armed, tooth of the posterior pair frequently smaller than that on the remaining femora; nasal plate not surrounded by an arcuate, glabrous, flattened space; vestiture of dorsum variable 2

1'. Posterior femora unarmed; nasal plate surrounded by a curvate glabrous, flattened space; dorsum completely clothed with squamosity, that of elytra variegated **cristatus** Sharp

2. Vestiture of dorsum densely squamose, composed of prostrate scales and semierect or depressed setae 3

---

[1]Entomology, Long Beach State College, Long Beach 15, California.

2'. Vestiture of dorsum very sparse, composed for the most part of recurved almost prostrate setae, with an occasional scattered circular scale .... **marshalli**, new species

3. Rostrum with dorsum slightly concave, front between eyes with a minute fovea; setae of elytra semierect .... **squamosus** Sharp

3'. Rostrum with dorsum flat; front without depression or fovea; setae on the elytra depressed, differing very little from scales .... **globipennis** Sharp

Only a few examples of *Bufomicrus* have been seen. Most of the following distributional data is from the literature.

Bufomicrus cristatus Sharp

Bufomicrus cristatus Sharp, 1891:146.

Distribution. Guatemala: Sinanja (Champion). Known only from the unique type.

Bufomicrus marshalli, new species

(Figures 1 and 2)

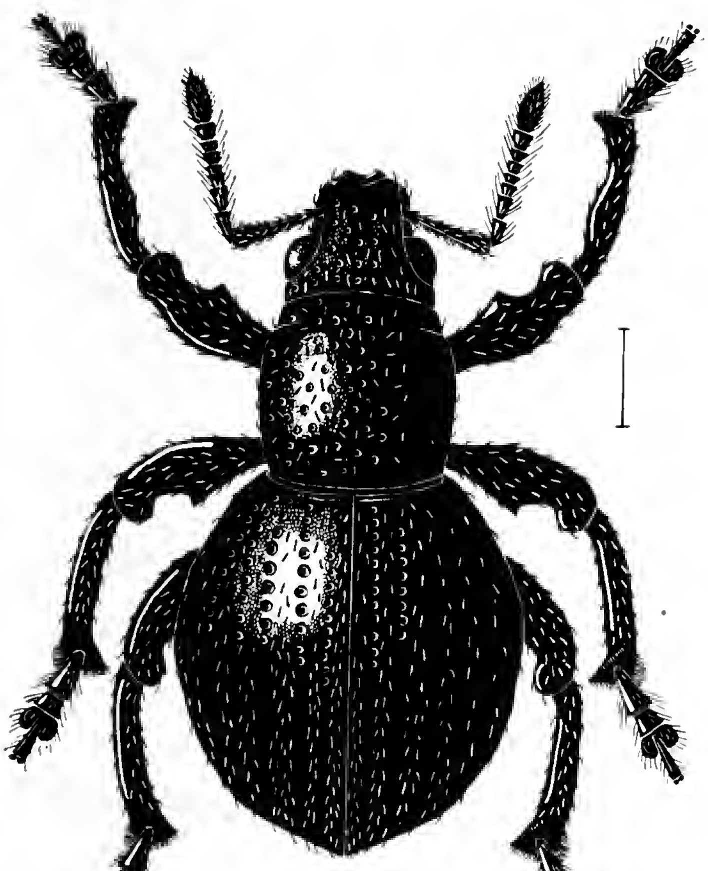
Female. Short, ovate; derm shining black when coating removed, the antennae dark reddish brown; very sparsely clothed dorsally with nearly prostrate recurved amber scale-like setae and a few scattered prostrate circular gray scales, the latter more frequently in the apical portion of the elytra.

Rostrum very short, as broad as long, gradually narrowing apically, coarsely, deeply punctured on dorsum, the latter appearing very flattened from above, but arcuate in lateral outline; nasal plate small, triangular, bordered with a prominent raised carina; subapical area slightly depressed; laterally an elongate triangular shaped fovea above the scrobes. Antennae rather long and slender, the scape nearly attaining the anterior margin of the prothorax. Funicle as long as scape, with the first two segments subequal, 3rd one-half as long as 2nd, 4th slightly shorter than 3rd, 5th nearly as long as 3rd, 6th shorter than 5th, 7th three-fourths as long as first. All segments sparsely clothed with long setae, (ratio of segments: 3:3:1.6:1.2:1.5:1.3:1.8). Club elongate-oval, acuminate at apex; as long as preceding 4 segments combined; very densely clothed with fine, prostrate pubescence and a few scattered setae. *Head,* in lateral view, a continuous outline with rostrum; front broad, flat and without fovea, but very coarsely, deeply punctured. Eyes circular, prominent, separated by twice their diameter. *Prothorax* as long as broad (4:4); the disc with a few scattered, irregularly sized deep punctures; sides strongly curved from base to constricted apex; flanks with coarse deep closely placed punctures. Scutellum absent. *Elytra* more than ½ wider than, and almost twice as long as prothorax, oval, nearly as broad as long (6.5:7.5); disc strongly convex; strial grooves absent, striae indicated by rows of large, deep circular punctures which are separated on disc by one-half their own diameter; intervals flat but appearing convex due to deepness of strial punctures; dorsal outline strongly convex to declivity, thence vertical to apex (fig. 2). *Ventral side* more densely clothed with scales and setae than dorsum; very closely and finely punctured throughout; a row of coarse, deep punctures immediately behind mesocoxae and on the intercoxal process of the first abdominal sternite. Anterior coxae contiguous; middle coxae separated by one-third their width, the mesosternum formed in a tubercle between them; hind coxae separated by nearly one and one-half times their width. Fore and middle femora with a prominent tooth; hind with a minute tooth. Tibiae long, narrow and with a row of short spines at the apex. Hind tibiae with corbels closed. Tarsi broad, rather flattened; first and last tarsal segments subequal, the second and third subequal, each about one-half as long as first, third very broadly bilobed; all segments very thinly pilose on the underside. Length 6.4 mm., width 3.4 mm.

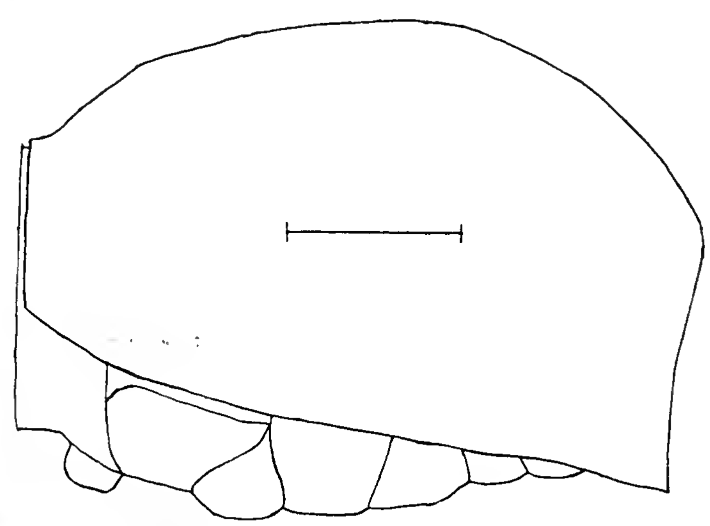
Male. Unknown.

Type locality. Izabal, Estado de Izabal, Guatemala.

Type material. Holotype No. 72, and 1 ♀ paratype from type locality, I-16-46, ELS, (ELS).



1



2

FIGURE 1. Dorsal view of *Bufomicrus marshalli*, n. sp., ♀, holotype. FIGURE 2. Lateral outline sketch of the elytra of *Bufomicrus marshalli*, n. sp., ♀, holotype. Line = 1 mm.

This species can be easily separated from other members of the genus by the characteristics utilized in the key. It is with great pleasure that I name this species in honor of Sir G. A. K. Marshall who has been an unfailing source of help in my studies of the weevils. The town of Izabal is located on the south shore of Lago de Izabal.

Bufomicrus squamosus Sharp

Bufomicrus squamosus Sharp, 1891:145.

Distribution. British Honduras: "British Honduras (Blancaneaux)." *Guatemala:* Teleman, La Tinta, Chacoj, Tamahu, San Juan, Panima, all in the Polochic Valley, Vera Paz. Additional localities: El Estor, Estado de Izabal (on north side of Lago de Izabal), I-15-46, ELS, (ELS), 3 examples.

Bufomicrus globipennis Sharp

Bufomicrus globipennis Sharp, 1891:146.

Distribution. Guatemala: Yzabal (Salle). Known only from the two examples cited in the original description. It is probable that the locality "Yzabal" and Izabal are the same.

Acknowledgements

I am indeed grateful to Dr. Fred Truxal and the Los Angeles County Museum for making otherwise unobtainable literature available, and to Sir G. A. K. Marshall of the Commonwealth Institute of Entomology, British Museum (Natural History), for efforts on his part in aiding to properly place some of this and other material, and for pertinent information regarding the types.

Literature Cited

Buchanan, L. L. 1939. The species of *Pantomorus* of America north of Mexico. Misc. Publ. United States Dept. Agric. no. 341:1-39. Illus.

Sharp, D. 1891. Biologia Centrali-Americana, Insecta, Coleoptera, Curculionidae: Apioninae, Thecesterninae, Otiorhynchinae, vol. 4, pt. 3:81-168. Illus.

Sleeper, E. L. 1953. New genera and species of Curculionidae with a new species of Anthribidae (Coleoptera). Ohio Journal. Sci., 53(2):113-120. Illus.

NECRODES SURINAMENSIS (SILPHIDAE) IN WESTERN WASHINGTON

Hatch (1957)[1] suggests that *Necrodes surinamensis* has recently been introduced "west of the Rocky Mountains where it is rapidly becoming established." In the Pacific Northwest Hatch cites records of one specimen from northeastern British Columbia (no date), one from Idaho (1949), a series from eastern Washington (1949, 1951, 1956), and three from western Oregon (1946, 1955).

In May, 1958, the writer collected two adult specimens of this species from a dead raccoon found in Dosewallips Canyon, Jefferson Co., Washington. These specimens from the Olympic Peninsula establish a new western Washington record and further corroborate Dr. Hatch's theory that *Necrodes surinamensis* has invaded the Pacific Northwest, and is becoming established there.—Jens W. Knudsen, Dept. of Biol., Pacific Lutheran College, Parkland, Wn.

---

[1]Hatch, Melville H. 1957. The Beetles of the Pacific Northwest. II: Staphyliniformia, pg. 11.

A STUDY OF THE THAUMASTODINAE, WITH ONE NEW GENUS AND TWO NEW SPECIES (LIMNICHIDAE)

By T. J. SPILMAN[1]

Coleopterists are always interested in the Micromalthids, Paussids, Lucanids, and other anomalous beetles. We get pleasure in speculating on their proper position in the beetle hierarchy, or we simply like to see the digressions that Nature takes. Whenever we speak of peculiar beetles, let us not fail to include the Thaumastodinae. They parallel the Hydradephaga in their streamlined form, the Dytiscids in their hind coxa, and the Melandryids in their hind tibial spurs; but except for confamilial relatives, they are dissimilar to all other beetles in the appearance of their head. The Thaumastodinae were transferred from the Byrrhidae by Hinton (1939, 1939a) and made a subfamily of the family Limnichidae. The other subfamilies of the Limnichidae are the Limnichinae, Cephalobyrrhinae, and Bothriophorinae.

This group came to my attention when I found Central American specimens in the National Museum collection. Heretofore the subfamily was known only from the Indo-Malayan Region. Blackwelder's (1944: 273) inclusion of *Throscinus* in the Thaumastodinae must certainly have been a mistake; Hinton (1939: 161) includes the genus in the Cephalobyrrhinae. Mr. G. E. Vogt and the late Mr. L. L. Buchanan were very helpful with suggestions, and Dr. W. T. M. Forbes wrote the descriptions of the hind wings. Mr. Harry G. Nelson kindly loaned two specimens from the Chicago Natural History Museum, Chicago, Illinois. All other specimens used in this study are in the U. S. National Museum, except as noted.

Thaumastodinae Champion

——————— Heller, 1921:155 (not named, described as new tribe, in Melandryidae).

THAUMASTODINAE Champion, 1924:25 (described as new subfamily, in Byrrhidae); Champion, 1924a:116 (different spelling, Thaumastinae, points out priority of his 1924 name); Hinton, 1939:161 (in key to subfamilies of Limnichidae); Hinton, 1939a:185 (repeats key of 1939); Blackwelder, 1944:273 (in Latin American checklist, by inclusion of *Throscinus,* probably in error).

Body streamlined and very compact. Head hypognathous, without posterior constriction, with mouthparts resting on the prosternum, the maxillae and labium hidden from view, in lateral aspect the face oriented approximately 30 degrees from

[1]Entomology Research Division, Agricultural Research Service, U.S. Department of Agriculture.

the vertical and the dorsal surface subhorizontal; eyes large, for the most part dorsal, separated by less than the width of a single eye; antenna short, with 7 or 11 segments, appearing weakly clavate because of the smallness of the middle segments, inserted near mandibles or distant from them; epistomal suture present or absent; labrum as long as broad; mandible with large molar area, apically tripartite and acuminate, and with median ciliated, movable, sclerotized appendage; maxilla elongate, lacinia and galea apically acuminate, with palpus having four segments, the last of which is fusiform; labium with postmentum, the prementum for the most part membranous, anteriorly arcuate, the palpi three segmented with the last segment truncate and parallel-sided; hypostomal bridge quadrangular; foramen magnum large, occupying much of the posterior area of the head, causing the distance between it and the emargination for the maxillary cardo to be very short; cervical membrane with a large cervical sclerite on each side extending in part from the membrane.

Pronotum as wide at base as elytra, with lateral borders strongly converging anteriorly. Pronoto-hypomeral junction angulate throughout its length. Hypomeron without suture or carina. Prosterno-hypomeral suture incised anteriorly. Prosternum very short anterior to fore coxal cavities; fore coxal cavities broadly opened posteriorly and closed interiorly, the cavities separated by a broad prosternal process, the apex of the process overlaying part of the mesosternum. Mesosternum very short, linear or short anterior to the middle coxal cavities, these cavities open laterally. Mesepisternum slender, broadest medially. Mesepimeron broad, tapering medially to attain the trochantin of the middle coxa. Metasternum short or very short anterior to the hind coxae. Metepimeron gradually or strongly narrowed posteriorly. Fore legs short, hind legs very long, middle legs of intermediate length; fore coxae oval and convex; middle coxae with trochantins; hind coxae adjacent, large or very large, oblique or strongly oblique, with large ventral plates which cover part of the femora in repose; hind trochanter large, oval, and projecting from the border of the femur; hind tibia with many strong spurs; tarsal segments simple except when sexually modified on the fore tarsi, with a formula of 4-4-4 or 4-5-5.

Abdomen with first visible sternite shortened medially by the encroachment of the hind coxae. Elytra without striae; pseudopleuron gradually narrowed posteriorly and persistent to the apex or to apical projection; pseudopleural carina sharp throughout. Hind wings with costal chitinization abruptly truncate, Rr free and flexibly connected at distal end to R, r-m absent, Cu curved sharply to inner margin, with three radiating folds at junction of R and Rr, with Forbes Type Four folding pattern. Metendosternite elongate, heavily sclerotized, with stalk fusiform, with tendons adjacent when present, and with triangular furcal arms which support large vertical plates. Male genitalia having aedoeagi of both the trilobate and vaginate types of Jeannel and Paulian; tegmen with two parameres which are separated for all or most of their lengths; sternite nine U-shaped. Female genitalia elongate, membranous for the most part, without apical styli. Adults usually found in or near water. Immature stages unknown.

Anterior tentorial pits and arms are absent, making the identification of the suture herein called the epistomal suture open to question. When fresh specimens are to be had for a study of the musculature, this question will probably be resolved. This epistomal suture continues laterally to a narrow declivous area dorsal to the mandibles and is in turn followed by a sulcus dorsal to the triangular area separating the mandible and maxilla (fig. 6). Could this be the subgenal suture? The foramen magnum dominates the posterior area of the head. The postoccipital suture is present, but the posterior tentorial pits are not evident. The small depression at either end of the tentorial bridge is the point of articulation of a cervical sclerite and probably not a tentorial pit. The tentorial bridge does not originate as is usual in the area posterior to the mouthparts; the invasion of this area by the foramen magnum has left little of the area available. The tentorial bridge arises from the border of the foramen, well separated from the mouthparts. The part most difficult to identify is the transverse plate suspended ventrally on the posterior area (a, figs. 5 and 6); to this plate is attached the postmentum of the labium. The plate could not be the gula, because the gula, according to Snodgrass (1935:127), must lie proximal to the tentorial pits, in this case proximal to the areas where the tentorial bridge joins the head capsule; in this insect only the cervical membrane lies proximal to these areas. It could be the submentum, actually a part of the labium, even though it is fused to the head capsule. It could merely be a part of the head capsule that has migrated ventrally, in which case it would be the hypostomal bridge; I have used this term. Once again, knowledge of the musculature would be very helpful. The part of the cervical sclerite which projects from the cervical membrane (fig. 6) is curved and fits into the anterior border of the prothorax, presumably to anchor the head in repose. On slowly extending the head, this projection slips through the incision at the anterior end of the sterno-hypomeral suture. The ciliated appendage on the mandible is intriguing (fig. 18). A membranous lobe, the prostheca or lacinia mobile, is found in a number of beetles, but it should be remembered that this structure is not a homologue of the maxillary lacinia. The sharp apex and ciliated margin of this appendage in the Thaumastodinae suggest a rasping or straining function. The broad apex of the prosternal process has on its dorsal surface a very strong carina which fits into a deep sulcus on the mesosternum. This locking mechanism is visible only when the two sterna are separated. In *Martinius* the aedoeagus is oriented inside the abdomen so that the penis is dorsal to the tegmen (figs. 13-16). In the other two genera the aedoeagus lies on its side in the abdomen because the curvature of the tegmen does not allow the usual orientation (figs. 21-22, 24-27). Thus, the dorsal view of the aedoeagus in *Martinius* is morphologically equal to the left view in the other two genera, and the right view is equal to the dorsal view. In *Martinius* the tegmen is symmetrical, trough-like, and lightly sclerotized, with the penis lying free in the tegmen. In *Acontosceles* and *Pseudeucinctus* the tegmen is asymmetrical at the base, tube-like, and well-sclerotized, with the penis enclosed throughout most of its length in the tube-like pars basalis.

A comparison of the three genera is given in the description of *Pseudeucinetus.* If the character mentioned for *Pseudeucinetus* is identical or similar to that same character in *Martinius,* an "(M)" is placed after the character. An "(A)" after the character represents similarity or identity to *Acontosceles.* Where neither (A) nor (M) is indicated after a characteristic, *Pseudeucinetus* is intermediate in that the character is not distinctly similar to that character in either *Acontosceles* or *Martinius.* Some of the attributes listed are qualitative and some are quantitative, and not all are to be given equal weight. From this tabulation it appears that *Pseudeucinetus* is intermediate, that it is more closely related to *Martinius* than to *Acontosceles,* and that *Martinius* is the virtual antithesis of *Acontosceles.*

The nomenclature of the group is rather simple; all generic names were proposed with original type species designations and were monobasic. However, the history of the subfamily name is interesting. In the description of his new genus Heller (1921) wrote "Pseudeucinetus g.n. Melandryidarum, tribus nova, prope Eustrophinos," but he did not specifically cite the tribal name. Of course, we could assume that his tribal name would consist of the generic stem plus a tribal suffix, but such a family-group name has never appeared in print. Hence, we must ask the question: Are the requirements for proposal of a new family-group name satisfied when an author shows intent but does not specifically mention that family-group name? I find nothing in the Règles, the Copenhagen Decisions, or in the draft of the new Code to cover this problem. At first glance we would say that Heller's statement, "tribus nova," is the same as citing his tribal name, but we must consider what would happen in many other groups if we decided in this manner. Quite often authors have stated that a certain genus will or probably will require a new tribe or subfamily, but we do not automatically append a suffix to the generic stem. It is necessary that a family-group name be specifically cited, just as we require that a genus be given a name.

Thaumastodinae was proposed by Champion (1924) for his new genera, but just a few months later Champion (1924a) realized that his genus *Thaumastodus* was a junior synonym of *Pseudeucinetus* of Heller (1921). This family-group name is therefore based on a junior synonym. Proposal 54(1)a of the Copenhagen Decisions recommends that a family-group name not be changed even though it is based on a junior synonym, and it appears that the new Code will incorporate this proposal. We do not have a choice of family-group names in this case, for only one name has been proposed.

1. Tarsal formula 4-5-5; eye attenuated ventrally; antenna inserted very near eye .... **Acontosceles** Champion
   Tarsal formula 4-4-4; eye evenly arcuate ventrally; antenna inserted near mandible, distant from eye 2
2. Antenna with 11 segments; eye subcircular; elytron with border entire .... **Pseudeucinetus** Heller
   Antenna with 7 segments; eye obviously transverse; elytron with lateral border serrate posteriorly .... **Martinius**, new genus

Acontosceles Champion

Acontosceles Champion, 1924:27 (described as new genus).

Head with face strongly convex in lateral aspect; epistomal suture absent; eyes ventrally attenuated and well separated; antennal groove not margined dorsally; antenna inserted much closer to eye than to mandible, with 11 segments, middle segments elongate; labrum with lateral borders sinuate; maxilla relatively broad, with galea apically bifid; labium with postmentum longer than wide, with ligula arcuate laterally, and with second palpal segment equal in length to third.

Pronotum depressed laterally. Mesosternum depressed below the level of the prosternal process, but without distinctly bordered depression for the reception of the prosternal process, and short but not linear in the area anterior to each middle coxa. Metasternum depressed medially, short anterior to hind coxae, slightly expanded laterally, weakly converging medially to become triangular between the coxae. Metepisternum gradually narrowing posteriorly. Hind coxa oblique, large, its length equal to the distance between it and the middle coxa. Hind tibia with many spurs proximally and distally, but few in the middle portion. Fore leg probably not exhibiting sexual dimorphism. Tarsal formula 4-5-5. Elytra with lateral border posteriorly entire.

Abdomen with the first visible sternite long laterally and short medially where the large hind coxae encroach; with the border of the ultimate visible sternite entire. Metendosternite with stalk bulbous anteriorly; vertical plate thickened along its dorsal border; with very short, approximate anterior tendons emanating from the apex of the stalk. Male with aedoeagus lying on its side when retracted within the abdomen, with pars basalis asymmetrical and sclerotized on all sides to form a tube, with the parameres shorter than the pars basalis and accuminate apically; sternite nine asymmetrical; sternite eight large and in the form of an H with the cross-bar arcuate.

1. Pronotum and elytra with lateral borders essentially forming a continuous border, the lateral borders of the pronotum only weakly converging at the posterior angles .... **hydroporoides** Champion
   Pronotum and elytra with lateral borders not forming a continuous border, the lateral borders of the pronotum obviously converging on the posterior third .... **tagalog**, new species

Acontosceles hydroporoides Champion

Acontosceles hydroporoides Champion, 1924:29, pl. B (described as new species).

Figure 10 on plate B in Champion's original description shows divergent parameres. This divergence was undoubtedly caused by rotation of the parts; this is corrected in my illustrations (figs. 24-25).

Previous records from literature. INDIA. *United Provinces:* Sudlimath River Bank, Haldwani Division of Kumaon, III-1923, leg. H. G. Champion (from Champion 1924).

Specimens examined. INDIA. *United Provinces:* (same data as given above) in the Baker Collection, USNM No. 64212 Cotypes 2 males.

Acontosceles tagalog, NEW SPECIES

Compared with *hydroporoides:* head with antennal scrobe deeper; antenna light brown, with apical segments becoming darker. Pronotum widest at posterior third; lateral borders converging posteriorly on posterior third and not forming a continuous border with the border of the elytra; posterior border with median lobe shorter. Metasternum broadly concave medially. Elytra more strongly convex laterally, so as to make the pseudopleural carina invisible dorsally through most of its length; more strongly declivous at apex; the sutural sulcus very shallow and barely evident toward the apex. Male genitalia with tegmen more arcuate and more slender; pars basalis more bulbous basally; parameres with serrations on apical half and strongly arcuate at apex.

Head with setae much coarser. Pronotum with very dense minute punctures and very dense minute scale-like setae over the surface, and larg coarse punctures and posteriorly directed prominent seate; the small punctures are more distinct and the large setae are more elert than in *hydroporoides;* the large setae are black but appear yellowish in certain light. Prosternal process covered with very long, very dense, yellowish, depressed setae. Elytra with punctures confusedly arranged, with very indistinct to roughened small punctures, larger punctures also less distinct and smaller than on pronotum; color pattern variegated, minute scale-like setae blackish or silverish. Ventral surface dark brown on the anterior part of the prothorax and gradually becoming reddish brown posteriorly. Measurements in mm.: length 2.1, width 1.0. (figs. 26-30).

Specimens examined. PHILIPPINE ISLANDS. *Manila:* Manila, Luzon Is., 10-1913, leg. G. Boettcher, from H. P. Loding 1935, Holotype male, USNM No. 64213.

This specific name refers to the Tagalog nation of Philippine peoples who inhabit the type locality.

Acontosceles sp.

One specimen before me differed from the two previous species in two obvious ways: the apex of each elytron is more strongly and broadly projected, and the ultimate visible abdominal sternite is glabrous on the middle line and angulate apically. A dissection of the genitalia shows the specimen to be female. It is possible, though admittedly not probable, that the differences mentioned are the result of sexual dimorphism. Therefore, I think it is better not to name this form until the female is known and described in the other two species. The specimen is from Calian, Mindanao Is., Davao Province, Philippine Islands, V-31-30, leg. C. F. Clagg; it is now located in the Chicago Natural History Museum.

Pseudeucinetus Heller

Pseudeucinetus Heller, 1921:155 (described as new genus); Champion, 1924a:116 (synonymized *Thaumastodus*).

Thaumastodus Champion, 1924:25 (described as new genus).

Head with face weakly convex in lateral aspect (M); epistomal suture present (M); eyes subcircular, almost contiguous; antennal groove margined dorsally (M); antenna inserted near mandible (M), with 11 segments (A), middle segments moniliform (M); labrum with lateral borders evenly arcuate (M); maxilla slender, with galea simple apically (M); labium with postmentum as wide as long (M), with ligula arcuate laterally (A), and with second palpal segment longer than third (M). Pronotum evenly convex (M). Mesosternum on the same level as the prosternal process (M), but without distinctly bordered depression for the reception of the prosternal process (A), and linear in the area anterior to each middle coxa (M). Metasternum evenly convex, very short anterior to hind coxae, expanded laterally, posterior borders converging medially to become very long and linear between the coxae (M). Metepisternum narrow, widest anteriorly, then becoming linear through most of its length (M). Hind coxa strongly oblique, subparallelogramic, very large, its length much greater than the distance between it and the middle coxa (M). Hind tibia with many heavy spurs throughout its length (M). Fore leg exhibiting sexual dimorphism (M). Tarsal formula 4-4-4 (M). Elytra with lateral border posteriorly entire (A). Abdomen with the first visible sternite very long laterally and very short medially where the very large hind coxae encroach (M); with the border of the ultimate visible sternite bidentate (M). Metendosternite with stalk not bulbous anteriorly; vertical plate not thickened along its dorsal border; anterior tendons not visible (M). Male with aedoeagus lying on its side when retracted within the abdomen (A), with the pars basalis asymmetrical and sclerotized on all sides to form a tube (A), with the parameres subequal in length to the pars basalis and not accuminate apically (M); sternite nine asymmetrical (A); sternite eight small and in the form of a wide V (M).

Pseudeucinetus zygops Heller

Pseudeucinetus zygops Heller, 1921:156, figs. 1-3 (described as new species); Champion, 1924a:116 (synonymized *fusiformis*); Maulik, 1931:505 (distribution).

Thaumastodus fusiformis Champion, 1924:27, pl. A (described as new species).

Figure 5 on plate A in Champion's original description shows some distortion, probably because of rotation of curved parts. The lacinia should be rotated a quarter-turn to the left to show the broad setae as facing medially and to show the distal end as being more arcuate; the galea should be rotated a half-turn. I have re-illustrated the male genitalia (figs. 20-23).

Previous records from literature. PHILIPPINE ISLANDS. *Davao:* Davao, Mindanao Is., Baker Collection No. 6814 (from Heller 1921, and Champion 1924). FEDERATED MALAY STATES. *Selangor:* Kuala Lumpur, Setapak Pond D, August 11 and 12, 1926, among algae, leg. C. Dover (from Maulik 1931).

Specimens examined. PHILIPPINE ISLANDS. *Davao:* (same data as given above) in the Baker Collection, 5 males, determined by K. M. Heller; Calian, Mindanao Is., V-31-30, leg. C. F. Clagg, 1 female [Chicago Natural History Museum]. *Negros Occidental: Tibidabo,* Manapla, Negros Is., XII-12-28, leg. W. D. Pierce, No. CC237, hooping beetles on ground, 2 males and 2 females; Saravia, Negros Is., III-22-29, leg. W. D. Pierce, cane soil, 1 female.

Martinius, NEW GENUS

Head with face weakly convex in lateral aspect; epistomal suture present; eyes transversely ovate, dorsal, almost contiguous; antennal groove margined dorsally; antenna inserted near mandible, short, with seven segments, apical segments moniliform; labrum with lateral borders evenly arcuate; maxilla slender, with galea simple apically; labium with postmentum as wide as long, with ligula having slender lateral projections, with the second palpal segment longer than the third.

Pronotum evenly convex. Mesosternum on the same level as the prosternal process, with distinctly bordered depression for the reception of the prosternal process, linear in the area anterior to each middle coxa. Metasternum evenly convex, very short anterior to hind coxae, expanded laterally, posterior borders converging medially to become very long and linear between the coxae. Metepisternum narrow, widest anteriorly, then becoming linear through most of its length. Hind coxa strongly oblique, subparallelogramic, very large, its length much greater than the distance between it and the middle coxa. Hind tibia with many heavy spurs throughout its length. Fore leg exhibiting sexual dimorphism. Tarsal formula 4-4-4. Elytra with lateral border posteriorly serrate.

Abdomen with the first visible sternite very long laterally and very short medially where the very large hind coxae encroach; with the border of the ultimate visible sternite bidentate. Metendosternite with stalk not bulbous anteriorly; vertical plate not thickened on dorsal border; anterior tendons not visible. Male with aedoeagus having the tegmen ventral to the penis when retracted within the abdomen, with the pars basalis symmetrical and not sclerotized dorsally, thus forming a trough for the penis, with the parameres subequal in length to the pars basalis and not accuminate apically; sternite nine symmetrical; sternite eight small and in the form of a modified V.

This new genus is named in honor of Dr. John C. Martin of Canada, who died in 1957. The description of the type species follows.

Martinius tellipontis, new species

Head with eyes slightly raised above the dorsal surface, one or two rows of punctures between the eyes; antenna attaining the middle point of the fore coxa, segments submoniliform, segment 3 short, segments 1, 2, and 7 longer than wide, the remainder with length subequal to width. Pronotum with anterior border emarginate, anterior angles acute, lateral borders arcuate and very strongly diverging posteriorly, posterior angles subrectangular and weakly overlaying the elytral humeri, posterior border sinuate on lateral thirds and on medial third with a broad, posteriorly projecting, truncated lobe. Elytra widest at anterior fourth, this being the widest point on the whole body; surface transversely evenly convex and longitudinally weakly convex; lateral border evenly arcuate and converging posteriorly to form a parabola at the apex; the pseudopleural carina, that is, the angulation of the dorsal surface with the pseudopleuron, visible throughout its length in dorsal view and therefore forming the lateral border; pseudopleural carina with approximately twelve serrations on the posterior half, the first few being widely separated and small, but becoming more closely placed and larger posteriorly; the apex of each elytron with a small truncated projection which lies medial to the apical projections on the ultimate strenite of the abdomen; pseudopleuron occupying completely the deflexed part of the elytra, wide anteriorly, narrowing gradually posteriorly, then maintaining a narrow width from the first visible abdominal sternite until it ends at the truncated projection of the apex.

The dorsal surface is covered with very dense, fine, setigerous punctures. The setae on the head are directed anteriorly and those on the pronotum and elytra are directed posteriorly. The setae have submetallic luster and are of three types. Those of the first type are very dense, short, fine, appressed, and light brown, and they cover most of the surface. The second type of setae, which are very dense, short, broad, appressed yellowish-golden, form irregular bands or spots on the elytra; these markings become obscured when light comes from certain directions. A third type of seta is evenly dispersed among the other two types; these are sparser, longer, fine, recurvate, and light brown. A very long seta projects anteriorly and then curves ventrally from the dorsal margin of each eye. The ventral surface is covered with very dense, fine, setigerous punctures. The setae of these punctures have submetallic luster, are whitish-yellow, posteriorly directed, appressed, and fine; they are slightly longer on the posterior abdominal segments. However, on the hypomeron the setae are directed anterio-ventrally, and on the abdominal sternites there are sparser and longer setae mixed with the dense and short setae. The ultimate visible sternite has four rows of very long, coarse, brown, curved setae, each row with three or four setae. Also on the ultimate sternite there is a very long, fine seta adjacent to each of the two apical projections. The antenna is clothed with whitish setae which are longer and denser on the ventral surface; much longer setae are sparsely distributed and are especially noticeable on the apex of the last segment. Legs with dense, whitish setae, except on the middle femur and tibia where they are less dense, and except on the middle tarsus where the setae are very scarce; the tarsi have a pair of coarse setae on the apex of each segment except the distal segment.

Sexual Dimorphism: the fore leg of the male has the apical third of the tibia and the first tarsal segment ventrally clothed with very dense and long setae and the first tarsal segment weakly broadened; in the female the setae of the fore leg are not modified, that is they are uniform throughout the leg, nor is the first tarsal segment wider than the adjacent segment. Measurements in mm.: male length 2.3-3.0, width 1.2-1.6; female length 2.3-3.2, width 1.2-1.6; the average measurements of the males are less than those of the females. (figs. 1-19).

Specimens examined. PANAMA. Canal Zone, Feb. 10, 1939, leg. C. H. Richardson, USNM No. 64214 Holotype male; same data, Allotype female, and Paratypes 19 males and 20 females; same data except leg. C. J. Drake, Paratypes 2 males and 1 female; Panama City, Canal Zone, Feb. 1939, leg. Carl J. Drake, Paratypes 2 females.

Dr. Drake, who presented these specimens to the National Museum, does not recall the exact situation in which these specimens were collected, but he says that he and Dr. Richardson did all their collecting in and very close by a small stream at Panama City. The name *tellipontis* is Latin: *tellus*—land, *pons*—bridge.

Literature Cited

Blackwelder, R. E. 1944. Checklist of the Coleopterous insects of Mexico, Central America and the West Indies, and South America. Part 2. U. S. National Museum Bulletin 185(2):189-341.

Champion, G. C. 1924. On a new subfamily of Clavicorn Coleoptera. Ent. Mon. Mag. 60(717):25-29, pls. A and B.

————. 1924a. *Thaumastodus fusiformis* Champ.: synonymical note. Ent. Mon. Mag. 60(720):116-117.

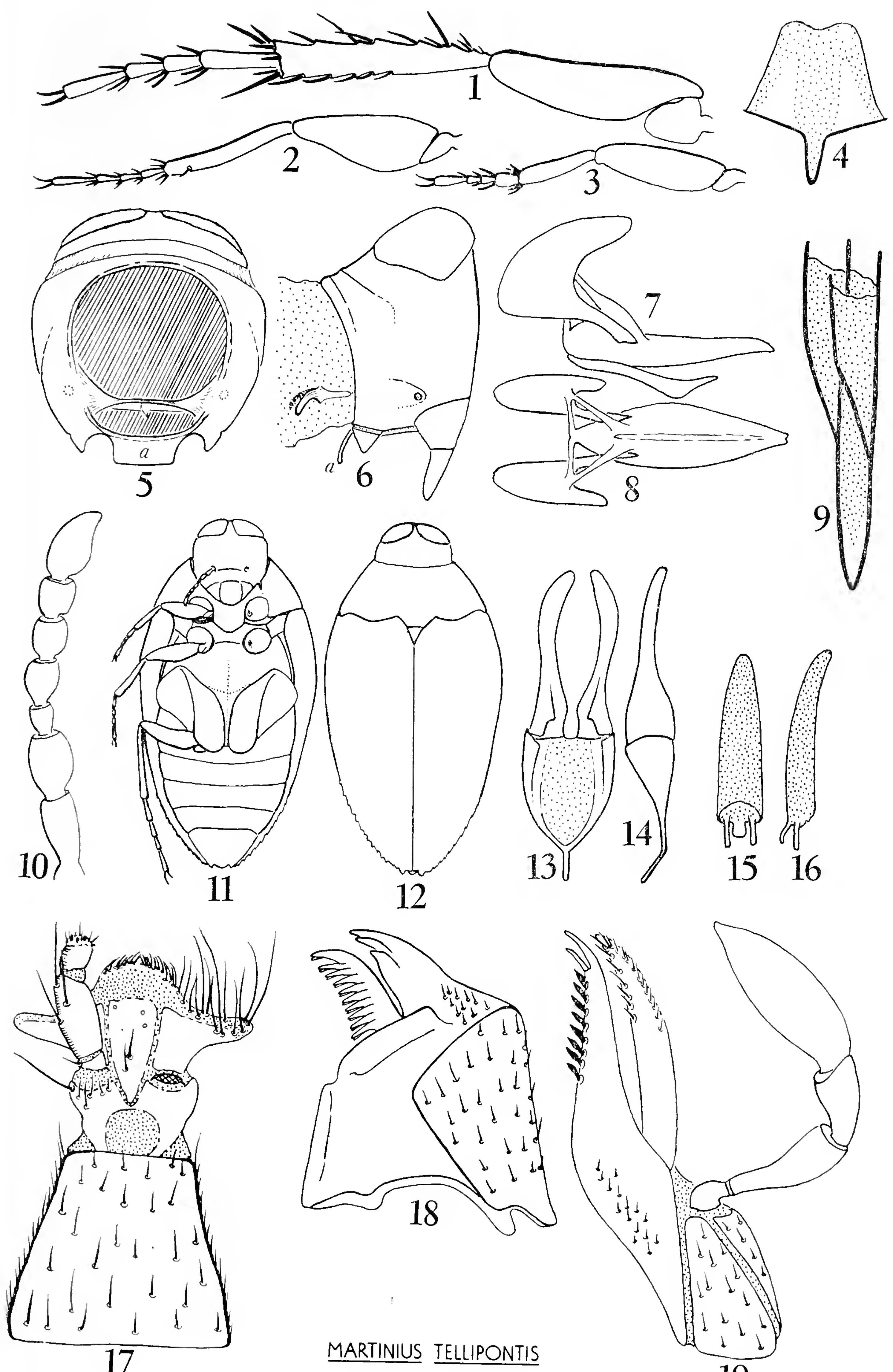
Heller, K. M. 1921. Philippinische Melandryidae. Ent. Blatter 17(10-12):155-157, 3 figs.

Hinton, H. E. 1939. An inquiry into the natural classification of the Dryopoidea, based partly on a study of their internal anatomy (Col.). Trans. Roy. Ent. Soc. London 89(7):133-184, 1 pl., 105 figs.

————. 1939a. A contribution to the classification of the Limnichidae (Coleoptera). The Entomologist 72(915):181-186, 11 figs.

Maulik, S. 1931. Papers on Malayan aquatic biology. III. Byrrhidae, Hydrophilidae, Chrysomelidae. Jour. Federated Malay States Mus. 1930-1931 [1931] 16(3-4):505-506.

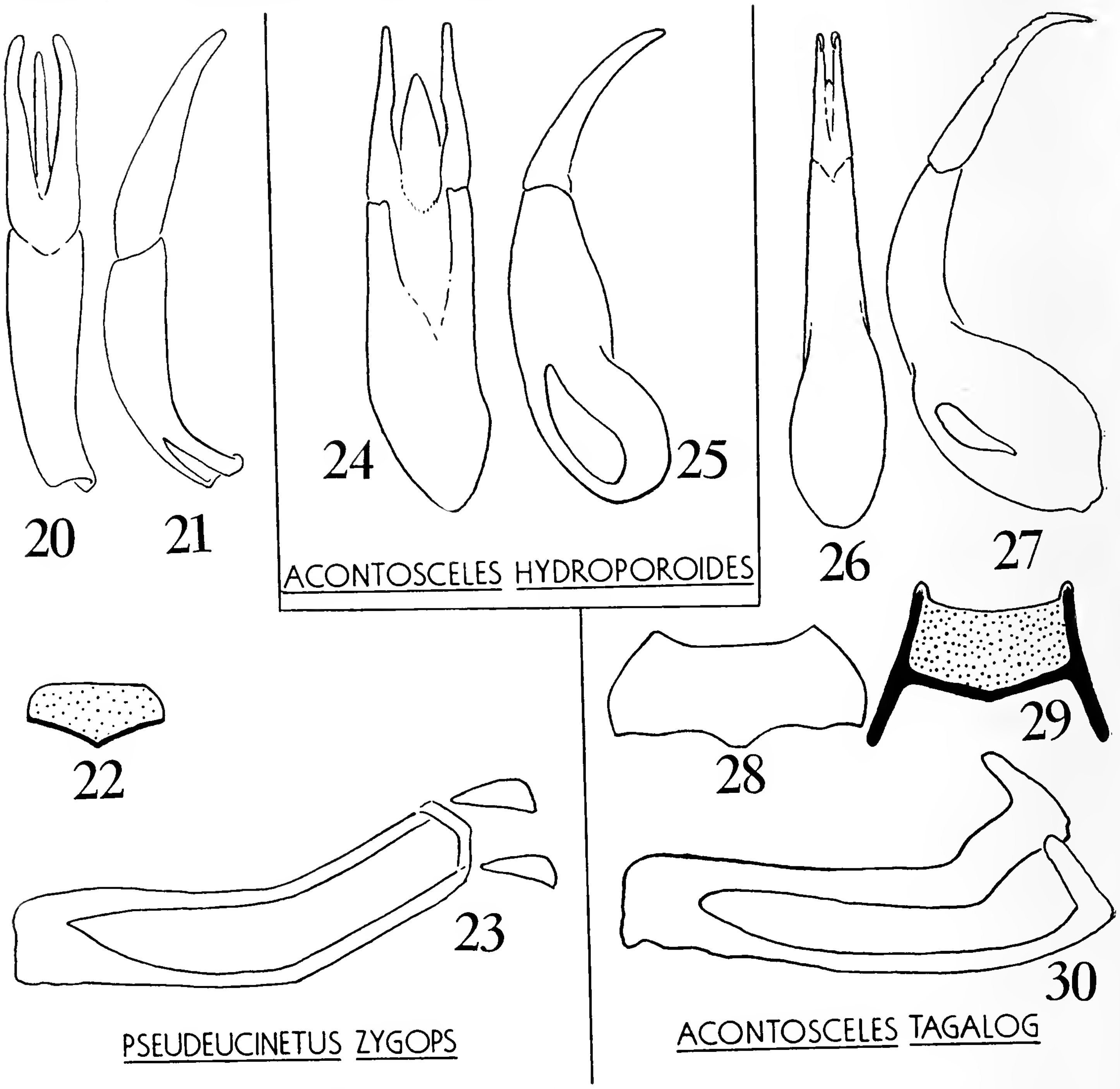
Snodgrass, R. E. 1935. Principles of insect morphology. 667 pp., 319 figs. New York and London.



MARTINIUS TELLIPONTIS

(See captions, next page)

FIGURES 1-19. *Martinius tellipontis* n. sp., male; fig. 1, right hind leg; fig. 2, right middle leg; fig. 3, right fore leg; fig. 4, sternite 8, ventral view; fig. 5, head, posterior view; a—hypostomal bridge; fig. 6, head, with cervical membrane, less labium, maxillae, mandibles and antennae, lateral view; a—hypostomal bridge; fig. 7, metendosternite, lateral view, from left side; fig. 8, metndoesternite, dorsal view; fig. 9, sternite 9, dorso-lateral view; fig. 10, antenna; fig. 11, whole specimen, ventral view; fig. 12, whole specimen, dorsal view; fig. 13, tegmen, dorsal view; fig. 14, tegmen, lateral view, from right side; fig. 15, penis, dorsal view; fig. 16, penis, lateral view, from right side; fig. 17, labium, posterior view; fig. 18, right mandible, anterior view; fig. 19, left maxilla, posterior view.



FIGURES 20-23. *Pseudeucinetus zygops, male;* fig. 20, aedoeagus, lateral view, from left side; fig. 21, aedoeagus, dorsal view; fig. 22, sternite 8, ventral view, fig. 23, sternite 9, dorso-lateral view.

FIGURES 24-25. *Acontosceles hydroporoides,* male; fig. 24, aedoeagus, lateral view, from left side; fig. 25, aedoeagus, dorsal view.

FIGURES 26-30. *Acontosceles tagalog* n. sp., male; fig. 26, aedoeagus, lateral view. from left side; fig. 27, aedoeagus, dorsal view; fig. 28, pronotum, dorsal view; fig. 29, sternite 8, ventral view; fig. 30, sternite 9, dorso-lateral view.

LITERATURE NOTICES

(We will publish under this title notices of publications that are new and should be called to our readers' attention. The notices are not signed; contributions will be used as space permits; authorship is anonymous.)

Many entomologists will be pleased to learn of a new international journal of entomology, STUDIA ENTOMOLOGIA (new series). Dr. Thomas Borgmeier, who is the editor, formerly published the Revista de Entomologia (1931-1951). Studia Entomologia is a multilingual journal devoted to insects in general, mainly of the Neotropical fauna. It is published once a year, each issue of approximately 500 pages. The price of an annual subscription is $6.00 US and payments should be sent to T. Borgmeier, Estrada Rio Grande 2116, Rio de Janeiro (Jacarepagua), D. F., Brazil. Vols. 1 and 2 of the Studia Entomologia have appeared and Dr. Borgmeier is to be congratulated on the excellent appearance and quality of this valuable contribution for the Neotropical region.

PACIFIC INSECTS is a new journal being published by the Entomology Department, Bernice P. Bishop Museum, Honolulu, Hawaii. It is devoted primarily to monographs or zoogeographical papers on insects and other terrestrial arthropods from the Pacific area, including eastern Asia, Australia, and Antarctica. The journal is the organ of "Zoogeography and evolution of Pacific insects," a project organized by the Bishop Museum in an attempt to coordinate such work. As is fitting, Dr. J. L. Gressitt heads the editorial committee. Publication is planned for four issues per volume, totaling at least 400 pages per volume. They are well on their way with the first number containing 172 pages of what seem to be important articles on three different orders. The format looks good; the keys are designed for easy use; distributional records are presented very neatly, for which cataloguers should be thankful; and the illustrations, both half tone and line, are clear. A nice feature is a continuing list of recent literature on Pacific insects; 26 titles are currently given. This journal has picked for its concern the largest group of animals from the most far-flung area on the earth. That this could have happened is surely another indication that our planet is shrinking. We wish the best of fortune to PACIFIC INSECTS.

ON THE STATUS OF CASEY'S SPECIES OF PROCULUS (PASSALIDAE)

By Donald E. Johnston[1,2]

Of the ten species of *Proculus* recognized by Hincks and Dibb (1935) three were described by the well known coleopterist T. L. Casey. These are *P. magister* Casey, 1897; *P. mandibularis* Casey, 1914 and *P. densipennis* Casey, 1914. *P. magister* and *P. mandibularis* were collected in Honduras and *P. densipennis* was taken in Guatemala. No new information on these species has been reported subsequent to their description. Because of this and because the original descriptions were rather brief and unaccompanied by figures it seemed desirable to examine Casey's types and attempt to clarify the status of his species. The results of this examination are reported herein.

Proculus densipennis Casey

Proculus densipennis Casey, 1914, Mem. Coleopt. V, p. 374.

In the original description Casey stated that his *P. densipennis* "differs [from *P. opacipennis*] in the narrower and more elongate elytra, sharper anteocular processes and less spinose external tibial margins, as well as in many other features. From *beckeri* Zang, it differs in its much smaller size, narrower form and in the pubescence of the elytra."

Examination of the original description and figure (Thomson, 1857) of *P. opacipennis* and of a small series of this species in the U. S. N. M. revealed that the differences cited by Casey do not exist. The holotype (unique) of *P. densipennis* is a "typical" specimen of *P. opacipennis* and the former name should be considered a probable synonym pending publication of new information on Thomson's type. Judging from Zang's (1905) description, *P. beckeri* is distinct from *P. opacipennis* but the brevity of the description and lack of figures exclude any discussion of possible relationships.

Proculus magister Casey

Proculus magister Casey, 1897, Ann. New York Acad. Sci. IX, p. 641.

In the original description Casey compared his new species, *P. magister*, with a form which he identified as *Proculus mniszechi* Kaup. In 1914, however, Casey stated that the form identified as *mniszechi* in the

---

[1]Department of Zoology, University of Maryland, College Park.

[2]The author would extend his thanks to the officials of the U.S. National Museum, especially Mr. O. L. Cartwright, for permission to examine the Casey types and to Sr. P. F. S. Pereira for his generous advice.

earlier paper was not this species but was *Proculus mandibularis* n. sp. (see discussion of *mandibularis* given below). In the 1914 paper that author compared the three species *magister, mandibularis* and *mniszechi* although he probably had before him no specimens which he regarded as belonging to the latter species. Examination of the original description and figure of *P. mniszechi* Kaup, 1868 and study of five specimens of this species in the U.S.N.M. collection failed to reveal any differences between these and the holotype and paratype specimens of *P. magister.* Therefore *Proculus magister* Casey is here regarded as a probable synonym of *P. mniszechi* Kaup pending publication of new information on Kaup's type.

Proculus mandibularis Casey

Proculus mandibularis Casey, 1914, Mem. Coleopt. V, p. 374.

Casey's (1897) misidentification of this species as *mniszechi* (see above) is not surprising in view of the almost complete morphological identity of the two forms. Comparison of the small series of *P. mniszechi* and the holotype and paratype of *P. mandibularis* (the only known specimens) revealed only one consistent difference, namely, the greater development of the dorsal mandibular tooth in *mandibularis* (the character on which Casey based the description of the species as new). This difference in the placement and degree of development of the dorsal mandibular tooth (illustrated in figures 1 and 2) is difficult to evaluate with the small number of specimens at hand. The difference in the mandibles might be considered a sexually dimorphic character but for Casey's statement (1897) that the specimens of *P. mandibularis* and *P. magister* (= *P. mniszechi*) consisted of a male and a female in each case (as I was unable to dissect the specimens this point could not be verified). That the elongated tooth in the specimens of *mandibularis* is probably not simple allometry was seen by comparing body measurements of *mniszechi* and *mandibularis.* Specimens of *mniszechi* and *mandibularis* which were virtually identical as regards body size differed in the development of the mandibular teeth. That the dorsal tooth is not a geographic variate was seen from the collection data of the types of *mandibularis* and *magister* (= *mniszechi*). Both were taken at San Pedro Sula, Honduras. A fourth possibility, that of balanced polymorphism, is impossible to evaluate at present. Until more specimens can be examined and more information on the biology of these beetles accumulates *P. mandibularis* should be tentatively regarded as distinct from *P. mniszechi.*

REFERENCES CITED

CASEY, T. L. 1897. Coleopterological notices VII. Ann. New York Acad. Sci. IX: 285-684.

———. 1914. Memoirs on the Coleoptera V. Miscellaneous notes and new species: 355-378.

HINCKS, W. D. and J. R. DIBB. 1935. Passalidae. Coleopterorum Catalogus 142:1-118.

THOMSON, M. J. 1857. Description de deux especes du genre Passalus. Arch. Ent., Tome I:420-422.

ZANG, R. 1905. Diagnosen neuer Passaliden. Deutsche Ent. Zeitschr. 1905, Heft II:315-316.

1 2

FIGURES 1 and 2. Lateral views of mandibles of *Proculus mniszechi* (1) and *P. mandibularis* (2).

The Coleopterists' Bulletin

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

VOLUME 14, 1960

Published by

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: 3 to date, $5.00 ea.; single numbers, $1.25 each; all prices postpaid. **Missing numbers:** Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts will be considered ONLY FROM SUBSCRIBERS and should be typewritten on 8½ x 11 sheets with at least 1 inch margins, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance after review by the Editorial Board. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five tear sheets of one page notes will be supplied free to the author if requested when returning galley proofs. Reprints of articles printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and *in all cases, descriptions of new species must be illustrated.* Descriptions of new species or genera MUST contain keys or be correlated with existing keys.

TABLE OF CONTENTS

Volume 14, 1960

ARNETT, R. H., JR., Contribution towards a monograph of the Oedemeridae 13. The "*fragilis*" complex of the genus *Oxacis* ... 33

BALL, G. E., A review of the taxonomy of the genus *Eurydcrus* LeConte, 1848. With notes on the North American Dapti (of authors). (Carabidae: Harpalini) 44

BARR, T. C., JR., A new genus of cave beetle (Carabidae: Trechini) from southwestern Virginia with a key to the genera of the Trechini of North America north of Mexico ... 65

BARR, W. F., Two new species of Cleridae from western North America ... 13

BEAL, R. S., JR., Description of a California species of *Ctesias* (Dermestidae) ... 95

BECKER, E. C., W. J. BROWN, and H. F. HOWDEN, Coleoptera in the Canadian National Collection ... 19

BURKE, H. R., A new genus and two new species of weevils from Texas with notes on others (Curculionidae) ... 121

HICKS, S. D., Canadian specimens of *Gnorimella maculosa* (Knoch) (Scarabaeidae) with notes on variation ... 91

KISSINGER, D. G., First record of the calendrine genus *Orthgnathus* Schoenherr from the United States (Curculionidae) ... 4

KISSINGER, D. G., Description of a new species of *Miloderes* Casey with notes on some broad-nosed weevils (Curculionidae) ... 25

KISSINGER, D. G., The *Apion* subgenus *Perapion* Wagner in North America (Curculionidae) ... 86

McDERMOTT, F. A., *Lucidotopsis* genus novum. (Coleoptera; Lampyridae) ... 18

McDONALD, J. M., SR., Notes on the distribution of some species of *Hymenorus* (Alleculidae) ... 1

McDONALD, J. M., SR., Morphology of the exoskeleton of *Capnochroa fuliginosa* (Melsheimer) (Alleculidae) ... 97

MEEUSE, B. J. D. and M. H. HATCH, Beetle pollination in *Dracunculus* and *Sauromatum* (Araceae) ... 70

NELSON, G. H., A new species of *Polycesta* (Buprestidae) ... 30

ROACHE, L. C., Ladybug, ladybug: what's in a name? ... 21

SCHEDL, K. E., Synonymies of bark beetles (Scolytidae) IV 174. Contribution to the morphology and taxonomy of the Scolytoidea ... 5

SCHEDL, K. E., Bark- and timber beetles from the Neotropical region ... 74

SELANDER, R. B., Restriction of the genus *Lytta* Fabricius (Meloidae) ... 80

SPILMAN, T. J., The tenebrionid *Diaclina Fagi* as a medicine in the Orient ... 12

WARNER, R. E., The genus *Stercodermus* new to America north of Mexico with a revised key to the genera of Brentidae ... 29

WERNER, F. G., *Hilarocassis exclamationis* (L.), a tortoise beetle not previously reported from the United States (Chrysomelidae: Cassidinae) ... 94

LIST OF NEW TAXA DESCRIBED IN VOLUME 14

Aphanotrechus Barr, new genus (Carabidae)........ 65
Aphanotrechus virginicus Barr, new species (Carabidae)........ 66
Apion (Perapion) wickhami Kissinger, new species (Curculionidae)........ 87
Ctesias dusmae Beal, new species (Dermestidae)........ 95
Cymatodera sobara Barr, new species (Cleridae)........ 13
Dictolytta Selander, new genus (Meloidae)........ 84
Epispasta Selander, new genus (Meloidae)........ 82
Lucidotopsis McDermott, new genus (Lampyridae)........ 18
Megalytta Selander, new genus (Meloidae)........ 83
Mesagroicus parmerensis Burke, new species (Curculionidae)........ 121
Miloderes nelsoni Kissinger, new species (Curculionidae)........ 25
Oxacis bitomentosa Arnett, new species (Oedemeridae)........ 35
Oxacis megathoracica Arnett, new species (Oedemeridae)........ 37
Oxacis xerensis Arnett, new species (Oedemeridae)........ 39
Paniculolytta Selander, new genus (Meloidae)........ 80
Paranametis Burke, new genus (Curculionidae)........ 123
Paranametis distincta Burke, new species (Curculionidae)........ 124
Phyllobaenus lautus Barr, new species (Cleridae)........ 16
Polycesta flavomaculata Nelson, new species (Buprestidae)........ 30

DATES OF PUBLICATION OF VOLUME 14, 1960

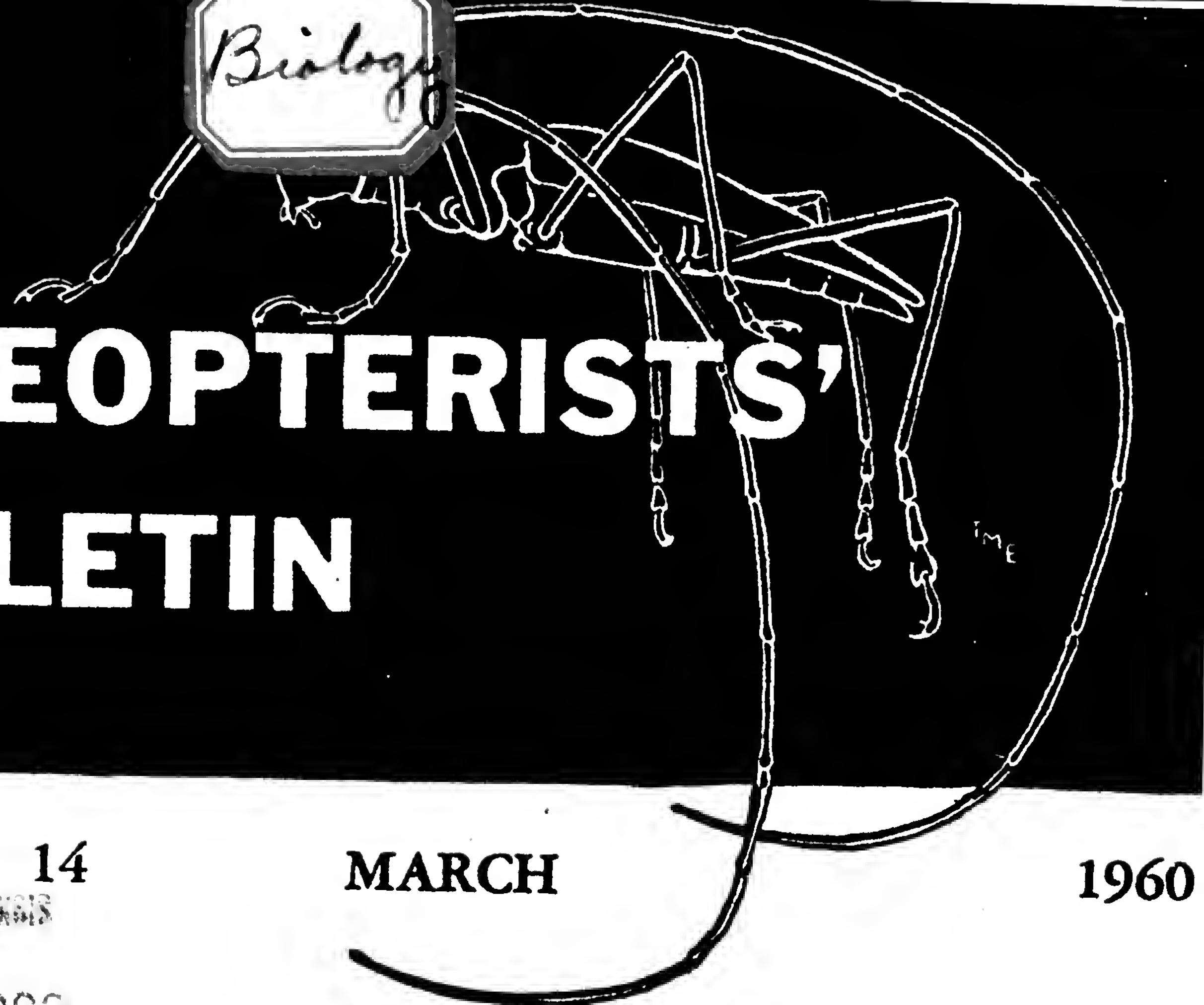
March (No. 1), March 25, 1960

June (No. 2), June 21, 1960

September (No. 3), September 7, 1960

December (No. 4), December 19, 1960

THE COLEOPTERISTS' BULLETIN



VOLUME 14 MARCH 1960

TABLE OF CONTENTS

McDONALD, SISTER JAMES MARIE, Notes on the distribution of some species of Hymenorus (Alleculidae) 1
KISSINGER, D. G., First record of the Calendrine Genus Orthgnathus Schoenherr from the United States (Curculionidae) 4
SCHEDL, KARL E., Synonymies of Bark Beetles (Scolytidae) IV 5
SPILMAN, T. J., The Tenebrionid Diaclina Fagi as a medicine in the Orient 12
BARR, WILLIAM F., Two new species of Cleridae from Western North America 13
McDERMOTT, FRANK A., Lucidotopsis genus novum, (Coleoptera; Lampyridae) 18
BECKER, E. C., et al., Coleoptera in the Canadian National Collection 19
ROACHE, LEWIE C., Ladybug, Ladybug; What's in a Name? 21
KISSINGER, D. G., Description of a new species of Miloderes Casey with notes on some broad-nosed weevils (Curculionidae) 25
WARNER, ROSE ELLA, The genus Stereodermus new to America north of Mexico with a revised key to the genera of Brentidae 29
NELSON, G. H., A new species of Polycesta (Buprestidae) 30

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: 3 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid. **Missing numbers:** Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten on 8½ x 11 sheets with at least 1 inch margins, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance after review by the Editorial Board. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five tear sheets of notes will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and *in all cases, descriptions of new species must be illustrated.* Descriptions of new species or genera MUST contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume 14 March (No. 1) 1960

NOTES ON THE DISTRIBUTION OF SOME SPECIES OF HYMENORUS (ALLECULIDAE)

By SISTER JAMES MARIE McDONALD, S.B.S.[1,2]

During the past three summers Dr. Ross H. Arnett, Jr. has done extensive collecting in Southwestern U.S.A. as part of a project made possible by grants from the National Science Foundation and the American Philosophical Society. These trips have yielded, among other things, a sufficiently large representation of Alleculidae to merit some study.

In going through the collection it was found that nearly 100% of the Alleculids belong to the genus *Hymenorus* which is not surprising since Fall (1931) totals their number as "legion" for the Texas to Southern California area.

Most of the material has been identified and effort made to gain additional information on the distribution of this genus. The localities listed for each species represent collecting stations, detailed descriptions of which will be given at a later date by Dr. Arnett. The lot numbers in parenthesis supply additional data concerning these stations.

Hymenorus cassus Fall

The following record is an extension of the distribution data given by Fall. His description of this species was based upon specimens from Santa Rosa, Lower California. The localities which follow also seem to indicate that this species is probably not a desert form.

Material examined.—15: ARIZONA: Cochise Co., Southwestern Research Station, in Cave Creek Canyon, Chiricahua Mts., nr. Portal, elev. 5000. (289) July 14, '57: 2 M., 2 F.; (309) Aug. 13, '57: 1 M. Santa Cruz Co., Pena Blanca Canyon, Atascosa Mts., elev. 4050. (361) Aug. 1, '58: 1 M. Pima Co., Bear Canyon Area, Mt. Lemmon, Santa Catalina Mts., elev. 6800. (387) July 2, '59: 5 M.; (391) July 6, '59: 2 M., 1 F.; (395) July 8, '59: 1 M.

---

[1] Department of Biology, The Catholic University of America (permanent address: 1663 Bristol Pike, Cornwells Heights, Pa.)

[2] My sincere gratitude is given Dr. Arnett for access to his collection and his ever-ready assistance, and Mr. T. J. Spilman of the Bureau of Entomology and Plant Quarantine, U.S.D.A. for generous aid in using the U.S.N.M. material.

Hymenorus grandicollis Champion

This species was known from Tucson and possibly from the Baboquivari Mts. by Fall. The range given below is from Texas to Alamos, Mexico, a noticeable extension.

Material examined.—7: TEXAS: Jeff Davis Co., Fort Davis State Park, nr. Ft. Davis, elev. 5000. (302) Aug. 10, '57: 2 M., 1 F. ARIZONA: Santa Cruz Co., nr. Ruby, Sycamore Canyon, Atascosa Mts., elev. 4050. (364) Aug. 2, '58: 1 M. MEXICO: Sonora, 2 mi. w. Alamos, semi-arid tropics, elev. 1400. (368) Aug. 6, '58: 1 M., 2 F.

Hymenorus papagonis Fall

The localities listed for this species by Fall when he described it were all in the true Sonoran Desert or adjoining Canyons in Arizona. Now, the range has been found to extend from the westernmost part of Texas which is in the Chihuahuan Desert to the southernmost part of the Sonoran Desert, Alamos.

Material examined.—57: TEXAS: Jeff Davis Co., Fort Davis State Park, nr. Ft. Davis, elev. 5000. (287) July 12, '57: 1 M., 1 F.; (302) Aug. 10, '57: 1 M., 2 F. ARIZONA: Pima Co., nr. Sabino Canyon, on desert, nr. Tucson, elev. 2750. (292) July 23, '57: 2 M.; (385) June 30, '59: 1 M., 2 F. Pima Co., 6 mi. n.w. Sasabe, Brown's Ranch, e. sl. Baboquivari Mts., elev. 4050. (351) July 27, '58: 7 M., 7 F. Pima Co., 4 mi. w. Sycamore Canyon, w. sl. Baboquivari Mts., in desert, elev. 3150. (360) July 31, '58: 9 M., 6 F. Santa Cruz Co., Pena Blanca Canyon, Atascosa Mts., elev. 4050. (420) July 20, '59: 1 M.; (439) Aug. 7, '59: 2 M., 1 F. Pima Co., Sabino Canyon, w. sl. Mt. Lemmon, Santa Catalina Mts., nr. Caretaker's house, elev. 2760. (386) July 1, '59: 1 M. Pima Co., Sycamore Canyon, w. sl. Baboquivari Mts., elev. 3520. (428) July 27, '59: 1 M., 1 F. Gila Co., Jones Water Campsite, nr. Globe, elev. 4500. (432) Aug. 3, '59: 9 M., 1 F. MEXICO: Sonora, 2 mi. w. Alamos, semi-arid tropics, elev. 1400. (368) Aug. 6, '58: 1 M.

Hymenorus exiguus Casey

A range from extreme western Texas through southern Arizona into southern California is given for this species by Fall. The following localities are all within this range. Judging from the available data, this species appears to be a desert form.

Material examined.—35: ARIZONA: Pima Co., nr. Sabino Canyon, on desert, nr. Tucson, elev. 2750. (292) July 23, '57: 1 M., 1 F.; (385) June 30, '59: 9 M., 5 F.; (414) July 15, '59: 3 M., 4 F. Pima Co., nr. Tucson, nr. Barnett Ranch on Redington Road, elev. 2650. (348) July 26, '58: 1 M. Pima Co., 4 mi. w. Sycamore Canyon, w. sl. Baboquivari Mts., in desert, elev. 3150. (360) July 31, '58: 2 M. Pima Co., Sabino Canyon, w. sl. Mt. Lemmon, Santa Catalina Mts., nr. Caretaker's house, elev. 2760. (373) Aug. Aug. 10, '58: 1 M., 3 F.; (386) July 1, '59: 1 M. Pima Co., Organ Pipe National Monument, at campsite nr. Hq., elev. 1670. (429) July 28, '59: 3 M., 1 F.

Hymenorus testaceus Casey

The following record agrees with the range from the Chiricahua Mts. to the Baboquivari Mts. as listed by Fall for this species.

Material examined.—33: ARIZONA: Cochise Co., Montezuma Canyon, Huachuca Mts., nr. Hq. recreation area, elev. 5400. (335) July 19, '58: 1 M.; Santa Cruz Co., Pena Blanca Canyon, Atascosa Mts., elev. 4050. (361) Aug. 1, '58: 1 M.; (419) July 19, '59: 1 M.; (420) July 20, '59: 1 M.; (421) July 21, '59: 2 M., 1 F.; (422) July 22, '59: 4 M., 9 F.; (424) July 23, '59: 1 M., 1 F.; (425) July 24, '59: 1 M., 2 F.; (439) Aug. 7, '59: 2 M., 1 F.; (442) Aug. 8, '59: 2 M., 2 F. Cochise Co., South Fork Canyon, nr. Portal, elev. 5350. (444) Aug. 10, '59: 1 M.

Hymenorus deplanatus Champion

The data given below adds the Baboquivari and Atascosa Mts. to the mountain ranges listed in Fall's work for this rather common species: Catalina, Huachuca, Chiricahua, and Pinalento Mts.

Material examined.—40: ARIZONA: Cochise Co., Montezuma Canyon, Huachuca Mts., nr. Hq. recreation area, elev. 5400. (335) July 19, '58: 1 M. Pima Co., 6 mi. n.w. Sasabe, Brown's Ranch, e. sl. Baboquivari Mts., elev. 4050. (351) July 27, '58: 3 M. Santa Cruz Co., nr. Ruby, Sycamore Canyon, Atascosa Mts., elev. 4050. (364) Aug. 2, '58: 1 M. Santa Cruz Co., Pena Blanca Canyon, Atascosa Mts., elev. 4050. (420) July 20, '59: 2 M., 4 F.; (422) July 22, '59: 2 M., 2 F.; (439) Aug. 7, '59: 2 M., 3 F.; (442) Aug. 8, '59: 9 M., 11 F.

Hymenorus ruficollis Champion

The localities listed for the material examined do not extend Fall's record which includes Nogales, Texas Pass and Santa Catalina Mts. The now known range of this species indicates that it is probably not a desert form.

Material examined.—19: ARIZONA: Santa Cruz Co., Pena Blanca Canyon, Atascosa Mts., elev. 4050. (361) Aug. 1, '58: 2 M.; (369) Aug. 8, '58: 1 M.; (419) July 19, '59: 1 M., 1 F.; (420) July 20, '59: 1 M.; (421) July 21, '59: 1 M., 1 F.; (422) July 22, '59: 1 M.; (424) July 23, '59: 1 M.; (439) Aug. 7, '59: 4 M., 1 F. Santa Cruz Co., nr. Ruby, Sycamore Canyon, Atascosa Mts., elev. 4050. (364) Aug. 2, '58: 2 M., 2 F.

Hymenorus liebecki Fall

Fall had specimens from the Huachuca Mts. when he described this species. The locality given below is an extension to the next mountain range west. In both cases, the material was collected outside the desert.

Material examined.—3: ARIZONA: Santa Cruz Co., Madera Canyon, elev. 5100. (436) Aug. 5, '59: 3 M.

Hymenorus quadricollis Fall

The record given below agrees with Fall's Alpine, Texas data for this interesting species.

Material examined.—1: TEXAS: Jeff Davis Co., Fort Davis State Park, nr. Ft. Davis, elev. 5000. (287) July 12, '57: 1 M.

LITERATURE CITED

FALL, H. C. 1931. The North American species of Hymenorus (Coleoptera: Alleculidae). Trans. American Ent. Soc. 57: 161-247.

FIRST RECORD OF THE CALENDRINE GENUS *Orthgnathus* SCHOENHERR FROM THE UNITED STATES (CURCULIONIDAE)[1]

A number of specimens of *Orthgnathus subparallelus* Chevrolat of both sexes were collected at the lights of the Southwestern Research Station near Portal, Arizona during July 2 to 15, 1959. Previously this species has been known from Mexico to Panama.

This genus is readily separated from other U. S. calendrines by having the pygidium almost completely covered by the elytra; our other calendrines (except *Yuccaborus* LeConte) have the pygidium permanently exposed. *Orthognathus* differs from *Yuccaborus*, which also has the pygidium covered, in having the hind tibia greatly expanded apically and ending in a broad, wide corbel plate; the unci of the tibiae are broadly angled ventrally; the prothorax has distinct post-ocular lobes; the beak is curved along the dorsal line and is tapered apically; and the mandibles are large, non-dentate, and triangular. *Yuccaborus* has the hind tibia linear and with at most a very narrow corbel plate; the unci of the tibiae are narrow and acute; the prothorax lacks post-ocular lobes; the beak is practically a straight cylinder; and the mandibles are small, flat, broad, and tridentate externally.

Orthognathus subparallelus varies greatly in size from 9.25 to 15.50 mm. in length; a specimen from San Andres Tuxtla, Veracruz, Mexico is only 8.00 mm. long.—D. G. KISSINGER, *Oakwood College, Huntsville, Alabama.*

[1] Work supported by a grant from the Johnson Fund of the American Philosophical Society.

SYNONYMIES OF BARK BEETLES (SCOLYTIDAE) IV

174. Contribution to the morphology and taxonomy of the Scolytoidea.

By KARL E. SCHEDL[1]

This paper deals with some recently observed synonymies within the family Scolytidae mainly from North America and the Neotropical region. It represents the fourth contribution of that type and shall be continued.

Liparthrum squamosum (Blackman)

Stephen L. Wood (Canadian Ent. LXXXIX, 1957) has dropped the genus *Erineosinus* Blackman transferring the genotype to *Liparthrum* Wollaston. This new synonymy seems to be correct but Wood's assumption of the close relationship of *L. squamosum* (Blkm.) with *L. mori* Aubé does not hold, probably because the author has not seen authentic specimens. A paratype of *Liparthrum* (*Erineosinus*) *squamosum* (Blkm.) I received from the author himself many years ago certainly is much closer related to *L. lowei* Woll. and *L. loweianum* Woll. than to the above mentioned species.

The genus *Liparthrum* Woll. belongs to the subfamily Hylesinae and has to be placed in the tribus Hypoborini.

Pseudocryphalus Swaine = Renocis Casey

The synonymy of *Pseudocryphalus* Sw. with *Renocis* Csy. was first indicated by H. Eggers (Wien Ent. Zeitschr. 47, 1931: 185), later verified by Schedl (Rec. South. Australian Mus. VI, 1936: 525) and W. M. Blackman (Proc. United States Nat. Mus. 88, 1940: 374-375).

Lately St. L. Wood proved the synonymy of *Renocis* (*Pseudocryphalus*) *brittaini* Sw. and *R. criddlei* Sw. with *R. heterodoxus* Csy.

The genus *Renocis* Csy. is closely allied to *Hypoborus* Er. both genera belonging to the subfamily Hylesinae, tribus Hypoborini.

Hexacolus (Erineophilus) guyanaensis Schedl

Schedl (Dusenia III, 1952: 346) proposed to drop the genus *Erineophilus* Hopk. in favour of *Hexacolus* Eichh. By this procedure not only the genotype *E. schwarzi* Hopk. has to be transferred to *Hexacolus* but also the second described species *E. guyanaensis* Schedl.

---

[1]Lienz, Osttirol, Austria.

Pagiocerus Eichhoff

According to the original description of *Pagiocerus* Eichh., *P. rimosus* Eichh. has to be designated as genotype. Eggers (Archiv. Inst. Biol. Sao Paulo I, 1928: 92) on the other hand, checked the type of *Bostrichus frontalis* Fabricius and found it perfectly agreeing with the types of *Pagiocerus rimosus* Eichh. originating from Colombia: Nevada Huila, leg. Stübel. and one specimen from Cuba collected by Riehl. Therefore *P. rimosus* Eichh. becomes a synonym to *Pagiocerus* (*Bostrichus*) *frontalis* (Fab.) and the latter the genotype of the genus *Pagiocerus* Eichh.

Pagiocerus frontalis (Fabricius)

Bostrichus frontalis Fabricius, Syst. Eleuth. II, 1801: 389.
Pagiocerus rimosus Eichhoff, Berl. Ent. Zeitschr. XII, 1868: 148.
Hylastinus fiorii Eggers, Ent. Bl. IV, 1908: 215.
Pagiocerus chiriquensis Eggers, Arch. Inst. Biol. Sao Paulo I, 1928: 92 (new synonymy).
Pagiocerus zeae Eggers, Arch. Inst. Biol. Sao Paulo I, 1928: 92.
Pagiocerus nitidus Eggers, Ent. Bl. XXVI, 1930: 170 (new synonymy).
Pagiocerus caraibicus Eggers, Arb. morph. tax. Ent. Berlin-Dahlem VII, 1940: 136 (new synonymy).

Two specimens of my collection have been compared with the type of *Bostrichus frontalis* Fab. in the Zool. Museum of the University in Kiel, one by Forstrat Eggers, the other by myself. They agree very well with about half of two large lots of this species I received during recent years; the first series has been reared from infested maize seeds imported into the Belgian Congo from La Malina, Lima, Peru, by J. Decelle, the other one collected by Dr. Kuschel in Tingo Maria, Peru, 17. XII. 1946. All these specimens are comparatively slender, the base of the pronotum is distinctly narrower than the elytra and its sides are subparallel on the basal half. The other half of both lots consists of specimens being somewhat stouter, the pronotum is relative broader, its sides more arcuate on the basal half and the strigose sculpture of the pronotal disc more conspicuous. Obviously these two forms represent the two sexes of *Pagiocerus frontalis* (Fab.), the more slender ones the females, the stouter ones the males. The females compare very well with a cotype of *Pagiocerus nitidus* Egg., the males with a cotype of *Pagiocerus zeae* Egg. and two metatypes of *Pagiocerus fiorii* Egg. all in my collection. To the same extent the males agree with two cotypes of *Pagiocerus caraibicus* Egg. and two metatypes of *Pagiocerus chiriquensis* Egg. The synonymy with all these species seems to be beyond doubts.

Aside of *P. frontalis* Fab. there remain two good species in the genus *Pagiocerus* Eichh. *P. granulatus* Egg. and *P. punctatus* Egg. and two species I have not seen yet *P. cribricollis* Eichh. and *P. luederwaldti* Egg.

On some North American Species of Ips DeGeer

In my paper "Die Kiefernborkenkäfer von Guatemala" (Zeitschr. f. angew. Ent. XXXVIII, 1955: 33-45) I have expressed some doubts about the validity of some of the North American species of *Ips* De Geer pro- posing in the same time a number of new synonyms based on my own large collection and the comparison with some loaned specimens. S. L. Wood two years later obviously under the influence of my publication checked some of my propositions confirming some of them coming to somewhat other results in other cases. Both studies lead to a more clear conception of some of the species of economic importance. The following remarks will add new facts for the same purpose.

Ips confusus (Leconte)

Late Forstrat Eggers, at the beginning of the war, has given to me a specimen of *Ips montanus* Eichh. *ex* coll. Schaufuss, of which collection the type originated also, bearing two labels, one saying "Cisco, Juli 69" and the other "*Ips montanus* Eichh. mit Type verglichen" written by Eggers himself. After the destruction of all other types in the Museum Hamburg during the war this single specimen seems to be the only representative of Eichhoff's *Ips montanus* left.

Comparing this type with my own material of *Ips confusus* Lec., partly compared with specimens of J. M. Swaine's collection, showed that they agree very well with regards of the sculpture, the vestiture and the position of the teeth on the elytral declivity. The only small difference to be noted is the fact that *Ips montanus* is but feebly larger than the average of *Ips confusus* Lec. Therefore there is no more doubt that *Ips montanus* Eichh. has to be regarded as a synonym of *Ips confusus* Lec.

The second accordance, that between *Ips montanus* Eichh. and *Ips vancouveri* Sw. I have reported on p. 40 of the publication mentioned above and this statement was repeated under "new synonymy" by Wood in 1957.

All these facts lead to the following synonymy: *Ips confusus* Lec. (*Ips montanus* Eichh., *Ips vancouveri* Sw.).

Ips concinnus (Mannerheim)

In my paper on the pine bark beetles of Guatemala I have drawn attention to the synonymy of *Ips concinnus* (Mannh.) with *Tomicus* *hirsutus* Eichh., *Ips mexicanus, Ips chamberlini* Sw. and *Ips radiatae* Hopk. basing my conclusions on the comparison of authentical material of all species. I also stressed the fact that there do not exist any known differences in the breeding habits of any importance. Minor deviations in the seasonal history and even in the construction of breeding tunnels are common within the genus *Ips* when one and the same species breeds in different host-plants as we know it from *Ips typographus* (L.) when breeding in the preferred host, the different species of spruce on one side and in pine or larch on the other.

Ips confusus (Leconte), I. cribricollis (Eichhoff), I. lecontei Swaine

Schedl (1955) has proposed the synonymy of *Ips cloudrofti* Sw., *Ips lecontei* Sw., *Ips vancouveri* Sw. and *Ips montanus* Eichh. with *Ips confusus* Lec. In the meantime it became obvious that only *Ips montanus* Eichh. and *Ips vancouveri* Sw. have to be referred to this species while *Ips cloudrofti* Sw. and *Ips lecontei* Sw. form a group for itself especially on account of the position of first small tooth on the upper margin of the declivity.

Ips cloudroft Sw. has been placed as synonym to *Ips cribricollis* (Eichh.) by Wood. *Ips lecontei* Sw. shows exactly the same arrangement of teeth on the elytral declivity but is decidedly larger. It will take some future investigations to prove if these two species, *Ips cribricollis* Eichh. and *Ips lecontei* Sw., can be regarded as independent species or if they are merely geographical races of one and the same species. The specimens from Guatemala referred by Schedl to *Ips confusus* (Lec.) have to be transferred to *Ips lecontei* Sw.

Xyleborus ferrugineus (Fab.)

Bostrichus ferrugineus Fabricius, Syst. Eleuth. II, 1801: 388(♀)
Xyleborus amplicollis Eichhoff, Berliner Ent. Zeitscher. XII, 1868: 280.
Xyleborus argentinensis Schedl, Ann. Mag. Nat. Hist. (10) VIII, 1931: 345.
Xyleborus bispinatus Eichhoff, Berliner Ent. Zeitschr. XII, 1868: 146.
Xyleborus confusus Eichhoff, Berliner Ent. Zeitschr. XI, 1867: 401.
Xyleborus fuscatus Eichhoff, Berliner Ent. Zeitschr. XI, 1867: 400.
Xyleborus hopkinsi Beeson, Insects of Samoa, IV. Col., Fasc. 4, 1929: 246.
Xyleborus impressus Eichhoff, Berliner Ent. Zeitschr. XI, 1867: 400.
Xyleborus insularis Sharp, Trans. R. Soc. Dublin III, 1885: 192.
Xyleborus notatus Eggers, Arb. morph. tax. Ent. Berlin-Dahlem VIII, 1941: 107.

Xyleborus nyssae Hopkins, United States Dept. Agr. Rep. 99, 1915: 66.
Xyleborus schedli Eggers, Ent. Bl. XXX, 1934: 83.
Xyleborus subitus Schedl, Rev. Brasilian Biol. 9 (3), 1949: 280.
Xyleborus tanganus Hagedorn, Deutsche Ent. Zeitschr. 1910: 8.
Tomicus trypanaeoides Wollaston, Col. Hesperidum 1867: 114.

The type of *Xyleborus ferrugineus* Fab., a female, is deposited in the Fabricius Collection in the Zoological Institute of the University in Kiel, Germany, a cotype pinned in the same way in the Zoological Museum of the University in Berlin. Both specimens I have seen when Eggers made its comparison with a series from Niederland Guyana, Paramaribo, C. Heller leg. two of them now being in my collection. Eichhoff and Hagedorn obviously never have seen the types of *X. ferrugineus* Fab. and the same applies to Winn Sampson and C. F. C. Beeson.

For *Xyleborus confusus* Eichh. I have checked type specimens from Venezuela, Reitter (2.47 mm long) and Caracas (2.72 mm) and specimens marked as types from Brasilia mer., Dohrn (2.55 mm), Surinam, Wehrnecke (2.48 mm), Portorico, Germar (2.65 mm) and Madagascar (2.82 mm). The latter series might have been used by Eichhoff in drawing up his description in the Ratio Tomicinorum where these localities are mentioned.

Both series, that of *Xyleborus ferrugineus* Fab. and *X. confusus* Eichh. are very much alike, the former having the elytral disc less regularly striate-punctate and the interstices not so clearly defined than in *X. confusus* Eichh. characteristics used by Eggers to separate the two species.

During my investigations in the Belgian Congo I collected large series of *X. ferrugineus* Fab. in a good number of localities and from many host plants. The individual variation was very marked in one and the same locality as well as in the progeny of a single female. The smallest specimen taken measured 2.1 mm in length, the largest one 2.8 mm, a still larger specimen from Africa in my collection with 3.00 mm originates from Nyembwe-Bulungwa in the former Deutsch Ost Afrika. Very stout specimens are 2.7 times as long as wide, the most slender ones 3.00 times. The sculpture of the elytral disc varies from regularly and strongly striate-punctate with fine and sparsely placed interstitial punctures to more weakly developed striae, more irregularly placed strial punctures and more numerous and larger punctures on the interstices. Other variations can be found in the steepness of the elytral declivity, in the relative size of declivital tubercles especially those on the third interstices and in the punctuation of the basal portion of the pronotum. The extremes of each one of these characteristics are connected by all grades of intermediate forms so that they cannot be used to separate the confusus-type from that of *X. ferrugineus* as this has been done in the past and *Xyleborus confusus* Eichh. has to be dropped in favour of *X. ferrugineus* Fab.

From the already recognized synonyma the type of *Xyleborus insularis* Sharp (in the British Museum) has been checked by Blandford (Biol. Centr. Amer. Col. IV, 1898: 217-218), that of *Tomicus trypanaeoides* Woll. (Brit. Mus.) and *Xyleborus tanganus* Hag. (Museum Hamburg) by Eggers (Wien. Ent. Zeit. 46, 1929: 48).

A great part of the many specimens I have seen from Central and South America show the same variations as those from Central Africa, others are somewhat larger than the average with the elytral disc more irregularly sculptured being closer to *Xyleborus fuscatus* Eichh. and *X. bispinatus* Eichh. The first mentioned name was commonly used by North American students, the second especially by Eggers and Schedl for specimens from the neotropical region. The types of both species have been studied by Eggers and Schedl several times but in spite of the possibility of direct comparison it become more and more unsatisfactory to keep them apart on well founded characteristics. They certainly represent not more than narrow limited individual variations.

Xyleborus amplicollis Eichh. according to the description seems to be a small beetle regularly striate-punctate on the elytral disc and with subimpunctate interstices. It might be regarded as the other extreme of the individual variation within the *Xyleborus ferrugineus* Fab.

A single specimen in my collection has been compared with the type of *Xyleborus impressus* Eichh. by late Forstrat Eggers in 1933. This specimen perfectly agrees with the metatypes of *X. ferrugineus* Fab. from Paramaribo, C. Heller leg. mentioned before.

In 1949 I received a specimen of the type series of *Xyleborus nyssae* Hopk. checked against the type itself by W. H. Anderson. This specimen corresponds exactly with the medium sized coarsely sculptured series of *X. ferrugineus* Fab. from Central Africa.

The specimens of *X. ferrugineus* Fab. from the Pacific Islands including Hawaii as a rule are rather large, about as long as the largest from Africa and South America. Some such large specimens have been described by C. F. C. Beeson as *Xyleborus hopkinsi*. *Xyleborus schedli* Egg., *X. argentinensis* Schedl and *X. subitus* Schedl are medium sized specimens of varying sculpture on the elytral disc. In the light of our present knowledge they all are without taxonomic value. The same applies to *X. notatus* Egg. and the two *in literis* names *X. obtusipennis*

Egg. and *X. biuncus* Schedl. Types of all these species are either in my collection or have been studied lately.

The *Xyleborus ferrugineus* (Boheman) sometimes confused with *X. ferrugineus* Fab. has nothing to do with this species but is a synonym to *Xyleborus similis* Ferr.

The male of *X. ferrugineus* Fab. has been described by A. D. Hopkins (United States Dept. Agric. Rept. 99, 1915: 67) under the name of *Xyleborus fuscatus* Eichh.

Xyleborus ferrugineus Fab. and its relatives have been arranged in a special group of the genus called *Xylebori bispinati.* After this synonymical study there remain but two more species besides *X. ferrugineus* Fab., the rather large species of *X. rufopiceus* Egg. from the Aethiopian region and the extremely large *X. sextuberculatus* Schedl from Argentine. It will take some more material and probably a certain extent of field observations before a final decision about their validity can be given.

Xyleborus (Anisandrus) dispar (Faricius)

Apate dispar Fabricius, Ent. Syst. I, 1792: 363 (♀ ♂)
Scolytus pyri Peck, Massachusetts Agric. Journ. IV, 1817: 205.

Although already E. A. Schwarz in the Proc. Ent. Soc. Washington II, 1890-1892: 198 indicated the synonymy of *Scolytus pyri* Peck to *Xyleborus* (*Apate, Anisandrus*) *dispar* Fabricius and Hagedorn in his Coleopterorum Catalogus (1910: 102) stressed this synonymy, the two names are still used separately, *Xyleborus pyri* Peck by American students, *X. dispar* in Eurasia. I have collected specimens on both continents having not found any significant difference in size or sculpture in either sex. I have also seen sepcimens of *X. pyri* Peck checked by late J. M. Swaine in the Canadian National Collection and compared them with my own European material. It seems advisable to use an uniform nomenclature especially as biological studies and observations are carried on on both continents.

Xyleborus xylographus (Say)

Bostrichus xylographus Say, Journ. Acad. Nat. Sci. Philadelphia V, 1826: 256.
Bostrichus saxeseni Ratzeburg, Die Forstinsekten I, 1837: 167.

S. L. Wood dealt with *Xyleborus saxeseni* Ratz. and *X. xylographus* (Say) lately, transferring to the former as synonyms *X. arbuti* Hopk., *X. tsugae* Sw. and *X. librocedrus* Sw. to the latter *X. canadensis* Sw. I have collected *Xyleborus saxeseni* Ratz. many times in various parts of Europe and had at hand thousands of specimens from other collectors in the course of forty years experience and from the North American *Xyleborus xylographus* (Say) I have also examined a good number of series among them specimens which served Eichhoff in preparing his description in his Ratio Tomicinorum. Although I was carefully searching for any significant differences all my efforts were made in vain. I am personally convinced that in the Holarctic Region we have only one common species for which by priority has to be used Say's name *Xyleborus xylographus* (Say).

Xyleborus femoratus Egg. = Xyleborus curtus Egg.

The type of *Xyleborus curtus* Egg. had been compared with two cotypes of *Xyleborus femoratus* Egg. studying especially the differences Eggers had given in his key for separating the two species. Although greatest care had been taken the differences mentioned by Eggers are of no taxonomic value and the synonymy seems to be beyond doubt.

THE TENEBRIONID *Diaclina Fagi* AS A MEDICINE IN THE ORIENT

The medicinal use of *Diaclina fagi* (Panzer), a species commonly found in stored products in the Orient, came to my attention on receiving specimens for identification from the Philippines. I have scanned the entomological literature concerned with entomophagy and found no mention of this beetle. The brochure in Chinese on the therapeutic uses of the beetle that was sent with the specimens provided much of the information that follows. The beetles are evidently used in many parts of China and Korea, and a transliteration of its Chinese name is yong-chun. The beetle is eaten after it has been fed on those Chinese herb medicines ordinarily used as a tonic. Or, to cure a particular disease, the beetle is fed on the medicines that are usually used to cure that disease. It is claimed that the curative powers of the medicines will thus be increased some tenfold. The recommended dosage is 5 to 7 beetles, chewed slowly, followed by a drink of water, just before bedtime; this dosage can be increased to 10 beetles three times a day. They are said to have a peppery taste. However, the patient is warned against taking too many at one time; this could cause irritation of the nasal passages and tongue. Of the 50 or more diseases against which this beetle is said to be effective, I might mention asthma, arthritis, tuberculosis, bed-wetting, and impotence. In addition, the beetle is used in the manufacture of wine, but not as the principal ingredient. It is an additive, making the wine into a tonic.—T. J. SPILMAN, *Entomology Research Division A.R.S., U.S.D.A., Washington, D. C.*

TWO NEW SPECIES OF CLERIDAE FROM WESTERN NORTH AMERICA[1]

By WILLIAM F. BARR[2 3]

The following descriptions are offered at this time in order that the names may be used in two papers being prepared by the writer for future publication.

Cymatodera sobara Barr, NEW SPECIES

Cymatodera puncticollis, Horn, 1876, Trans. American Ent. Soc., 5:222 (in part); Wolcott, 1921, Proc. United States Nat. Mus., 59:271; Barr, 1950, Proc. California Acad. Sci., (4)24(12):492.

Male: Small size, robust, dark brown; mouthparts and ventral surface dark testaceous; elytra with a broad, testaceous fascia at basal third, narrowed and interrupted at lateral and sutural margins. *Head* very finely, sparsely punctured, nearly smooth, moderately but inconspicuously clothed with short, semirecumbent, fine pale hairs and suberect hairs; front somewhat flattened, very feebly bi-impressed; eyes rather large, distance between them one and one-half times the length of last antennal segment; antennae robust, extending to basal third of elytra, not distinctly serrate, segments cylindrical, ratio of lengths of segments one to eleven, 9:5:5:5:7:7:7:7:7:7:12, last segment elongate, blunt at apex; maxillary palpus with last segment robust, sides broadest in front of middle, narrowing toward apex, apical margin rounded. *Prothorax* finely, sparsely punctured, densely but inconspicuously clothed with short, semirecumbent, fine pale hairs, sparsely intermixed with long, erect and suberect stiff hairs; pronotum broader along front margin than hind margin (32:28), broadest at middle, about one and one-half times longer than median width (48:33); sides weakly constricted in front of middle, very strongly constricted behind middle; disc convex, without distinct transverse impressions, abruptly descending to hind margin; antescutellar impression feebly indicated, subbasal tumescences absent. *Scutellum* rounded; disc convex, sparsely punctured; hind margin subtruncate, feebly notched at middle. *Elytra* densely but inconspicuously clothed with very short and short, suberect pale hairs, sparsely intermixed with long, erect stiff hairs; length along suture slightly more than twice the width behind humeri (114:54); postscutellar impression feebly indicated; humeri distinct; sides subparallel; apices broadly rounded, sutural angles narrowly rounded; disc feebly convex, striae extending to near apical fourth, strial punctures nearly round, deep, rather coarse, becoming finer apically, interstrial spaces at middle about as broad as width of strial punctures. *Mesosternum* deeply, moderately punctured; triangular apical half of episternum nearly smooth. *Metasternum* convex with a strongly indicated longitudinal impression in front of hind margin at middle and a small, circular median depression near front margin, finely, sparsely punctured; midline entire; carinae or

[1] Published with the approval of the Director of the Idaho Agricultural Experiment Station as research paper number 468.

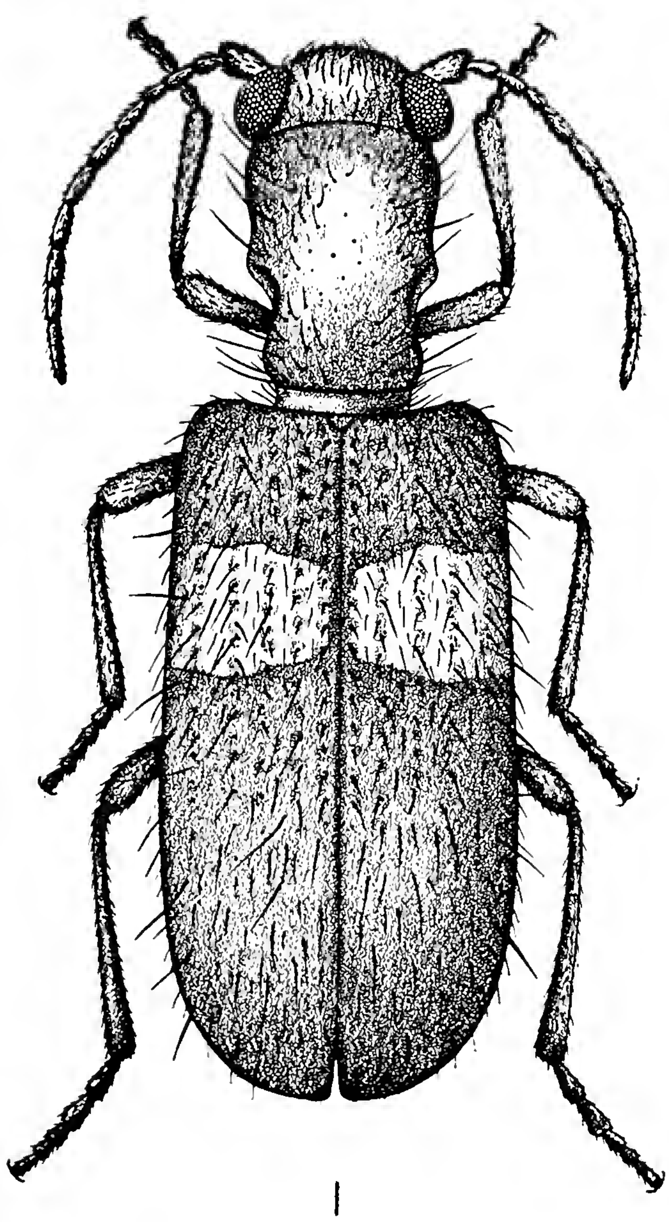
[2] University of Idaho, Moscow, Idaho.

[3] The writer wishes to express his thanks to Marjorie Statham of The American Museum of Natural History for the illustrations appearing in this paper.

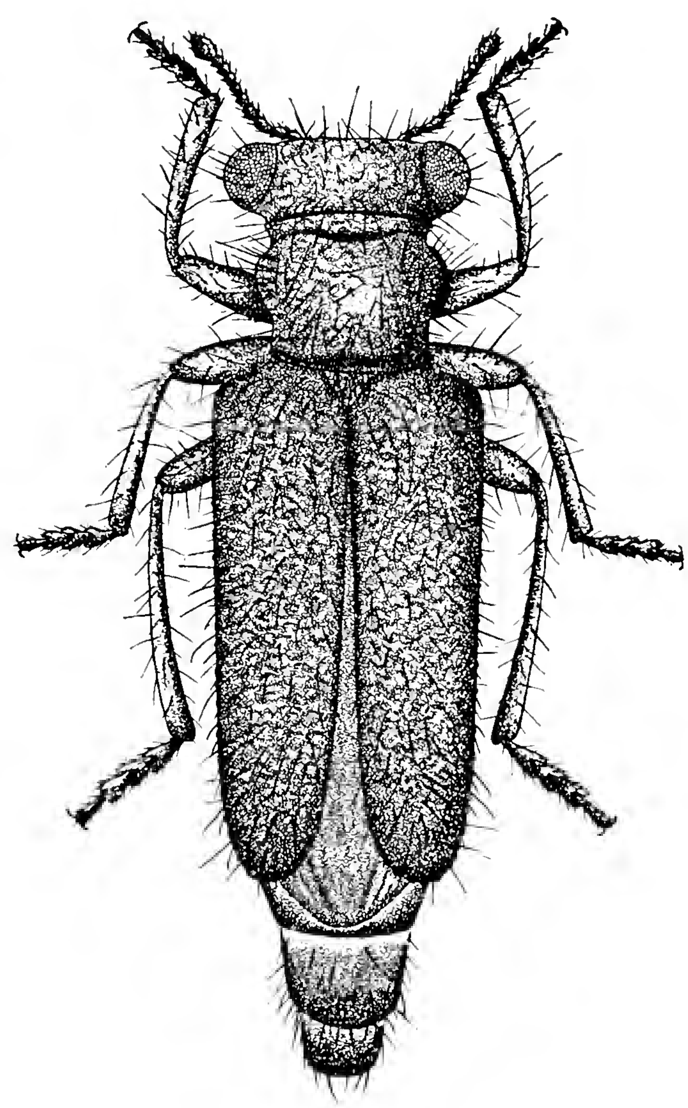
tubercles absent. *Legs* finely punctured, distinctly rugose, densely but inconspicuously clothed with short, semirecumbent pale hairs, sparsely intermixed with longer erect hairs; tarsal claws with a broad, triangular basal tooth, shorter than median tooth which is shorter than acuminate apex of claw, median tooth slender, acuminate at apex. *Abdomen* very finely and sparsely punctured; sternites one to four with hind margins narrowly membranous; fifth sternite with hind margin very feebly emarginate; sixth sternite with lateral margins oblique, feebly arcuate, hind margin more or less truncate; fifth tergite with hind margin truncate, feebly notched at sides; sixth tergite broader (except at extreme base) and considerably longer than sixth sternite, lateral margins oblique, nearly straight hind margin more or less semicircularly rounded, ventral surface with a feebly indicated, arcuate subapical carina. *Length:* 4.3 mm.

Female: Distance between eyes slightly more than one and one-half times the length of last antennal segment. The ratio of lengths of antennal segments one to eleven, 9:5:5:4:6:6:7:7:7:7:13. Abdomen with hind margin of fifth sternite truncate; sixth ternite with lateral and hind margins broadly rounded; fifth tergite with hind margin truncate; sixth tergite as long as sixth sternite, lateral and hind margins more or less broadly rounded, ventral surface without the subapical carina. *Length:* 4.7 mm.

Holotype male, allotype female (California Academy of Sciences) and four male and 19 female paratypes from Palo Verde, Imperial County, California, August 17, 1946 (W. F. Barr and P. D. Hurd), collected at light. Additional paratypes as follows. two males from 15 miles south of Ajo, Arizona, August 11, 1949 (F. Werner and W. Nutting); eight males and 16 females from Ehrenberg, Yuma County, Arizona, June 19, 1946 (W. F. Barr), July 17 and 28, 1938 (F. H. Parker), August 11, 16, 24, and 28, 1938 (F. H. Parker); 23 males and 30 females from Gillespie Dam, Maricopa County, Arizona, August 9, 1948 (F. Werner and W. Nutting); one male and one female from between Gunsight and Covered Wells, Pima County, Arizona, July 12, 1950 (J. P. Figg-Hoblyn); one male from Hope, Yuma County, Arizona, August 12, 1948 (F. Werner and W. Nutting); two males and six females from Laguna Dam, Yuma County, Arizona, August 10, 1948 (F. Werner and W. Nutting); four males and two females from Marinette, Arizona August 2, 1918 (E. Schiffel); six males from San Luis, Yuma County, Arizona, June 15, 1940 (W. F. Barr and K. S. Hagen), August 11, 1940 (E. C. Van Dyke); two females from Yuma, Arizona, August 1924 (Fenyes); one male and four females from Blythe, Riverside County, California, July 10, 1947 (J. W. MacSwain), July 15, 1946 (W. F. Barr and P. D. Hurd), July 22, 1947 (W. F. Barr); one female from Holtville, Imperial County, California, June 23, 1946; two males and one female from Mecca, California, July 12, 1923 (W. Benedict); three males and seven females from foot of mountains, west of Salton Sea Beach, Imperial County, California, July 23, 1952 (H. B. Leech and J. W. Green); one female from Pinon Flat, San Jacinto Mountains, Riverside County, California, May 30, 1939 (E. G. Linsley); one male and one female from Providence Mountains, San Bernardino County, California, September 19, 1936 (L. J. Muchmore and J. A. Comstock); four males and eight females from Ripley, Riverside County, California, July 26, 1946 (W. F. Barr and P. D. Hurd); and one male from Westmorland, Imperial County, California, June 5, 1938 (reared from mesquite). Paratypes in the collections of the American Museum of Natural History, California Academy of Sciences, Carnegie Museum, Chicago Natural History Museum, Cornell University, H. F. Howden, J. N. Knull, Los Angeles County Museum, A. T. McClay, Museum of Comparative Zoology, F. H. Parker, Philadelphia Academy of Sciences, F. T. Scott, United States National Museum, University of Arizona, University of California, University of Idaho, University of Kansas, University of Minnesota and the writer.



1



2

FIGURE 1. *Cymatodera sobara* n.sp., holytype. FIGURE 2. *Phyllobaenus Lautus* n.sp., holotype.

Several hundred specimens, not designated as paratypes, also have been seen from many localities in the southwestern United States and northwestern Mexico. At present the known range of this species extends from Lower California and southeastern California through northwestern Mexico and southern Arizona and New Mexico to western Texas. Details on the complete distribution of this species will be presented in a subsequent paper.

This common species is represented in most collections under a variety of names, including *C. puncticollis* Bland, *C. schwarzi* Wolcott, *C. aegra* Wolcott, *C. turbata* Horn and *C. delicatula* Fall. Although related and bearing superficial resemblance to these species, *sobara* may be easily recognized by its antennal structure, a feature noted by Wolcott in his 1921 paper when he called this species *puncticollis.* All the antennal segments of *sobara* are cylindrical and present a different appearance from the outer segments of the related species which are distinctly serrate. This character will suffice in the recognition of this species.

C. sobara exhibits considerable variation in color and markings, some of which appears to have geographical significance. In the western part of its range the specimens usually are uniformly brown on the upper surface with a pair of paler antemedian spots or a band that is narrowed at the suture and sides of the elytra. However, most Lower California specimens are piceous in color with pale markings as described above. In the vicinity of Tucson, Arizona, specimens have been found that are piceous in color, but with an elytral fascia that is not narrowed or interrupted at the suture. In eastern Arizona and adjoining New Mexico most specimens have the pronotum and elytral apices light brown or reddish in color giving them a decidedly different appearance from the paratypic material from California and western Arizona.

Phyllobaenus lautus Barr, NEW SPECIES

Male: Medium size, slender; head and pronotum deep blue-green, somewhat brassy; elytra blue-black; undersurface black, base of abdomen brownish; mouthparts, labrum and antennae yellowish; legs blackish, trochanters, apices of femora and tibiae, and tarsi brownish. *Head* broader than thorax and slightly narrower than elytra, dorsal surface and front finely, sparsely punctured, moderately clothed with short, subrecumbent pale hairs intermixed with longer, suberect brownish hairs; front with a shallow depression at middle; undersurface finely wrinkled, shining, glabrous. *Pronotum* slightly broader than long (18:15); surface very sparsely punctured, finely rugose, moderately clothed with short and long, suberect brownish hairs; sides strongly arcuate, broadest in front of middle; subbasal transverse impression deep, at sides extending anteriorly beneath lateral expansions; subapical transverse impression broadly U-shaped on disc, paralleling front margin at sides. *Scutellum* triangular, obliquely elevated apically; disc roughened, sparsely punctured, rather densely clothed with short, subrecumbent whitish hairs. *Elytra* conspicuously shorter than abdomen, approximately twice as long as basal width (45:23); sides parallel; apices separately rounded, very feebly tumid, subserrate, strongly dehiscent at suture; surface rather densely, coarsely punctured, moderately clothed with subrecumbent and erect brownish hairs; disc with a slight swelling near the base of each elytron and an elongate sutural depression on basal third. *Abdomen* shining, nearly smooth, very sparsely clothed with fine, suberect pale hairs; tergites four to six visible behind elytra; sixth tergite convex, lateral margins broadly arcuate, hind margin nearly transverse; fifth sternite broadly, shallowly emarginate at middle; lateral processes of sixth sternite extending nearly to apex of sixth tergite, broad at base, gradually narrowing to an acute and inwardly curved apex. *Length:* 4.0 mm.

Female: Sixth abdominal segment narrower than that of male, sixth tergite with hind margin slightly arcuate, sixth sternite nearly as long and as broad as sixth tergite, broadly and deeply depressed at middle, hind margin transverse. *Length:* 4.0 mm.

Holotype male, allotype female (University of Washington) and four male and five female paratypes from Corvallis, Oregon, July 14, 1940 (K. M. and D. M. Fender). Paratypes in the collections of the University of Washington and the writer.

This distinctive species which apparently is quite restricted in distribution is also quite uniform in structure and appearance. Only the legs which may be dark in some specimens and light in others display any notable variation. *P. lautus* appears to be related to *P. subfasciatus* (LeConte) and may be separated from that species by the sparsely pubescent, uniformly punctured elytra which are blue-black in color.

LUCIDOTOPSIS GENUS NOVUM. (COLEOPTERA; LAMPYRIDAE)

By FRANK A. MCDERMOTT[1]

Three species of lampyrids from eastern and southeastern Asia have been described as *Lucidota* or its equivalent. None of these agrees strictly with Castelnau's generic description, although not greatly different from American species considered as *Lucidota*. However, as the Asian species are probably not congeneric with the American species, and as they do appear to be related, I am setting up the new genus *Lucidotopsis* to include them and any similar species found later. All three species appear to be described from males.

Lucidotopsis gen. nov.

Type species: *Lucidota cruenticollis* Fairmaire.

Lampyrids of small to medium size (6 to 13 mm. long), outline narrowly elliptical; pronotum may be narrowed forward, no translucent spots; antennae one-half body length or more, articles 3 to 10 broad, slightly dentate (each may be a flattened cone receiving the base of the succeeding article); elytral costae evident; posterior ventral segments with pointed lateral lobes; luminous organs may be present on the 5th and 6th ventrals, although not mentioned in the descriptions; probably only slightly luminous.

The following species are now included in this genus:

carinicollis Fairmaire, Ann. Soc. Ent. France, (6) IX (LVIII), 1889, p. 38. (**Lucidota**)........Interior China.

costatipennis Pic, Mélang. Exot. Ent., #22, 1917, p. 6. (**Dilychnia**)........Viet Nam.

cruenticollis Fairmaire, Ann. Soc. Ent. France, (6) IX (LVIII), 1889, p. 38 (**Lucidota**)........Interior China; Malaya.

While geographic separation alone is an insufficient basis for generic separation, attention may be directed to the following cases among the Lampyridae in which groups of similar insects in the two hemispheres have been separated generically.

EASTERN HEMISPHERE	WESTERN HEMISPHERE
Lucidina	**Pyractonema**
Pyrocoelia	**Lucernuta**
Lamprohiza	**Phausis**
Nyctophila	**Microphotus**

[1] Wilmington, Delaware.

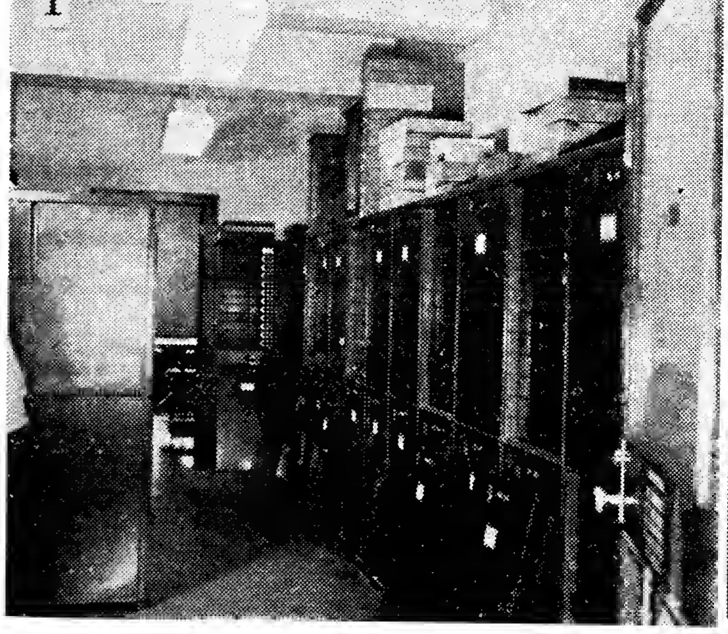
COLEOPTERA IN THE CANADIAN NATIONAL COLLECTION

The Canadian National Collection of Insects is entrusted to the care of the Entomology Research Institute (formerly part of Science Service) of the Department of Agriculture. The Coleoptera occupy one large room (figure 1) and part of the five offices of the curatorial staff of the Coleoptera section (three research officers and two technicians). There are approximately 550,000 specimens of Coleoptera contained in 1,150 U.S.N.M. style drawers and unit trays (figure 2) and housed in steel cabinets. About 50 drawers are now added per year.

The present collection had its beginning in the early 1920's, when the late Norman Criddle of Treesbank, Manitoba, amalgamated the collections of the Department of Agriculture, the Canadian National Museum, W. Hague Harrington, and John D. Evans. The Canadian National Museum, unlike the U. S. National Museum, does not now maintain an insect collection, the housing and building of the collection being entirely under the auspices of the Department of Agriculture. During the past 32 years the collection has been developed systematically by annual collecting surveys (see map), as well as by purchase and exchange, and by contributions from entomologists both professional and amateur. Until 1947 the fauna of northern Canada was poorly represented. The Northern Insect Survey was instituted then, and during the past 12 years 60 surveys were conducted at arctic and subarctic localities. During the same period surveys were conducted in the United States and Mexico.

In general, the collection's coverage decreases from north to south; it is best for arctic Canada and poorest for Mexico, as it contains only 10,000 Mexican beetles. Thus the collection complements other collections of North American beetles. Groups that have received special attention and that are therefore very well represented are the aquatic families, forest Coleoptera, Carabidae, Chrysomelidae, Elateridae, and Scarabaeidae. The collection of Mr. J. B. Wallis, Winnipeg, Manitoba, including types and 40,000

1



2

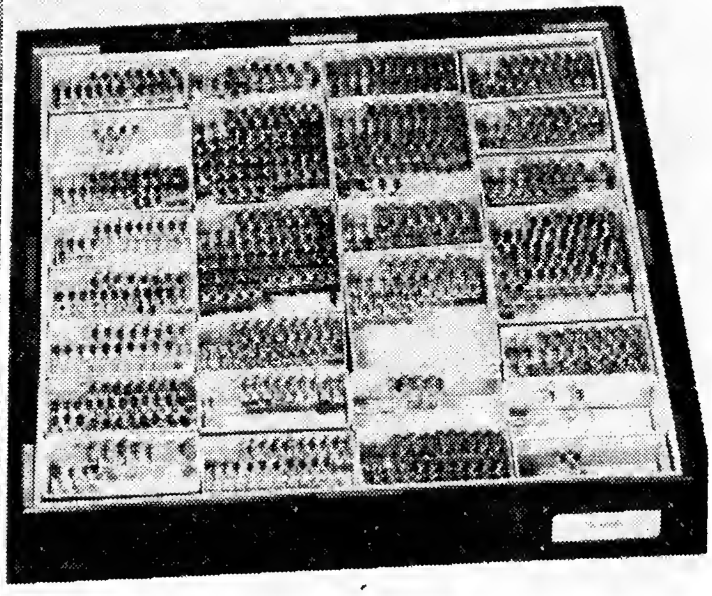


FIGURE 1. Main room of Coleoptera section. FIGURE 2. Drawer of *Calligrapha* showing method of arrangement.

specimens, was recently acquired. In addition to the main North American collection, there is a modest Palaearctic collection.

The collection now stands as the most comprehensive collection of the Coleoptera of the northern two-fifths of the continent. An important feature is that it reveals fairly adequately the distributions of a large number of species that are poorly represented in other collections.

It is noteworthy that many North American beetles have their northern limits somewhere in Canada, instead of ceasing abruptly at the United States—Canada border.—E. C. Becker, W. J. Brown, H. F. Howden, *Entomology Research Institute, Department of Agriculture, Ottawa, Canada.*

Map. North American localities surveyed by staff of the Entomology Research Institute: ●, localities where the party included at least one coleopterist; ○, localities visited by staff other than coleopterists.

LADYBUG, LADYBUG: WHAT'S IN A NAME?

By Lewie C. Roache[1]

Plants or animals closely associated with our everday lives or otherwise brought to the public notice are often designated by a variety of common names. Because of economic value or other common interest certain plants and animals in sundry areas receive local names. Thus through the years and over a range of localities a familiar organism may come to be popularly styled in a number of ways. Coccinellid beetles are variously referred to as "ladybugs", "ladyclocks", "ladycows", and "ladyflies".

To say nothing of the incorrectness of these common names, confusion can easily arise because of the multiplicity of epithets referring to one and the same or to closely related organisms. The system of scientific nomenclature, of course, resolves the confusion over the precise identity of the animal or plant in question. Some attempts, however, have also been made to provide consistency of terminology in common designations. Early editions of Britton and Brown's illustrated flora of Northeastern United States and Canada included under the scientific name of a given plant, extensive lists of the various common names in use throughout the distribution range of that plant. Approaching the problem from another point of view, the Committee on Common Names of the American Association of Economic Entomologists puts out an approved list of common names of insects. Upon the recommendation of this committee the incorrectness of a common designation is likewise indicated by having the misleading substantive combined with its modifying name. Thus the terms "ladybug", "ladybird", "ladycow" written as single continuous words indicate that the coccinellid is neither bug, bird, nor cow. Unfortunately the names do not indicate that it *is* a *beetle*.

An uncommon interest in the many common names of this widely distributed and economically beneficial family Coccinellidae has prompted this note.

In 1606 we find a literary work of Sylvester Du Bartas alluding to these beetles as "ladycows". Drayton in 1630 writes thus of the ladycow:

> "The dainty shell upon her backe
> Of crimson strewed with spots of blacke."

[1] Catholic University of America, Washington 17, D. C. (Permanent address South Carolina State College, Orangeburg, S. C.)

Coccinellids were well known to Leeuwenhoek who referred to them as "cow-ladies" or "lady-birds". The designation "ladybug" or "ladybird" is common today in the United States and in some parts of England.

Other less familiar names used in America and other countries indicate the popular association of this beetle with religious beliefs. *Coccinella septempunctata* was in Scandinavia dedicated to the Virgin Mary and is there to this day called *Nyckelpiga*, "Our Lady's Key-Maid" and in Sweden more particularly *Jung-fru Marias Gullhona*, "The Virgin Mary's Golden Hen".

A like reverence was paid to these beautiful insects in other countries. In Germany they have been called *Frauen or Marien Käfer*, "Lady-beetles of the Virgin Mary", and in France they are known by the names *Vaches de Dieu*, "Cows of the Lord", and *Bêtes de la Vierge*, "Animals of the Virgin". The names we know them by—lady-bird, lady-bug, lady-fly, lady-cow, lady-clock, lady-couch (a Scottish name), etc. have reference also to this same dedication or at least respect.

Perhaps from designation of the beetle as *Our Lady's* insect it was but a short step to use it in reference to ladies of rank as in the case of the Chemin Indians at San Juan Capistrano mission in California where the wives of the first and second chiefs were called by the Juaneño names, *Corrone* and *Tepi*, for the red and yellow ladybugs respectively. Perhaps, too, the vivid coloring and popularity of these beetles led them to be associated with royalty in Scotland where the peasants call them "King", "King Galowa" or "Colowa".

Other appellations and a variety of superstitions and popular beliefs are also evinced in rhymes and incantations solemnly or playfully chanted over this little creature. The association of the ladybird with fine weather probably derived from the faith of the Viennese who often prayed for good weather before the miracle working image of Our Lady at Marybrun. Hence we find the Austrian children throwing the insect into the air and crying:

> Käferl, Käferl, Käferl;
> Flieg nach Mariabrunn
> Und bring uns a schöne Sonne.
>
> Little beetle, beetle,
> Fly to Marybrunn
> And bring us a fine sun.

In England the children further believe that injuring the little beetle will certainly bring rain.

With the Northmen the insect is believed to predict the harvest. If its spots exceed seven, bread-corn will be dear; if they are fewer than seven, there will be an abundant harvest and low prices. In the following rhyme the insect is invoked to bring food:

Marspäert, fly to heaven
Bring me a sack full of biscuits,
For me one, for thee one,
For all the little angels one.

Perhaps the abundance of Coccinellids in June have led young people to associate it with romance. In the north of Europe it is thought lucky when a young girl in the country sees a lady-bird in the spring. She then lets it creep about her hand and says, "She measures me for wedding gloves." And when (induced by the heat of the girl's hand and the ardor of her love) the little beetle lifts its elytra and flies away the girl takes careful note of the direction of flight for from thence her sweetheart shall one day come.

In Norfolk, too, where this insect is called Bishop Barnabee, the young girls have the following rhyme, which they continue to recite to it placed upon the palm of the hand until it takes wing and flies away:

Bishop, Bishop Barnabee,
Tell me when my wedding be;
If it be tomorrow day,
Take your wings and fly away!
Fly to the east, fly to the west,
Fly to him that I love best.

Why the ladybird is called Bishop Barnabee or Burnabee there is great difference of opinion. Some take it to be from St. Barnabas, whose festival falls in the month of June, when this insect first appears; others think it a corruption of the "Bishop-that-burneth" in allusion to the fiery elytra of the beetle.

While using the insect to predict one's fortune in love is common throughout Scotland, England, and northern Europe, it is held in the Netherlands to forebode any form of good luck. In England it is believed to be extremely unlucky to destroy these insects. Persons killing them, it is thought, will infallibly, within the course of the year, break a bone or meet with some dreadful misfortune.

Apropos to the good fortune the insect was supposed to bring was its consideration as a remedy for human ills. It was formerly considered as an efficacious treatment for the colic and measles. Accounts are found where it has often been recommended as a cure for toothache, the remedy being to mash one or two of the beetles and put them in the hollow tooth to relieve the pain immediately. Jaegers reported that he tried this application in two instances with success. It would indeed be interesting if analysis of mashed ladybirds indicated the presence of a pain-killing substance in their bodies.

It is likewise curious to note that a favorite coccinellid chant (somewhat similar in England and America) does not have its basis in popular beliefs, but actually refers to sound biological fact.

Ladybird, ladybird, fly away home,
Your house is on fire, your children will burn!

The meaning of the above familiar though cryptic chant seems to be this. The larva or young of the ladybird feed principally upon the aphids or plant lice of the vines of the hop. Fire is the usual means employed to destroy the aphids on the vines and thus the ladybird's "children" are likewise endangered.

Whether or not the many common names of the coccinellids in general and sometimes specifically *Coccinella septempunctata* are based on fact or fancy; whether or not the appellations are misleading or are biologically apt, it still remains true that the numerous varied epithets given this bright little beetle are a testimony of its continued favor and popularity.

Bibliography

Albin, E. 1720. A Natural History of English Insects. Albin, London. pp. 1-200, 100 illustrs.

American Association of Economic Entomologists, Committee on Nomenclature and Common Names of Insects. 1905. Common names of insects approved for general use. Bur. Ent. Bul. 52:93.

Boscana, Rev. Fr. Friar Geronimo. 1846. Chinigchinich, historical account of the Acagchemen Nation at San Juan, in Alfred Robinson's life in California. p. 331.

Bradley, J. C. 1903. Vernacular names again. Ent. News. 14:26.

Braid, Wm. 1858. Cyclopedia of Natural Sciences. 8 vols. London and Glascow.

Campbell, J. Dykes. 1883. Antidotes against bookworms. Notes and Queries. London. Series 6. 7:505.

Chambers, Robert. 1841. Popular Rhymes of Scotland. Edinburgh. p. 170.

Cowan, F. 1865. Curious Facts in the History of Insects Including Spiders and Scorpions. Lippincott, Philadelphia. pp. 1-396.

Dovaston, John Freeman M. 1825. Poems, Legendary, Incidental, and Humorous. (Third Edition with Additions). W. Morris, Shrewsbury. p. 354.

Duncan, James. 1840. Introduction to Entomology (with memoirs of Swammerdam and de Geer). W. H. Lizars, Edinburgh. 331 p.

Eddy, P. F. 1931. Insects in English poetry. Sci. Mthly. 33:53-77, 148-163.

Essig, E. O. 1931. A History of Entomology. McMillan, New York. 1028 p.

———. 1941. Common names of insects. Pests and Their Control. 9 (7): 7-10, 26-27.

Hyslop, J. A. 1929. Common names and taxonomy. Psyche. 36: 107-111.

Jaeger, B. 1864. The Life of North American Insects. Harper and Brothers, New York. pp. 1-319.

Jaeger, E. C. 1944. A Source-book of Biological Names and Terms. Thomas, Springfield, Ill. 256 p.

JOY, N. H. 1932. A Practical Handbook of British Beetles. Vol. I. H. F. & G. Witerby Holborn, London. p. 326.

KIRBY, W. and W. SPENCE. 1815. An Introduction to Entomology or Elements of the Natural History of Insects. 4 vols. Longmans, London.

KROEBER, A. L. 1925. Handbook of Indians of California. Bull. Bur. American Eth. 78:649.

LITTLE, WM., ET AL. 1933. The Shorter Oxford English Dictionary. 2 vols. Clarendon Press, Oxford.

MELANDER, A. L. 1940. Source Book of Biological Terms. Dept. of Bio. City College, New York. 157 p.

MURRAY, SIR JAMES A. H. and W. A. CRAIGIE. 1926. A New English Dictionary on Historical Principles. 10 vols. Clarendon Press, Oxford.

MUESEBECK, C. F. W. 1946. Common names of insects approved by the American Association of Economic Entomologists. Jour. Econ. Ent. 37 (4): 427-448.

NEWELL, ROBERT H. 1845. Zoology of the English Poets. London.

ORMONDE, F. 1895. Names—scientific vs. common. Ent. News. 6: 212-213.

PATTERSON, R. 1841. Natural History of the Insects Mentioned in Shakespeare's Plays. Newman, London. 270 p.

SAILER, REECE O. 1955. Common names approved by the Entomological Society of America. Bul. Ent. Soc. America. 1 (4): 1-34.

THROPE, BENJ. 1851. Northern Mythology 8 vols. London.

WEISS, HARRY BISCHOFF. 1936. The Pioneer Century of American Entomology. (mimeographed) New Brunswick, New Jersey. 320 p.

WHITNEY, WM. D. 1889. The Century Dictionary and Cyclopedia. 12 vols. Century, New York.

DESCRIPTION OF A NEW SPECIES OF MILODERES CASEY WITH NOTES ON SOME BROAD-NOSED WEEVILS (CURCULIONIDAE).

By D. G. KISSINGER[1]

Miloderes nelsoni, NEW SPECIES

(figures 1-3)

Length: 5.00 to 7.50 mm.; Width: 3.25 to 4.50 mm.

Densely, uniformly clothed with metallic pale green scales. On sides of elytra and prothorax with long, projecting, silky, hairlike setae, each seta about two-thirds as long as length of prothorax, on disc of elytra setae much shorter except at declivity, suberect. Rostrum continuous with frons, in front view tapered from base to apex, apex distinctly narrower than frons, wider at base than long; vaguely impressed dorsally at level of insertion of antennae; epistoma not distinctly separated from rostrum, its apex truncate or broadly emarginate; pregular region at apex regularly emarginate, postmentum not visible as a peduncle in ventral view, prementum roughly rectangular, wider than long, with six setae; mandibles multisetose; scrobes well defined dorsally and ventrally, bent downward somewhat posteriorly but scape rests on bottom of eye because dorsal margin overhangs scrobe in front of eye and there is apparent as a projection. Antenna with scape reaching to about middle of eye, slender, straight, somewhat clavate at apex;

[1] Oakwood College, Huntsville, Alabama.

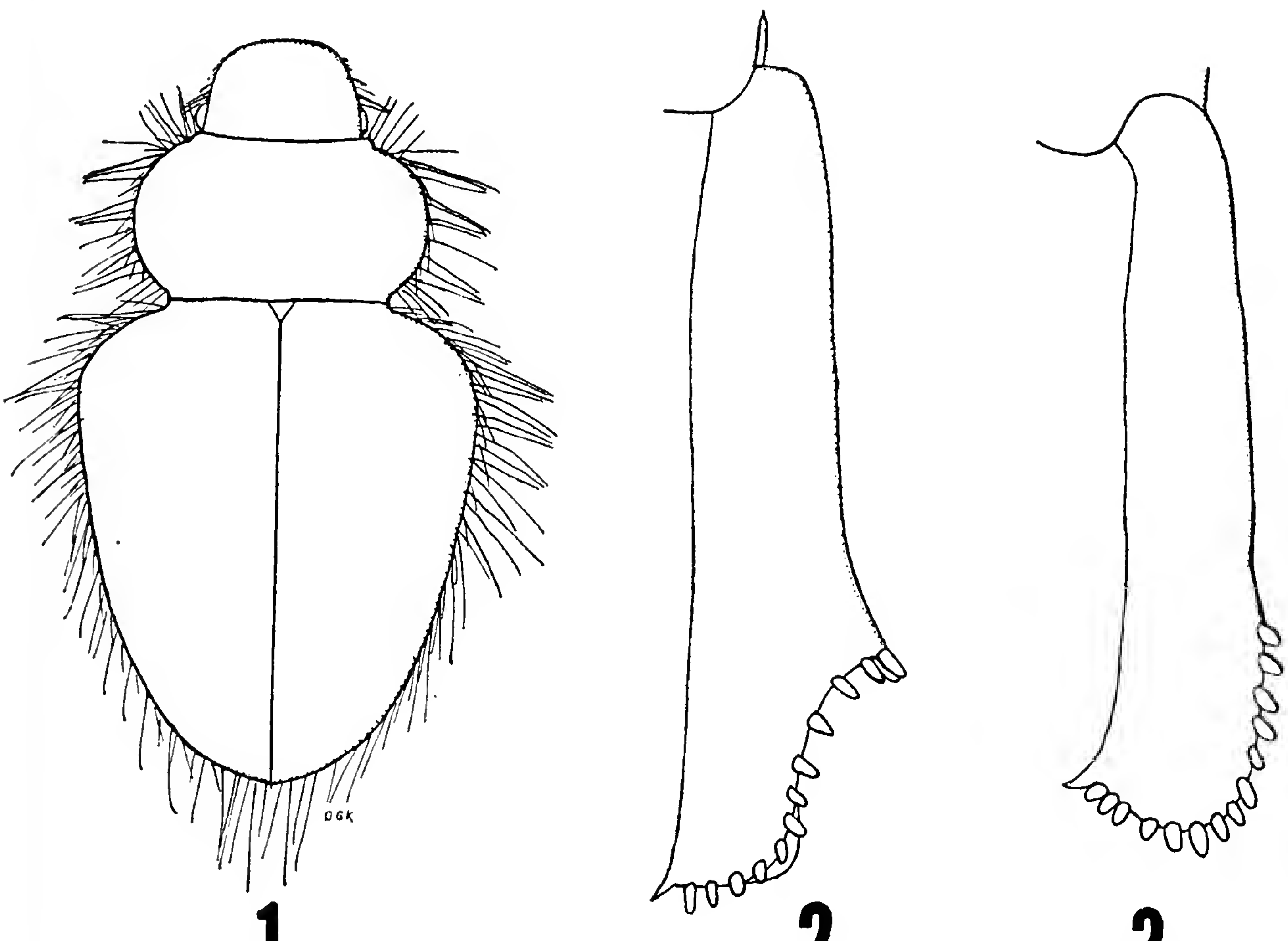
scape and funicular segments 1-6 clothed with broad scales; segment 7 clothed with hairlike setae and slightly asymmetrical, wider on dorsal side, rather closely applied to club, segment 7 wider than long. Eye wider in transverse diameter than long. Prothorax nearly twice as wide as long, base about two-thirds as wide as middle; sides very strongly, evenly rounded from slight constriction at base to vaguely constricted apex, widest at middle; transversely strongly convex, flattened along median longitudinal area; laterally sides of dorsal region overhang the pleural region; with weakly developed postocular lobes and well developed vibrissae; coxae about equidistant from front and hind margins; hind margin truncate, front margin broadly emarginate dorsally and ventrally; metepisternal suture not visible. Functional wings lacking. Elytra not striate, measured from apex of scutellum three times (or slightly more) as long as prothorax, one-third to two-fifths wider than prothorax; roughly triangular in outline, widest at basal fifth and sides converging to broadly rounded apex; scutellum small, glabrous, shining. Abdomen with intercoxal process truncate, very broad, wider than width of middle coxae combined; measured along mid line ventrite 1 as long as 2 and 3 combined, ventrite 2 longer than 3 and 4 combined, ventrite 5 equals 3 and 4 combined; suture between ventrites 1 and 2 shallow, obscured medially, broadly arcuate, other sutures deep, straight. Tibia 3 with corbel open, apex with a single row of very coarse, short spines, row strongly ascending posteriorly. Tarsal segments clothed with broad scales, segments 1 and 2 beneath with coarse, erect spines; male with segment 3 of tarsi 1 and 2 much wider than female, small fringe of pubescence at apex of segment in both sexes. Female genitalia similar to that of *Miloderes setosus* Csy. illustrated by Ting, 1940.

Described from 25 males and 21 females labeled Eureka Valley, Inyo Co., California, June 10, 1955, J. Ross Family, on *Coldenia plicata* (determination of plant by Dr. Roos). Holotype (male) and allotype in the California Academy of Sciences. Paratypes in same collection, U. S. National Museum, British Museum (N. H.), G. H. Nelson collection and the author's collection.

I am pleased to name this striking species in honor of Dr. Gayle H. Nelson, who inspired me to study beetles during my undergraduate study.

M. nelsoni is quite similar to *M. viridis* Pierce in its green coloration. The latter species has the outer angles of the front tibiae produced into a rather broad, flat, acutely triangular lobe and the outer margin of the tibia is produced into a thin flattened lamina in the apical half; *nelsoni* has the front tibia slightly wider toward the apex and produced into a rather flat, fairly broad truncate paddle but the outer angle is obtuse and the outer margin of the tibia is rounded; the elytra of *viridis* are more parallel and are widest near the middle, the declivity of *viridis* as seen from the side is evenly rounded and straight toward the apex, while in *nelsoni* the declivity is convex above and overhangs the apex somewhat, its outline is concave just before the apex; *viridis* has the setae on the elytra nearly equal in length on the sides and disc, *viridis* does not have such a pronounced fringe of long matted silky hair along the sides of the prothorax and elytra; the sides of the dorsal area of the prothorax of *viridis* do not overhang the pleural region as in *nelsoni*.

M. viridis and *M. nelsoni* both differ radically from the type of the genus (by monotypy), *M. setosus* Casey, in that tibia 3 has the corbel spines strongly ascending posteriorly while *setosus* has the spines confined to the truncate apex of the tibia; also the first two species have multisetose mandibles while *setosus* apparently has trisetose mandibles. *M. nelsoni* further differs radically from both *viridis* and *setosus* in that its prementum has six setae instead of two, as is characteristic of the latter two species.



1 2 3

FIGURES 1-3. *Miloderes nelsoni* sp. n. FIG. 1—Entire dorsal view. FIG. 2—Hind tibia. FIG. 3—Front tibia.

A prementum with six setae is apparently unique among members of the "*Cimbocera* group." Ting (1940), who first recognized the group and revised it, recorded only nonsetose, bisetose, or quadrisetose prementa in the group.

Eucilinus Buchanan and **Thysanocorhinus** Van Dyke

In the course of trying to place *M. nelsoni* in the correct genus most of the U. S. broad-nosed genera were studied. Apparently no one has noticed the great similarity of *Eucilinus* Buchanan and *Thysanocorhinus* Van Dyke. *Eucilinus* is unique among U. S. broad-nosed weevils in that each tarsus bears a single claw; *Thysanocorhinus* has two equal, connate claws. The major difference between the taxa is that the apex of tibia 3 of *Eucilinus* is truncate and its row of coarse spines is in nearly a horizontal, straight line. *Thysanocorhinus* has the apex of the tibia truncate for a short distance, then the row of spines strongly ascends in a slight arc posteriorly. The differences described do not seem to me to be of true generic value (they may hold as subgenera however), therefore, *Eucilinus* Buchanan, 1926 (= *Thysanocorhinus* Van Dyke, 1938), new synonymy.

Eucilinus is remarkably similar to *M. nelsoni* as both of its species have long silky hair-like scales along the sides of the prothorax and elytra; they also have the antennae and dorsal surface of tarsal segments clothed with broad, overlapping scales, and the tarsi beneath with erect, spinelike setae; the rostrum is continuous with the frons and is shorter than wide at base.

Eucilinus differs with its lack of postocular lobes and vibrissae, which are generally held to be characters of subfamily magnitude; the claws are either connate or single and not free as *Miloderes*; and the scrobes are open posteriorly so that the scape rests on the eye, but in *Eucilinus* the scape is arcuate so that it fits around the eye while in *Miloderes* the scape is straight.

I am indebted to Dr. Nelson for permission to describe this species, and to Miss Rose Ella Warner, of the U. S. National Museum, for loan of representatives of *Miloderes* and other favors.

Literature Cited

Ting, P. C. 1940. Revisional notes concerned with *Cimbocera* and related genera. Bull. So. California Acad. Sci. 39 (2): 128-157.

THE GENUS STEREODERMUS NEW TO AMERICA NORTH OF MEXICO WITH A REVISED KEY TO THE GENERA OF BRENTIDAE

By Rose Ella Warner[1]

Stereodermus, Lacordaire, Gen. Col. VII p. 419 (1866).

This genus of small Brentidae consists at present of twenty five-species distributed in Mexico, Nicaragua, Guatemala, Costa Rica, Panama, South America, Cuba, Puerto Rico, Philippines, Sumatra and the islands Engano Mentawai and Batu off the coast of Sumatra. The specimen here reported from the United States was collected in Key West, Florida June 16, 1958 by W. W. Warner. From description the species is quite similar to *Stereodermus exilis* Suffrain from Cuba.

The following key (revised from Bradley, A Manual of the Genera of Beetles of America North of Mexico, 1930, p. 261) includes the five genera of Brentidae now present in America. The genus *Vasseletia* Sharp from Lower California is not included.

1. Head longer than broad, oval, lateral margins prolonged and convergent behind the eyes, beak of female shorter than that of male................**Brentus** Fabricius 1787

   Head short, transverse, or quadrate, lateral margins hardly prolonged and not convergent behind the eyes; beak of female equal in length or longer than that of male.. 2

2. (1) At least front femora dentate.. 3

   All femora unarmed; antennal segments two to eight equal in width, last three forming feeble club........................**Paratrachelizus** Kleine, 1921

3. (2) Anterior tibiae more or less incised; hind coxae more than usually distant from one another; third elytral interval incurved toward suture; vestiture distinct; size small (5½-8 mm); sexes extremely similar. (The sexes cannot be satisfactorily distinguished)........................**Stereodermus** Lacordaire 1866

   Anterior tibiae not incised; glabrous, size larger, sexes extremely dissimilar............ 4

4. (3) Antennal segments two to eleven equal in width, or the outer slightly narrower; head simple, without projecting hind angles, not strongly constricted behind; beak very dissimilar in the two sexes, shorter and broader in male, narrow and cylindrical in female..................**Arrhenodes** Schoenherr 1826

   Outer joints of antennae broader, segments two to eleven gradually increasing in length and width; head strongly constricted behind with angular projections behind each eye; beak dissimilar in the two sexes, dilated at the apex in male, long and narrow before antennal insertion in female....**Heterobrenthus** Sharp 1895

[1] Entomology Research Division, A.R.S., U.S.D.A., Washington, D. C.

A NEW SPECIES OF POLYCESTA (BUPRESTIDAE)

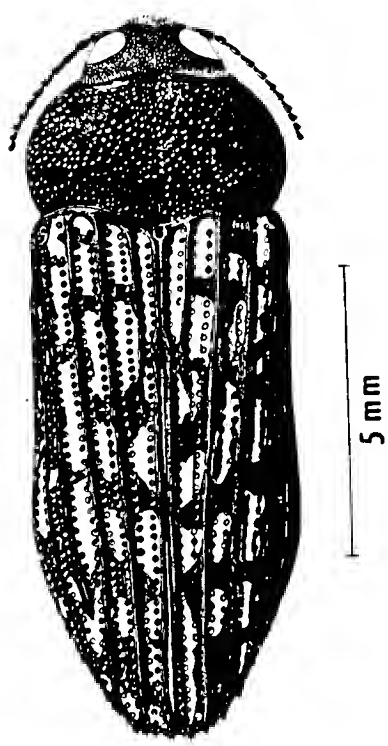
By G. H. NELSON[1]

While cutting into dead limbs of *Quercus dumosa* Nuttall near Pinyon Flats in Riverside County, California during the summer of 1959 the following striking new species of *Polycesta* was discovered.

Polycesta flavomaculata, NEW SPECIES

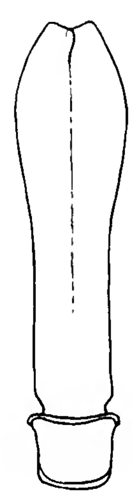
(figs. 1-3).

Medium sized, moderately slender but with lateral margins of elytra tapering abruptly toward apices; feebly shining, head and under surface bronzy black, pronotum and elytra black with slight bluish tinge, elytra



1

2



3

FIGURES 1-3. *Polycesta flavomaculata*, n. sp., dorsal views. FIG. 1. Adult male. FIG. 2. Male genitalia, median lobe. FIG. 3. Male genitalia, lateral lobes.

with profuse yellow maculations; scutellar costae distinct; third and fourth tarsal segments with membranous lobes beneath.

MALE: Head with front moderately concave, densely punctured with rather coarse punctures on front and moderately clothed with fine erect and suberect silvery hairs, punctures smaller behind eyes and on occiput, the latter sparsely punctured medially with a hairline median sulcus extending from base forward to between upper extent of eyes; clypeus with front margin shallowly arcuately emarginate, front angles obtusely rounded; antennae extremely long and slender, reaching to behind front coxal cavities.

Pronotal width to length of ratio of 1.6 to 1; front narrower than base; lateral margins broadly rounded, widest behind middle; anterior margin feebly lobed at middle; posterior

[1] Department of Anatomy, College of Medical Evangelists, Loma Linda, California.

margin bisinuate; surface moderately punctured on disk, punctures larger and more dense laterally; disk with a feeble median depression extending from base to near anterior margin, a smooth median sulcus at basal fourth; surface of disk between punctures opaque, more shining anteriorly and laterally.

Scutellum elongate, oval, convex, surface nearly smooth, shining.

Elytra very slightly wider than pronotum and slightly less than four times longer; humeri moderately developed, humeral angles obtuse; side margins slightly expanded behind base, then feebly sinuate to widest place at beginning of apical third and arcuately tapering to apices; apical fourth of lateral margin irregularly spinose; sutural costae distinct, divergent just before junction of basal and middle thirds, then parallel to apical fourth where they are slightly divergent and then convergent at apices; elytra expanded medially from sutural costae to overlap each other throughout most of length; scutellar costae distinct, extending to middle third of elytra; interstrial spaces two and four costate and entire; interstrial spaces six and eight costate, both obliterated basally in humeral prominence, sixth terminated at apical fourth, eighth extended to apex; interstrial spaces with small sparce punctures; each stria with a single row of close set, large, shallow punctures; surface of elytra with a few fine, short, silvery hairs laterally and at apex.

Under surface densely, rather finely, shallowly punctured, punctures less dense medially on metasternum and abdomen, moderately clothed with short, suberect silvery hairs; anterior margin of prosternum arcuate anteriorly at sides, arcuate posteriorly at middle; disk of first abdominal sternite swollen, hind margin broadly lobed at middle; hind margin of second abdominal sternite feebly sinuate, of third feebly arcuate anteriorly, of fourth straight; hind margins of second, third and fourth abdominal sternites slightly prolonged at sides; last abdominal sternite broadly triangular, hind margin arcuate, slightly prolonged toward tip and concavely truncate at tip; third tarsal joint with a moderately developed membranous lobe beneath, fourth joint inconspicuous except for broad membranous lobe beneath.

The male genitalia (figs. 2, 3) are distinctive. Median lobe with lateral plate-like structures greatly reduced. Lateral lobes with obliquely truncated apices.

Length: 12.3 mm.; Width: 4.2 mm.

FEMALE: Differs from male in being larger, yellow maculations relatively reduced in size, disk of first abdominal sternite flattened at middle; hind margin of first abdominal sternite arcuate forward at middle; hind margin of second abdominal sternite feebly so; hind margin of last abdominal sternite not prolonged at apex and very faintly arcuately truncate.

Length: 18.5 mm. Width: 6.6 mm.

Type material: Holotype, male (California Academy of Sciences, Entomology, San Francisco), allotype, female (writer's collection), sixteen male and nineteen female paratypes from 2.5 miles north of Pinyon Flats Public Camp, Highway 74, San Jacinto Mountains, Riverside County, California, June 30 to July 20, 1959, collected by George Walters and the writer. The holotype was collected on July 2 and the allotype on July 6. Paratypes in the following collections: California Academy of Sciences, W. F. Barr, George Walters, R. L. Schultz and the writer.

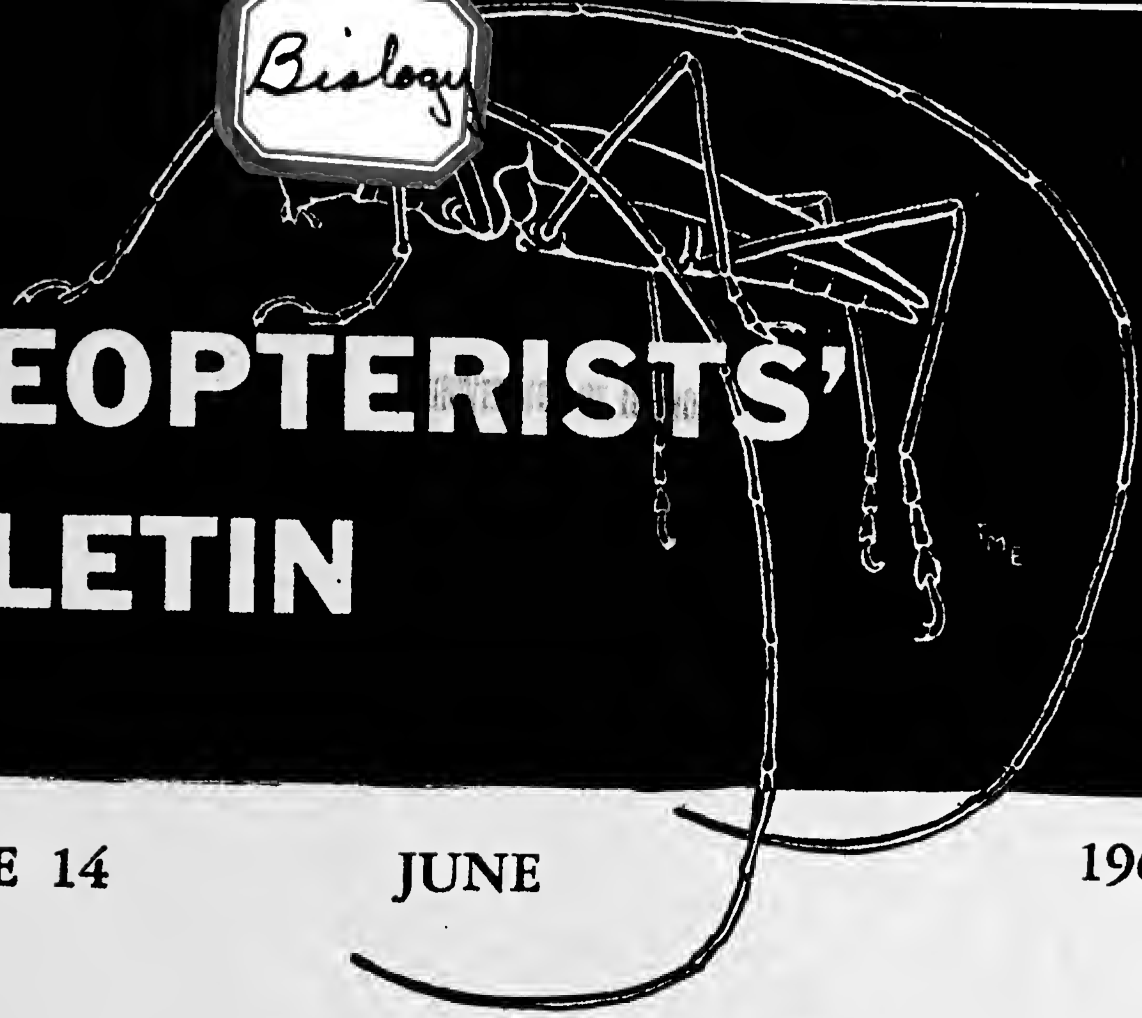
Host: The entire series was either cut or reared from partly dead trees of *Quercus dumosa* Nuttall.

Because of its distinctive yellow maculations *Polycesta flavomaculata* is easily separated from other species of *Polycesta*. An examination of morphological characteristics reveals that *P. flavomaculata* does not readily fit into any of the three groups of *Polycesta* as proposed by Barr '49, but exhibits characteristics of both the *arizonica* and *elata* groups. Characteristics which *P. flavomaculata* has in common with the *arizonica* group are: pronotal sculpturing, scutellar costae and lobed third and fourth tarsal segments. Those it has in common with the *elata* group are: elytral shape and swollen first abdominal sternite of the male. The males range from 9.8 to 13.5 mm. in length and from 3.5 to 4.8 mm. in width; the females from 14.3 to 20.3 mm. in length and from 5.3 to 7.4 mm. in width.

Literature Cited

Barr, W. F. 1949. A revision of the species of the genus *Polycesta* occurring in the United States. American Mus. Nov. No. 1432: 1-42.

THE COLEOPTERISTS' BULLETIN



VOLUME 14 JUNE 1960

TABLE OF CONTENTS

ARNETT, R. H., Jr. Contribution towards a monograph of the Oedemeridae 13. The "fragilis" complex of the genus Oxacis.......... 33

BALL, G. E. A review of the taxonomy of the genus Euryderus Le Conte, 1848. With notes on the North American Dapti (of authors). (Carabidae: Harpalini)........ 44

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: 3 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid. **Missing numbers:** Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten on 8½ x 11 sheets with at least 1 inch margins, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance after review by the Editorial Board. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five tear sheets of notes will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the **Bulletin** will be considered. Articles with illustrations are particularly desired, and *in all cases, descriptions of new species must be illustrated.* Descriptions of new species or genera MUST contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume 14 June (No. 2) 1960

CONTRIBUTION TOWARDS A MONOGRAPH OF THE OEDEMERIDAE 13. THE "FRAGILIS" COMPLEX OF THE GENUS OXACIS[1]

By Ross H. Arnett, Jr.[2, 3]

There is little doubt that the genus *Oxacis* LeConte, as now restricted (Arnett, 1958), is a very difficult genus to understand. The species are close and variable. In advance of the publication of a revision of the species of this genus occurring in the North and Central American parts of its range, the following descriptions are published so that names will be available for other studies pending the publication of the revision.

There is included here a key to the species of the part of the genus involved in this study. This key is based on characters that, because of the variation of many of the species, must be used with great caution. Every attempt has been made to use reliable characteristics, but color characteristics are all that are available as usable key characters. Fine details of shape and proportions help to define the species, but such features cannot be used in a key. A key to all of the members of the genus will appear in the generic revision. The group of species here considered may be called the "fragilis" complex. The species of the genus *Oxacis* offer a good example of the taxonomic problems involved in closely related species as described by Brown (1959).

[1] The previous part of this series, no. 12, was published in 1957, Coleopt. Bull., 11: 1–8.

[2] Department of Biology, The Catholic University of America, Washington 17, D. C.; Entomological Series, paper no. 5.

[3] This research has been supported by grant no. 8627 from the National Science Foundation. This help is herewith gratefully acknowledged. The loan of material has been acknowledged in previous parts of this series. I would like to thank Dr. John C. Townsend, Department of Psychology, Catholic University, for his helpful suggestions in the treatment of the statistical data used in this study. Miss Eileen R. Van Tassell prepared fig. 1 used in this paper. Her help is gratefully acknowledged.

METHODS.—Included with these descriptions is a discussion of the intraspecific variation of the species. This is an attempt to overcome the limitations of the holotype method of description, and at the same time recognize the need for a means of tying nomenclature objectively to the species as we known them, and to bring into "alpha" taxonomy some aspects of "gamma" taxonomy not always considered. In this way it is possible to place the holotype in the population series. It will be seen that further variation studies can be added easily as additional material becomes available if the type series of the species are characterized sufficiently. It also permits an easier, more convenient means of recording population data which will be of later use, and eventually will lead to a full characterization of the species.

In order to conserve space, detailed locality data which includes collectors names, and location of material, are not included in these summaries. However, these data are recorded in the files of the author. Processed copies of the data on all collections studied are deposited with each collection and are available in this way to all future students of the group. Specimens lacking adequate locality data are not considered in these studies. This includes most old specimens with nothing more than state or county labels. It is necessary, of course, to use such material for purely morphological studies, but with the amount of good material now available, it is believed that further consideration of poor material, in general, is a great waste of time.

Measurements in this paper (fig. 2) are taken as follows: total length (T.L.) is computed by summation of the length of the head (H.L.) from the apex of the labrum to the posterior margin of the eyes, the pronotum (P.L.), and the elytra (E.L.). Width is taken at the widest part of the body, which in the case of this group is the sum of the width of the basal portion of each elytron (E.W. $\times$ 2) at its widest point. Pronotum length is measured from the anterior to posterior along the midline; width (P.W.) is measured at its widest point. Mandible length (M.L.) is computed by measuring the distance from its base to the apex of the left mandible in dorsal (anterior) view as the longest distance (curvature is not considered because of the difficulty of taking such measurements routinely). Elytra length is measured as the distance from the base of the elytra at the posterior lateral angle of the scutellum to the apical most portion of the elytra. Elytra width is computed as the sum of the width of the basal portion of each elytron at its widest point (which is also the width of the body in this case).

KEY TO THE SPECIES OF OXACIS LE CONTE OF NORTH AND CENTRAL AMERICA. I. THE "FRAGILIS" COMPLEX

1. Pubescence of elytra of two distinct colors and texture.. 2

 Pubescence of uniform, or nearly uniform color throughout................................. 3

2(1). Coarse brown, erect hairs scattered throughout white, more recumbent hairs on elytra in proportions varying from nearly equal parts of each to a very few erect brown hairs located mainly toward apex and sutural areas of elytra (fig. 1)..**bitomentosa**, n. sp.

 Brown hairs in patches on elytra otherwise covered with white hairs, giving surface a variegated appearance..**variegata** Champion

3(1). Color pale to tan or yellow, or if brownish, body wide and pubescence coarse; elytra with or without black stripes; antennal segments may be short and fusiform.. 4

 Color fuscus, orange-red and piceus, entirely dark, or if pale, body not immaculate, usually narrow; antennal segments elongate and parallel sided.............
Not "fragilis" complex

4(3). Antennae with segments fusiform, short and broad in shape (fig. 3); body usually very pale in color, immaculate...**megathoracica**, n. sp.

 Antennae with segments elongate, parallel sided; body pale to tan or yellow, with or without distinct black markings.. 5

5(4). Body pale to tan or light brown, immaculate... 8

 Body yellowish, always with blackish to dark brownish markings......................... 6

6(5), Elytra without black or dark brown stripes; body entirely reddish-yellow except for apex of femora and remainder of legs and antennae black...........................
constricticollis Champion

 Elytra with a distinct narrow black or dark brown stripe on each elytron............. 7

7(6). Black stripe on each elytron entire...**bilineata** Champion

 Black stripe on each elytron absent at basal half except for small black spot at base...**pictipennis** Champion

8(5). Color pale; pubescence fine, surface somewhat shiny...............................**fragilis** Horn

 Color tan to light brown; pubescence coarse, surface dull....................**xerensis**, n. sp.

Oxacis bitomentosa, new species

The tan color, coarse, depressed white hairs and more or less evenly distributed suberect, stout brownish hairs readily separate this species from all other members of the genus. It has somewhat the appearance of *O. variegata* Champion from Central America, and is very close in appearance to *O. xerensis*, n. sp., but differs from both species by the presence of and distribution of the brown hairs.

Holotype.—NEVADA, Clark Co., Colorado River Canyon, R. E. Blackwelder, April 22, 1930 (deposited in the United States National Museum collection, type no. 65085).

Description of the holotype.—Male. Length: 10 mm.; width: 2.4 mm.

Head: length/width ratio, .840; surface finely, shallowly punctate, space between punctures microrugose. Antennae 7.5 mm. in length; second segment one-half length of the third; segments five to eleven four times as long as broad, parallel sided, segments one to four broader apically than basally, each segment with several erect setae in addition to recumbent clothing setae. Eyes elongate oval, slightly emarginate anteriorly; eyes in dorsal view set farther apart than their width in this view. Mandibles: head length/mandible length ratio 1.500; curved, slender, apices acute, apices not deflexed. Maxillary palpi with the apical segment elongate, the sides nearly parallel.

Pronotum: length/width ratio, 1.140; sides sharply constricted at the middle, anterior half rounded, posterior half with sides nearly parallel; punctures nearly the same as those of the head. Legs normal, slender, tibial spurs prominent; claws entire. Elytra length/width ratio: 2.833; surface shallowly punctate.

Abdomen shiny, surface subrugose; apex of fifth visible sternite slightly emarginate.

Pubescence of two types, the dominant body setae are recumbent, long, coarse, white; irregularly interspersed and suberect, brownish to blackish, stouter setae comprising about thirty percent of vestiture of the basal portion of the elytra (fig. 1).

Color: tan with chestnut stains on vertex, sides of pronotum and visible abdominal sternites three to five; apices of mandibles piceus.

Male genitalia: normal for the genus; no specific characters apparent.

Allotype.—Same data as holotype. Female. Length: 12.4 mm.; width 3 mm. The allotype resembles the holotype in all respects except that the apex of the fifth visible sternite is somewhat less emarginate. The various ratios are as follows: Head length/width ratio: .830; head length/mandible length ratio: 1.294; pronotum length/width ratio: 1.126; elytra length/width ratio: 2.800.

Paratypes.—33; 8 males, 25 females. Paratypes are designated from the following localities: *United States:* NEVADA, Clark Co., Colorado River Canyon, 1 male (type locality); CALIFORNIA, Inyo Co., Death Valley, 3 females; San Bernardino Co., Baker, 1 female; Riverside Co., Twenty-nine Palms, 2 males, 3 females; San Diego Co., Borrego Valley, 1 female; Imperial Co., Potholes, 1 female; ARIZONA, Yuma Co., Yuma, 4 females; Wellton, 1 female; *Mexico:* BAJA CALIFORNIA, San Felipe, 2 females, 1 male; Bahia de los Angeles (also labelled Angeles Bay), 4 females; Isla San Francisco, 1 female; La Paz, 1 female; SONORA, 5 mi. w. Guaymas, 1 male; SINALOA, Los Mochis, 3 males, 2 females.

Larvae: Unknown.

Biology.—Adults have been collected as early as April 9th and as late as June 7th. The majority of specimens were collected during late April and early May. This seasonal appearance holds true throughout the range of the species. These dates roughly correspond with the end of the spring rains throughout the distribution of this species. This may indicate that the appearance of the adults corresponds to the flowering of certain plants, but no data are available which will link this species with any wild plants. However, the specimens recorded from Los Mochis were intercepted at Nogales, Arizona in a shipment of tomatoes.

Distribution.—(Map 1). This species is strictly confined to the western limits of the Sonoran Desert, in the Colorado and Gulf Coast subdivision, with the exception of the specimens collected in Death Valley.

Variation.—None of the population samples are large enough to make extensive statistical analyses. The total length of the males studied is obviously considerably less than the length of the females. Likewise the male pronotum length/width ratio is higher than that of the female. Unfortunately only three populations studied contained males. Of these, two show striking sexual dimorphism of total length, but the Los Mochis population contains males that are almost the same length as the females. In general, the specimens are darker in the southern part of the range, but this is not true in all cases. Other variations are not considered significant on the basis of these small numbers.

This species closely resembles many of the variants of *O. xerensis*, but the two types of clothing setae will separate them as mentioned above.

Oxacis megathoracica, new species

The pale color, fusiform antennal segments, and the broad pronotum will serve as recognition characters for this species.

Holotype.—ARIZONA, Yuma Co., Ehrenberg, June 19, 1946 (W. F. Barr).

Description of the holotype.—Male. Length: 9.4 mm.; width: 2.2 mm.

Head: length/width ratio, .851; surface very shallowly punctate, space between punctures microrugose. Antennae 5.5 mm. in length; second segment one-half the length of the third; segments three to ten three times as long as wide, segment eleven one and one-half times as long at the tenth; each segment fusiform (fig. 3). Eyes reniform, in dorsal view set farther apart than the width in this view. Mandibles: head length/mandible length ratio, 1.538; strongly curved, apices slender, not deflexed. Maxillary palpi with the apical segment elongate, sides nearly parallel, slightly broader near base.

Pronotum: length/width ratio, 1.039; broadly rounded anteriorly, constricted behind, gradually narrowing to the base; surface somewhat more deeply punctate than the head, area between punctures nearly smooth. Legs normal for the genus, slender, tibial spurs prominent, claws simple. Elytra: length/width ratio, 2.863; surface shallowly rugose-punctate.

Abdomen dull, surface rugose; apex of the fifth visible sternite broadly truncate; fifth tergite scoop-shaped forming a hood over the genitalia.

Pubescence moderate, white, recumbent, denser near the apices of the elytra and along the sides.

Color: pale tan, immaculate.

Male genitalia: normal for the genus; no specific characteristics apparent.

ALLOTYPE.—Same data as holotype. Female. Length: 10.2 mm.; width 2.4 mm. The color of the body of the female is somewhat darker than that of the male. The apical segment of the maxillary palpus is decidedly triangular, widest near the middle. The surface of the head and thorax between the punctures is more definitely microrugose.

PARATYPES.—7; 6 males, 1 female. Paratypes are designated from the following localities: *United States:* ARIZONA, Prescott, 1 male; CALIFORNIA, Brawley, 3 males; Imperial Co., 1 male; San Diego Co., 1 female; *Mexico:* BAJA CALIFORNIA, Bahia de los Angeles, 1 male.

Larvae: Unknown.

BIOLOGY.—Adults have been taken from May 9th to July 14th.

DISTRIBUTION.—(Map 1). This species may be confined to the Sonoran Desert region, but none of the locality data is precise enough to indicate what life zones this species occupies. Anyone of the above localities could indicate mountain top distribution as well.

VARIATION.—The short series upon which this species is based indicates only tremendous size variation. The smallest specimen measures a mere 4.1 mm. in length; the largest 11.3 mm. Both of these specimens are males, and the size of their genital apparatus is approximately the same, which leaves the small specimen with genitalia way out of proportion to the rest of its body. This is to be expected when size variation is due to larval nutritional differences but certain structures are under genetic control. Otherwise the small specimen would be an abnormal mutant or a representative of at least a different and isolated population. This constant size regulation is not restricted to the genitalia. The setae on the small specimen are actually nearly the same size as those of the large specimen, not proportionately smaller as might be expected.

This species resembles *O. fragilis* in general appearance and color. It may be readily separated from the later, however, by the shape of the antennal segments, those of *O. megathoracica* being short and fusiform in contrast to the longer and parallel sided segments of *O. fragilis*.

Oxacis xerensis, new species

(Figure 2)

This species resembles *O. bitomentosa* in color, size, and shape, but may always be separated from the later by the absence of any dark brown, semierect setae mixed with the pale clothing setae.

Holotype.—BAJA CALIFORNIA, 15 miles north of Punta Prieta, Michelbacher and Ross, July 29, 1938 (deposited in the California Academy of Sciences collection).

Description of the holotype.—Male. Length: 10.9 mm.; width: 2.1 mm.

Head: length/width ratio, .960; surface with punctures shallow, small, area between punctures microrugose. Antennae 7.6 mm. in length; second segment one-half length of the third; segments five to eleven five times as long as broad, each segment very slightly expanded apically, each segment with several short, erect setae in addition to recumbent clothing setae. Eyes moderate, reniform, set farther apart than their width in dorsal view. Head length/mandible length ratio: 1.484; mandibles broadly curved, apices subacute, not deflexed. Maxillary palpi long, the apical segment narrowly triangular, widest near the middle.

Pronotum: length/width ratio, 1.207; sides not sharply constricted at the middle; surface shallowly, finely punctate, punctures somewhat coarser than those of the head, area between punctures microrugose. Legs normal for the genus; slender; tibial spurs prominent; claws slender. Elytra: length/width ratio, 3.467; surface shallowly rugose-punctate.

Abdomen dull, subrugose; fifth visible sternite apically subtruncate, slight emargination perceivable.

Pubescence moderately coarse, moderately dense, recumbent white clothing setae.

Color: uniformly brown.

Male genitalia.—Normal for the genus; no specific characteristics evident.

Allotype.—Same data as holotype. Female. Length 9.2 mm.; width 2.1 mm. Head length/width ratio: 1.047; head length/mandible length ratio: 1.760; pronotum length/width ratio: 1.232; elytra length/width ratio: 2.870. The female agrees with the holotype in all essential features except for the size differences and the shape of the fifth visible abdominal sternite which is apically slightly produced, without emargination.

Paratypes.—19; 8 males, 11 females, all the same data as the holotype and allotype.

Larvae: Unknown.

Biology.—The series upon which this species is based was collected on July 29, 1938. See below for further discussion of seasonal appearance. No further biological information is available except that it is evident that this species prefers very arid localities.

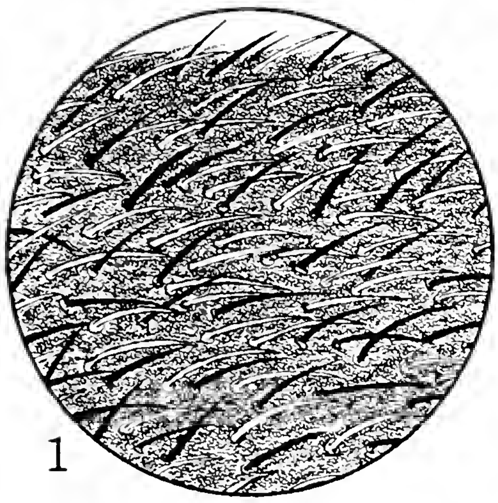
Distribution.—(Map 1). In addition to the type series, the following specimens are presently considered to be the same species. They are not designated as paratypes, however, for several reasons. Some of these population samples are sufficiently distinct to warrent further study as possible sibling species, or at least their exact placing in the evolutionary pattern of this complex remains uncertain. Included in this series is a Horn paratype of *O. fragilis*. The treatment of this specimen will remain uncertain until the population variation at this locality can be studied. It seems reasonable, therefore, to name the Punta Prieta population as a distinct species based on material that is so obviously different from the type of *O. fragilis* that there will never be a question as to its specific rank. To designate the remainder of the specimens as paratypes at this time, when there is the possibility that some at least may later be treated as separate species, seems to be a useless formality.

As can be seen from this list of localities, this species has much the same distribution as *O. bitomentosa* and is likewise confined to the western most portions of the Sonoran Desert.

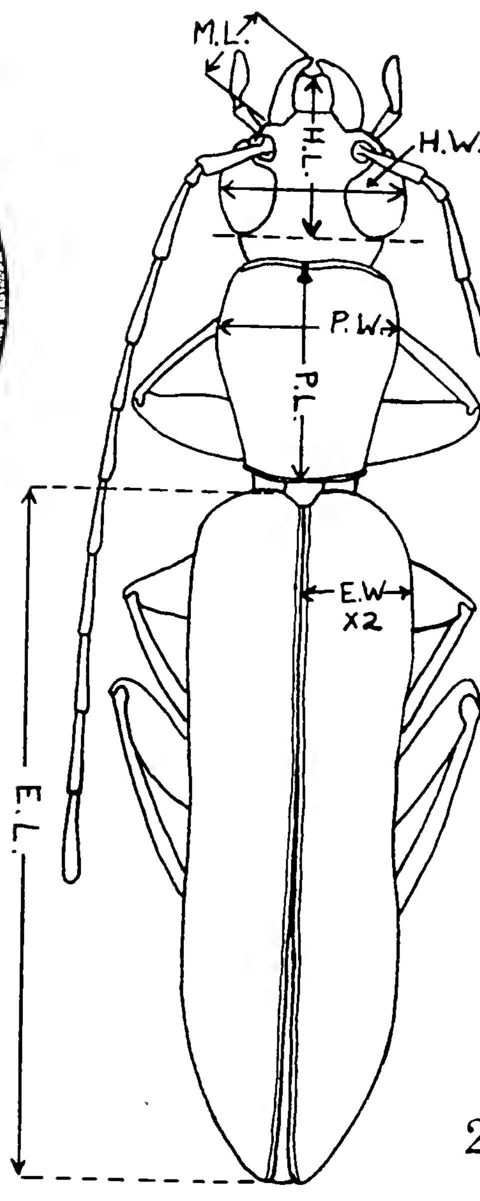
Specimens examined.—65: 17 males, 48 females; *United States:* ARIZONA, Yuma Co., Ehrenberg, 1 male, 5 females; CALIFORNIA, Riverside Co., Blythe, 2 males, 6 females; Ripley, 1 male, 1 female; Indian Wells, 2 females; Indio, 1 male, 2 females; Coachella Valley, 9 females; San Diego Co., Borrego Valley, 1 female; Imperial Co., Experiment Farm, 1 female; Holtville, 1 male, 1 female; Winterhaven, 1 male; *Mexico:* BAJA CALIFORNIA, San Felipe, 1 female; Calamajuet, 1 female (Horn paratype of *O. fragilis*); 15 mi. N. Punta Prieta (type specimens); Mesquital, 1 male, 1 female; 15 mi. N. San Ignacio, 1 female; 45 mi. N. San Ignacio, 8 males, 10 females; 20 mi. N. Comondu, 1 female; 15 mi. S. E. Arroyo Seco, 1 male, 3 females; Triunfo, 2 females.

Variation.—There are not enough specimens in any single population sample of this species to test statistically for population differences. However, several statistical analyses have been made to see if certain obvious differences tend to be borne out mathematically. Range and means have been plotted as a graph for each of the 19 localities represented. This seems to indicate at least three distinct population centers, described as follows.

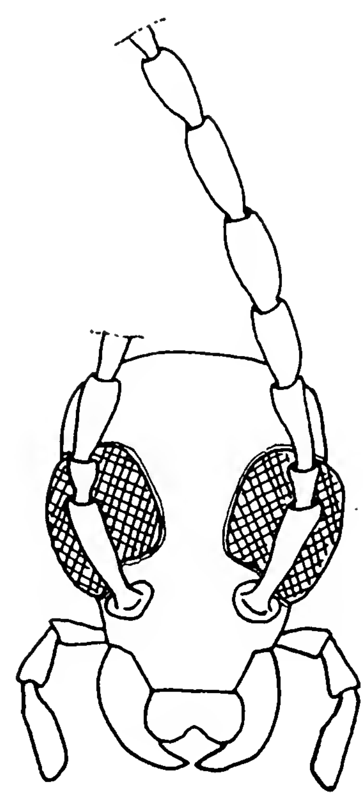
I. *Ehrenberg population.* Three samples, Ehrenberg, Arizona, Blythe and Ripley, California, with a total of 4 males and 12 females, are the extent of the known population. The clothing setae of these specimens is shorter and finer than that of the other populations. The specimens are shorter in length and have shorter mandibles. It is difficult to say where the Imperial Co., California specimens belong, but in general appearance and ratios, they fall with this population group. These specimens were collected from July 20th to August 24th with the exception of one specimen collected May 7th. This specimen belongs to the Coachella Valley population and it can only be speculated that it is a stray.



1



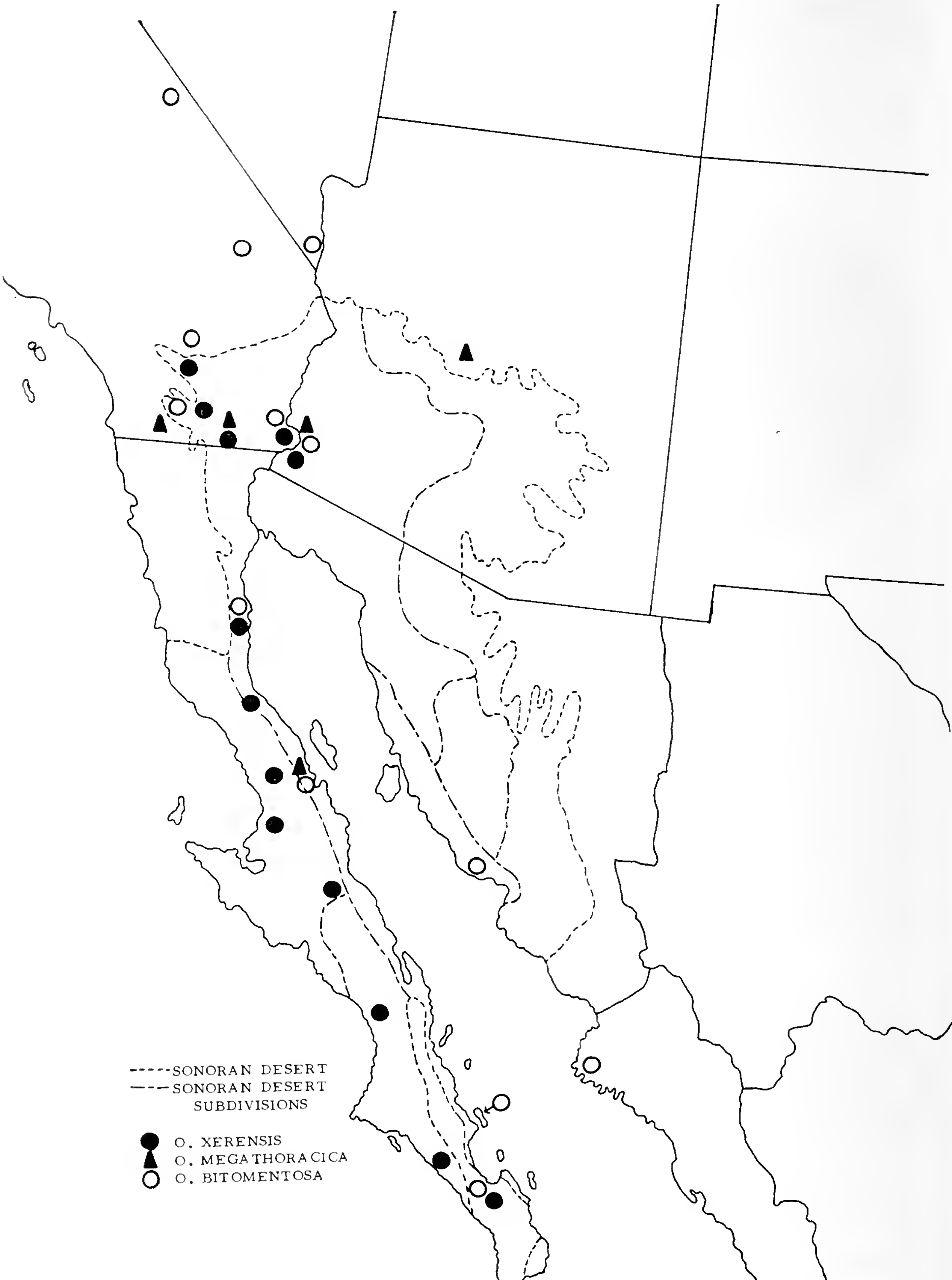
2



3

FIGURES 1–3. FIG. 1.—A portion of an elytron of *Oxacis bitomentosa*, n. sp. showing the two colors of clothing setae. FIG. 2.—dorsal view of *O. xerensis*, n. sp., showing the points of measurement. FIG. 3.—the head of *O. megathoracica*, n. sp., showing the shape of the antennal segments, in part.

II. *Coachella Valley population.* The known population consists of Indian Wells, Indio, Coachella Valley, and Borrego Valley, with a total of 1 male and 14 females. The clothing setae are long and coarse; the total length approximates that of the San Ignacio population. The head length/mandible length ratio appears to be extremely variable, but tends to be smaller than that of the Ehrenberg population, indicating that the mandibles are larger. The pronotal length/width ratio appears to be the most uniform feature of this species. The greatest difference exhibited by this



MAP 1.—The Sonoran Desert and adjacent territory showing the distribution of three new species of *Oxacis* LeConte. The boundries of the desert and its subregions are adapted from Shreve, 1951.

population seems to be the head length/width ratio. The head is usually broader than long in these, as opposed to the longer than broad head of the San Ignacio population. To test this, the *t* test was applied to the Coachella Valley and San Ignacio samples. This test shows that the mean differences are real and the null hypothesis can be rejected. This gives reason for considering the two populations as distinct. To further test this, the F test was applied to determine if it was possible to pool variances, again with positive results. The specimens were collected from April 24th to June 25th.

III. *San Ignacio population.* The Baja California specimens for the most part seem to be a separate, but extremely variable population. Almost all of the specimens have the characteristic long and relatively coarse clothing hairs. The head is usually longer than wide, the mandibles are moderate in length, and the elytra are much longer than wide. The few specimens from the extreme southern part of the known range, those from Comondu and Arroyo Seco are broader and tend towards the general appearance of the Ehrenberg population (which may indicate a central-peripheral pattern of distribution). The specimens were collected from July 13th to July 29th.

Discussion

A great deal more needs to be known about the species described in this interesting complex before it can be determined exactly what their evolutionary status may be. These are close species and occupy an area of extremely diverse habitats. It is not surprising then, that they are difficult to interpret. The limited number of specimens make it possible to do little more than speculate. The numerical data upon which these speculations are based are filed for future use and are not presented here.

A careful study of the available information shows the following, which is also a summary of this paper:

1) Color characteristics have little positive value in the description of the species in this complex except in the case of the two Central American species which have distinctive, clearly delimited, and non-variable maculations. Color can be used as an aid to identification by offering recognition patterns useful in the preliminary sorting of specimens.

2) The populations tend to vary geographically with some indication of the central-peripheral population pattern (Brown, 1957, 1958) in *O. xerensis* at least.

3) There appears to be three intergrading populations of at least one species, *O. xerensis.* These populations show vague morphological differences, which are evident only after the specimens are arranged geo-

graphically, measured, and the means and range of variation studied. Statistical tests, such as the t and F tests indicate that a normal variation curve would be present if enough specimens were available. From these data it is evident that three factors may be correlated: morphological difference, the season of appearance of the adults, and the rainy season (Turnage and Mallery, 1941) for the area. It is suspected that elevation differences (which also indicate differences in floral ecology) could also be correlated if these data were available with the specimens.

Literature cited

Arnett, R. H., Jr. 1958. Speciation and distribution in the genus Oxacis (Coleoptera). Proc. 10th Int. Cong. Ent., 1: 805–811.

Brown, W. J. 1959. Taxonomic problems with closely related species. Ann. Rev. Ent., 4: 77–98.

Brown, W. L., Jr. 1957. Centrifugal speciation. Quar. Rev. Biol., 32: 247–277.

Brown, W. L., Jr. 1958. Proc. 10th Int. Cong. Ent., 1: 89-99.

Turnage, W. V. and Mallery, T. D. 1941. An analysis of rainfall in the Sonoran Desert and adjacent territory. Carnegie Inst. Washington Publ. 529, 45 pp.

Shreve, F. 1951. Vegetation of the Sonoran Desert. Carnegie Inst. Washington Publ. 591, 192 pp.

A REVIEW OF THE TAXONOMY OF THE GENUS EURYDERUS LE CONTE ,1848. WITH NOTES ON THE NORTH AMERICAN DAPTI (OF AUTHORS). (CARABIDAE: HARPALINI)

By George E. Ball [1]

I. Introduction

Among an assortment of carabid beetles from New Mexico which I received for identification some years ago was a specimen of the genus *Euryderus*, which I attempted to determine. I soon found that this was going to be a difficult task, for the specimen did not seem to have the necessary combination of characters to fit any of the couplets in the most recent key available (Casey, 1914: 54–57). The attempt to solve this problem led to the study which is presented in the following pages.

II. Acknowledgements

The following curators made available to me specimens in their care: W. J. Brown, Department of Agriculture, Ottawa (Canadian National Collection); Henry Dietrich,

[1] Department of Entomology, University of Alberta, Edmonton, Canada

Cornell University; and Hugh B. Leech, California Academy of Sciences. E. A. Chapin, formerly of the United States National Museum (presently at the Museum of Comparative Zoology), permitted me to study the Casey types, and P. J. Darlington, Jr., Museum of Comparative Zoology, allowed me to examine the Le Conte type of *Eurydérus*. Henry Howden, Department of Agriculture, Ottawa, recently checked some important points for me, and T. J. Spilman, United States Department of Agriculture, provided a microfilm of a reference that could not be obtained at the University of Alberta. M. H. Hatch provided some distributional records, and a copy of the original description of *Amara grossa* Say. The manuscript was critically reviewed by W. G. Evans and Brian Hocking and the final draft was typed by Miss Joan Shore, Department of Entomology, University of Alberta. I am grateful to all of these people for their generous assistance.

III. The Genus *Euryderus*

This genus may be distinguised from the other North American harpalines by the following combination of characters: glossae quadrisetose; paraglossae setose; without specialized vestiture on the ventral surface of the anterior and middle tarsi; anterior tibia flattened and outer apical angle produced into a prominent sharp projection (Fig. 2); lateral margin of pronotum with a row of setae; at least elytral intervals 3, 5 and 7 with a row of large setigerous punctures, the setae long and slender; internal sac of male genitalia with two groups of large spines which are arranged in parallel series, parallel to long axis of median lobe, and a strong "tooth" at right angle to long axis of median lobe (Fig. 1).

Euryderus Le Conte, 1848

1848. *Euryderus* Le Conte, p. 151 [not *Eurydera* Castelnau, 1831]

TYPE SPECIES: *Euryderus zabroides* Le Conte, 1848
[Monobasic]

1848. *Euryderus* Le Conte, p. 371.

1852. *Nothopus* Le Conte, p. 67.

TYPE SPECIES: *Euryderus zabroides* Le Conte, 1848
[Monobasic]

1853. *Nothopus* Le Conte, p. 381.

1854. *Nothopus*, Lacordaire, p. 266, 392.

1868. *Nothopus*, Gemminger and Harold, p. 251.

1881. *Nothopus*, Horn, p. 177.

1883. *Nothopus*, Le Conte and Horn, p. 54.

1900. *Nothopus*, Tschitscherine, p. 342.

1906. *Euryderus*, Cockerell, p. 240.

1910. *Nothopus*, Blatchley, p. 174.

1914. *Nothopus*, Casey, p. 50, 54.

1920. *Nothopus*, Leng, p. 70.

1932. *Euryderus*, Csiki, p. 1081.

1933. *Euryderus*, Leng and Mutchler, p. 80.

1942. *Euryderus*, Van Emden, p. 41 and 73.
1942. *Euryderus*, Jeannel, p. 621.
1945. *Nothopus*, Chu, p. 30.
1951. *Euryderus*, Jaques, p. 50.
1953. *Euryderus*, Hatch, p. 164 and 260.

This synonymy indicates a certain amount of confusion relating to the generic name. Actually, the matter is quite simple, as Cockerell (1906) pointed out. Le Conte (1852: 67) believed that the name *Euryderus* had to be considered as a junior homonym of *Eurydera* Castelnau, and so the new name *Nothopus* was proposed. As a matter of fact, *Euryderus* and *Eurydera* are non-homonymous. *Euryderus* and *Nothopus* are absolute synonyms, and since the former name was published first, it must stand as the correct name for the genus.

IV. The Species

The first species included in *Euryderus* was *zabroides* Le Conte, 1848. In using this name, Le Conte indicated the similarity in form of this species and the members of the Amarini, of which *Zabrus* is a member. In an addendum (1859: 543) to a republication of Say's description of *Amara grossa* (1834: 340) Le Conte suggested that this species may be the same as *zabroides*, but stated that the description of Say was too vague to establish the synonymy with certainty. In 1914, Casey published a major revision of the North American Harpalini, in which he described three new species of *Euryderus*, and a new subspecies of *zabroides* Le Conte. Now, because Casey was able to see four species in a group where previous workers saw only one, and if it is difficult for subsequent workers to recognize these species, then it follows that Casey created the present taxonomic problem. The solution to the problem must then be sought in an analysis of the diagnostic characters used by that author for his new species.

Casey used ten characters in all. Study of the types indicated that four of these characters were unreliable, that is, what Casey stated about the types was not borne out when they were re-examined. These were: the ratio of head width to pronotal length; depth of elytral striae; shape of elytra; and width of the lateral gutters of the pronotum. The six remaining characters were not very impressive, but the variates of each were sufficiently distinct so that they could at least be roughly evaluated. These are listed in Table I.

It seemed that the best way to evaluate the characters was to determine to what extent the variates were correlated. If the combination of variates stated to be typical for each species occurred at a relatively high frequency, then one could conclude that a number of distinct forms was represented in the genus. This would not prove that each combination was specifically distinct, but would be the first step in such a direction. However, if in additional material these variates were found not to be related as they should be according to the original descriptions, then the basis of recognizing the described entities would be destroyed.

Because four of the six characters to be analyzed could not be assessed numerically, each variate of each character was assigned a letter, depending upon which species it was supposed to characterize. For example, the color "black" was designated by the letter *p*, standing for *privatus* Casey, because this species was the only one of the five named forms diagnosed by Casey as being all black. If a given variate was characteristic of more than one species, for example "punctures of the pronotum numerous and larger anteriorly than posteriorly", then the letter designation depended upon the number of named forms of which the variate was characteristic. The variate cited above was characteristic of *valens*, *zabroides*, *obtusus* and *privatus*. Thus a specimen with this characteristic would be graded v, z, o, p, as shown in Table I. Specimens studied were designated by a letter for each of the variates they possessed and the total number of variates of the six characteristics studied was determined for each specimen (1-v, 1-o, 2-z, 2-a). For purposes of summation, the variates represented by more than a single letter were designated by the letter X (i.e. 1-X). Thus a specimen with "punctures of the pronotum numerous and larger anteriorly than posteriorly" (this variate symbolized by v, z, o, p, as indicated above) received the letter X for this one variate, and the appropriate letter designation for each of the remaining five characters (for example 1-v, 1-o, 2-z, 1-a, 1-X). Intermediate variates were designated by the letter I (i.e. 1-I).

The combinations of variates for specimens which would key to each of the Casey species are presented in Table II. Now, if these species are recognizable, the majority of specimens studied should be found in one of the "typical" groups of combinations. In reality, only four specimens out of 228 were referable to one of the combinations shown in Table II, and these four fitted the *valens* category; the others had such combinations of variates that they could not be referred to any of the named forms. To illustrate this, Table III contains a summary of values assigned to a population sample collected at Medicine Hat, Alberta. Note that not a single specimen can be assigned to any one of the groups indicated in Table II.

These data seem to indicate that the variates are not correlated in the way they should be, if Casey's species have any meaning. Because this

TABLE I

Symbol Designation of Certain Specific Characters in Eurydertus Given by Casey, 1914.

A. COLOR	
1. all black	p (privatus)
2. black dorsally, labrum black	v (valens)
3. rufo-piceous dorsally, labrum black	z (zabroides)
4. rufo-piceous dorsally, labrum black medially	o (obtusus)
5. rufo-piceous dorsally, labrum all rufous	a (arizonicus)
B. FRONTAL IMPRESSIONS OF HEAD	
1. elongate, shallow	v, z, p
2. broader, shallower	o
3. punctiform	a
C. PRONOTAL FOVEAE	
1. distinct from marginal grooves, deeper	a
2. continuous with marginal grooves, shallower	v, z, o, p
D. PRONOTAL PUNCTURES	
1. few posteriorly, very few to absent anteriorly	a
2. numerous and larger anteriorly and posteriorly	v, z, o, p
E. ELYTRA: L/W	
1. 1.18–1.26	o
2. 1.27–1.36	v, z, p
3. 1.37–1.40	a
F. SETAE OF THE ELYTRA	
1. 72–90 in odd intervals, evens with a few apically	a
2. 18–28 in odds, none in evens	p
3. less than 72 in odds, none in evens	z
4. less than 72 in odds, a few in evens	v

is so, I conclude that Casey's arrangement is incorrect, and that all of the names proposed by him apply to individuals of the same species. The oldest trivial name available is *grossa* Say 1834 (Amara), and it is sufficiently clear from the original description that this name indeed

TABLE II

Combinations of Variate Symbols of Specimens of Euryderus Which Would Key to The Casey Species.

1. 2-v, 4-X; or 1-v, 1-I, 4-X	*valens*
2. 2-o, 3-X; (only 5 variates given in key)	*obtusus*
3. 2-z, 4-X; or 1-z, 1-I, 4-X	*zabroides*
4. 2-p, 4-X	*privatus*
5. 6-a	*arizonicus*

applies to the single species of *Euryderus,* the opinions of Le Conte and Casey notwithstanding. Therefore, the synonymy of this species is as follows:

EURYDERUS GROSSUS (SAY, 1834)

Amara grossa Say, 1834: 430 ("inhabits N.W. Terr.")—Say, 1859: 543.—Le Conte, 1859: 543.—Casey, 1914: 57.

Nothopus grossus, Gemminger & Harold, 1868: 251.—Blatchley, 1910: 174.

Euryderus grossus, Csiki, 1932: 1081.—Hatch, 1953: 164, 260 (fig. adult).

Euryderus zabroides Le Conte, 1848: 151; type, MCZ No. 5871, locality label a green disc ("Neb etc"), Le Conte Coll. Museum of Comparative Zoology, Harvard University.—__________, 1848: 371.—Csiki, 1932: 1081.—Van Emden, 1942: 41 & 73 (larva).—Hatch, 1953: 164.

Nothopus zabroides Le Conte, 1852: 67.__________, 1853: 381. Gemminger & Harold, 1868: 251.—Le Conte & Horn, 1883: 54.—Blatchley, 1910: 174. Casey, 1914: 57; Leng, 1920: 70.—Csiki, 1932: 1081.—Chu, 1945: 30 (fig of larva).

Nothopus valens, Casey, 1914: 55, Type specimen, USNM No. 47727, labelled "Ia.", Casey Coll., United States. National Museum. NEW SYNONYMY.—Leng, 1920: 70.—Csiki, 1932: 1081.

Euryderus valens, Csiki, 1932: 1081.—Jaques, 1951: 50.

Nothopus oltusus Casey, 1914: 56, Type specimen, USNM No. 47729, labelled "Col.", Casey Coll., United States National Nuseum. NEW SYNONYMY.—Leng, 1920: 70.

Euryderus obtusus Csiki, 1932: 1081.

Nothopus zabroides privatus Casey, 1914: 56; Type specimen USNM No. 47726, labelled "Tex.", Casey Coll., United States National Museum. NEW SYNONYMY.—Leng, 1920: 70.

Euryderus privatus, Csiki, 1932: 1081.

Nothopus arizonicus Casey, 1914: 56; Type specimen, USNM No. 47728, labelled "Ariz.", Casey Coll., United States National Museum.—Leng, 1920: 70.

Euryderus arizonicus, Csiki, 1932: 1081.—Van Emden, 1942: 73 (as a synonym of *zabroides* Le Conte).

TABLE III

Combinations of Variate Symbols of Euryderus Specimens From Medicine Hat, Alberta

2-v, 1-o, 3-a	1-v, 1-o, 2-a, 1-I, 1-X	2-o, 1-z, 2-a, 1-I
2-v, 1-o, 2-a, 1-X	1-v, 2-a, 3-X	2-o, 1-a, 2-I, 1-X
2-v, 1-o, 2-a, 1-I	1-v, 1-o, 1-a, 1-I, 2-X	2-o, 1-a, 3-X
1-v, 2-o, 2-a, 1-I	1-v, 1-o, 3-a, 2-X	1-o, 1-a, 1-I, 2-X
1-v, 1-o, 1-z, 2-a, 1-I	1-v, 2-a, 1-I, 2-X	1-o, 1-z, 1-a, 1-I, 2-X
1-v, 2-a, 2-I, 1-X	1-v, 1-z, 2-a, 2-X	1-o, 1-p, 1-a, 3-X
1-v, 3-a, 1-I, 1-X	1-v, 1-a, 1-I, 3-X	1-o, 1-a, 1-I, 3-X
1-v, 1-o, 1-z, 2-a, 1-X	1-v, 1-a, 1-I, 1-X	1-z, 1-p, 2-a, 2-X
1-v, 1-o, 2-a, 1-I, 1-X	1-v, 1-o, 4-X	1-p, 1-a, 4-X

V. GEOGRAPHICAL VARIATION

The following observations do not constitute an exhaustive review because they are based on the few specimens that were readily available to me, and because I have considered only those characters which have been used as a basis for diagnosis of taxonomic units within this genus. The analysis shows the geographical pattern for each character. Variation in the majority of these characters is difficult to describe accurately because the variates tend to grade into one another. This does not apply to variation in the number of setigerous punctures on the elytra, and so this aspect is dealt with in more detail.

The total number of elytral punctures on a single specimen varies from 30 (Dallas, Texas) to 107 (Medicine Hat, Alberta). Sample means range from 40 (Dallas, Texas, N = 18) to 92 (Clear Creek, Colo., N = 3). When the samples are compared, a continuum of variation is seen, but one which does not appear to comprise a simple cline. The lowest average values occur in the British Columbia, Kansas and Arkansas samples; the highest values are represented by the Colorado and Arizona samples. The variation pattern is analyzed in detail, using the number of punctures in the even-numbered intervals only. This variate was chosen rather than the total number of punctures for two reasons. First, the observed pattern is principally the result of variation which occurs in the number of punctures in the even intervals, and so emerges more clearly, if the even intervals are considered independently. Second, there is a general correlation between the total number of elytral punctures and the number of punctures in the even intervals alone. Thus the sum of the punctures in the even intervals is a useful index of the total number of punctures. Therefore, it is unnecessary to present details for variation in the latter character.

Data on variation in the number of punctures in the even intervals are presented in Table IV. These values represent the number of punctures in the even intervals of both elytra. The sexes were pooled for purposes of this analysis because variation in this character appears to be independent of sex. Statistical parameters are presented for samples of 10 or more. The mean values are very low for samples from Kansas (excluding *Medora*), eastern Texas, and Arkansas; they are slightly higher for the Osoyoos, British Columbia sample and higher still for El Paso, Texas, and Medora, Kansas. The mean values are appreciably higher again for the remainder of the samples. Another fact to be derived from Table IV is that the samples having the lowest means also exhibit relatively slight variation. Coefficients of difference were calculated for the larger samples to assess the taxonomic significance of the observed differences. Values are presented in Table V. Those over 1.28 signify that more than 90 per cent of the curves of variation do not overlap for the two populations for which the values were calculated. Such pairs of samples are "taxonomically different" at the subspecies level (Mayr, Linsley & Usinger, 1953: 146). Values around 1.23 indicate that about 88 per cent of the compared samples do not overlap; for values around 1.04 there is joint non-overlap of 85 per cent; the very low figures indicate a wide overlap of the sample curves.

These data seem to indicate that the Medicine Hat, Aweme, Denver, and Colorado Springs population samples form a group distinct from the

Table IV

Data on Geographical Variation in Total Number of Setiferous Punctures in Even-Numbered Elytral Intervals in Euryderus Grossus Say.

LOCALITY	N	RANGE	MEAN	S.D.
Osoyoos, B. C.	3	0–2	0.67	
Empress, Alta.	2	7–10		
Medicine Hat, Alta.	27	0–28	9.15±1.38	7.18
Lost River, Alta.	4	5–41	21.20	
Rutland, Sask.	2	5–19		
Pine Lake, Sask.	3	1–14	7.67	
Canora, Sask.	8	2–17	6.12	
Great Sand Hills, Sask.	4	11–15	14.80	
Aweme, Man.	11	1–23	10.73±3.23	7.44
Hill City, S. D.	3	8–12	9.33	
Valentine. Neb.	5	3–12	8.20	
Chesterton, Ind.	5	2–16	8.40	
Denver, Colo.	16	0–24	9.94±1.52	6.08
Colorado Springs, Colo.	10	0–26	10.00±2.89	9.14
Clear Creek, Colo.	3	4–13	9.33	
Pueblo, Colo.	9	4–26	12.56	
Rocky Ford, Colo.	4	1–14	8.75	
Las Vegas, N. M.	6	6–16	11.83	
Kavenata, Ariz.	3	7–25	14.33	
Chiricahua Mts., Ariz.	6	4–19	10.17	
El Paso, Tex.	7	0–4	1.20	
Medora, Ks.	3	0–7	2.67	
Sedgwick Co., Ks.	8	0–1	0.12	
Pottawattomie Co., Ks.	18	0–1	0.11±0.07	0.31
Dallas, Tex.	12	0–1	0.08±0.01	0.21
Hope Co., Ark.	5	0	0.00	

TABLE V

Coefficients of Difference Between Some Population Samples of Euryderus Grossus.

	Aweme	Denver	Colorado Springs	Pottawattomie Co., Ks.	Dallas, Tex.
Medicine Hat	0.11	0.005	0.005	1.21	1.23
Aweme		0.005	0.004	1.40	1.39
Denver			0.006	1.54	1.57
Colorado Springs				1.05	1.06
Pottawattomie Co., Ks.					0.06

Pottawattomie County and Dallas, Texas samples which form a second group. This latter group is very different from the Aweme and Denver samples; less different from the Medicine Hat sample, and still less different from the Colorado Springs sample. The observed differences are not exactly correlated with geographical distance between samples. For example, Denver is about half way between Medicine Hat and Dallas. If the pattern of variation were a gentle cline, then the mean of the Denver sample would be about mid-way between the means of the other samples in question. The fact is that the Denver and Medicine Hat samples are hardly different, while both are markedly different from the Dallas sample.

Another factor to consider besides total number of punctures in the even elytral intervals is the relative frequency of punctate and impunctate individuals throughout the range of the species. (The terms "punctate" and "impunctate" are used here only with reference to the even-numbered intervals.) Thus the number of variates is reduced to two, and this has the effect of increasing the statistical importance of individual specimens. Data are presented in Figure 3. The numerators of the fractions on this map represent the number of specimens from one locality which lack punctures in the even intervals. The denominator represents the total number of individuals comprising the sample. The triangles stand for localities which are represented by single specimens: white for impunctate; black for punctate specimens. The triangle in Colorado, one-half of which is black, represents two specimens each from a different but adjacent locality. Figure 3 shows that a substantial percentage of Kansas-eastern Texas specimens are impunctate. This applies generally also to individual specimens from the adjacent areas. Two of three individuals collected at Osoyoos, B. C. lack punctures. The remaining British Columbia specimens are punctate (a total of five in one individual, fewer than that in the remaining). Throughout the rest of the area, the punctate condition predominates. The El Paso (type locality of *E. privatus* Casey) sample occupies an intermediate position both geographically and with respect to this character distribution. This locality may be marginal for the complete expression of the "punctate" variate. This same statement applies to specimens from western Oklahoma and western Kansas, and probably also to the specimens from south-central British Columbia.

Thus the samples of *Euryderus grossus* may be placed in one of two categories, depending upon whether or not the even elytral intervals are punctate. The impunctate samples occupy the southeastern periphery of the total range of *grossus*, and the very limited material from British Columbia suggests that the northwestern periphery also has a considerable proportion of this phenotype. This statement requires further comment. Although only two out of six B. C. specimens are impunctate, the others have very few punctures in the even intervals. This condition is common in those population samples where the majority of specimens are impunctate. This is why I consider it likely that populations which occupy southern British Columbia are phenotypically similar to those which occupy the Kansas-Texas area. Elsewhere, the punctate phenotype predominates. Probably relatively steep clines formed by geographically intermediate populations bridge the gaps in means which are shown in the data.

This distribution of characters can be interpreted as a central-peripheral one (Brown, 1958). In terms of this hypothesis, I suggest that the impunctate phenotype is the older, and that it has been replaced in the center of the range by the more recently evolved "punctate" type. Presumably the replacement process has gone farther in the northwest than it has in the southeast. The assumption that the impunctate phenotype is more primitive is based on the fact that the majority of harpalines are impunctate, and so specialization would be a departure from this norm. The greater the number of punctures, the greater the specialization, and thus the farther is the departure from the ancestral condition. Conversely the less specialized type would be characterized by fewer punctures. Implicit in this hypothesis is the assumption that the punctate variate is adaptively superior to the impunctate one, or at least that it is an external manifestation of a more favorable genetic combination. I have no information which bears on this vital point.

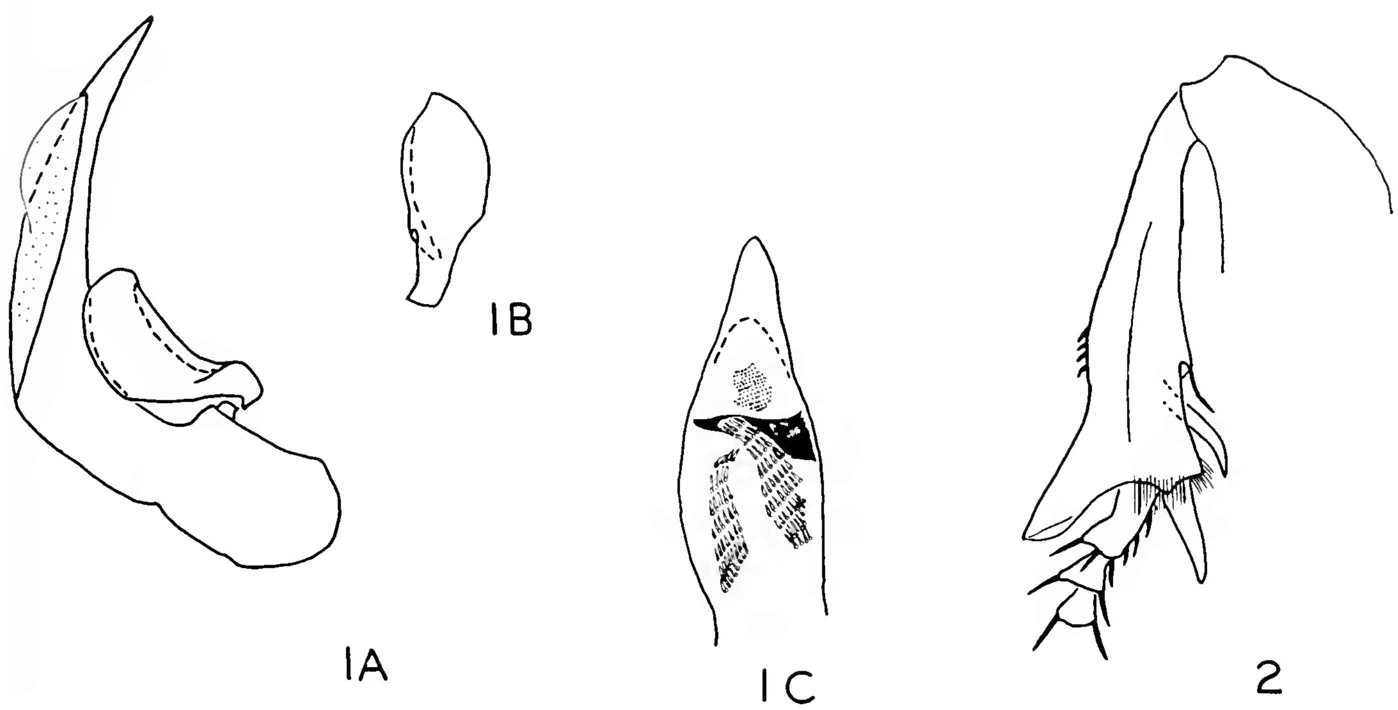


FIG. 1 Male genitalia of *Euryderus grossus* (Say), El Paso, Texas, July 27, 1919, J. C. Bradley (CU). A. Median lobe, left lateral aspect, actual length, base to apex, 3.2 mm.; and left lateral lobe *in situ*. B. Right lateral lobe, ventral aspect. C. Apical portion of median lobe, ventral aspect, showing spine series and tooth of internal sac *in situ*. FIG. 2 Right front tibia of *Euryderus grossus* (Say), Hope, Arkansas (CU).

An alternative hypothesis to the one presented above is that the punctate variate is the more primitive one, at least in *Euryderus*, and that more recently, parallel mutations have occurred and have been selected for independently toward the southeastern and northwestern periphery of the range of the species. Such mutations led to the reduction in the total number of punctures, especially in the even intervals. These alternatives can be tested, but only indirectly, in terms of population genetics and experimental ecology.

Color of the integument varies from wholly black to completely rufopiceous. Many specimens are intermediate between these extremes, with some parts of the body darker than others. Both extremes occur throughout the range of the species. In the samples from British Columbia, Alberta, Saskatchewan, Manitoba, western Texas, and Arizona, intermediate specimens predominate. In Kansas and eastern Texas, black specimens are more numerous, but in Arkansas, which is still farther east, the specimens are all relatively pale. The importance of this variation is difficult to assess because black grades into rufo-piceous, and it is often difficult to decide how to classify a given specimen. Also, color is known to change ontogenetically, so a pale specimen may be such only because it was killed before the cuticle had sufficient time to darken. Therefore, one must wonder how accurately the observed differences reflect real differences among the gene pools of the various populations.

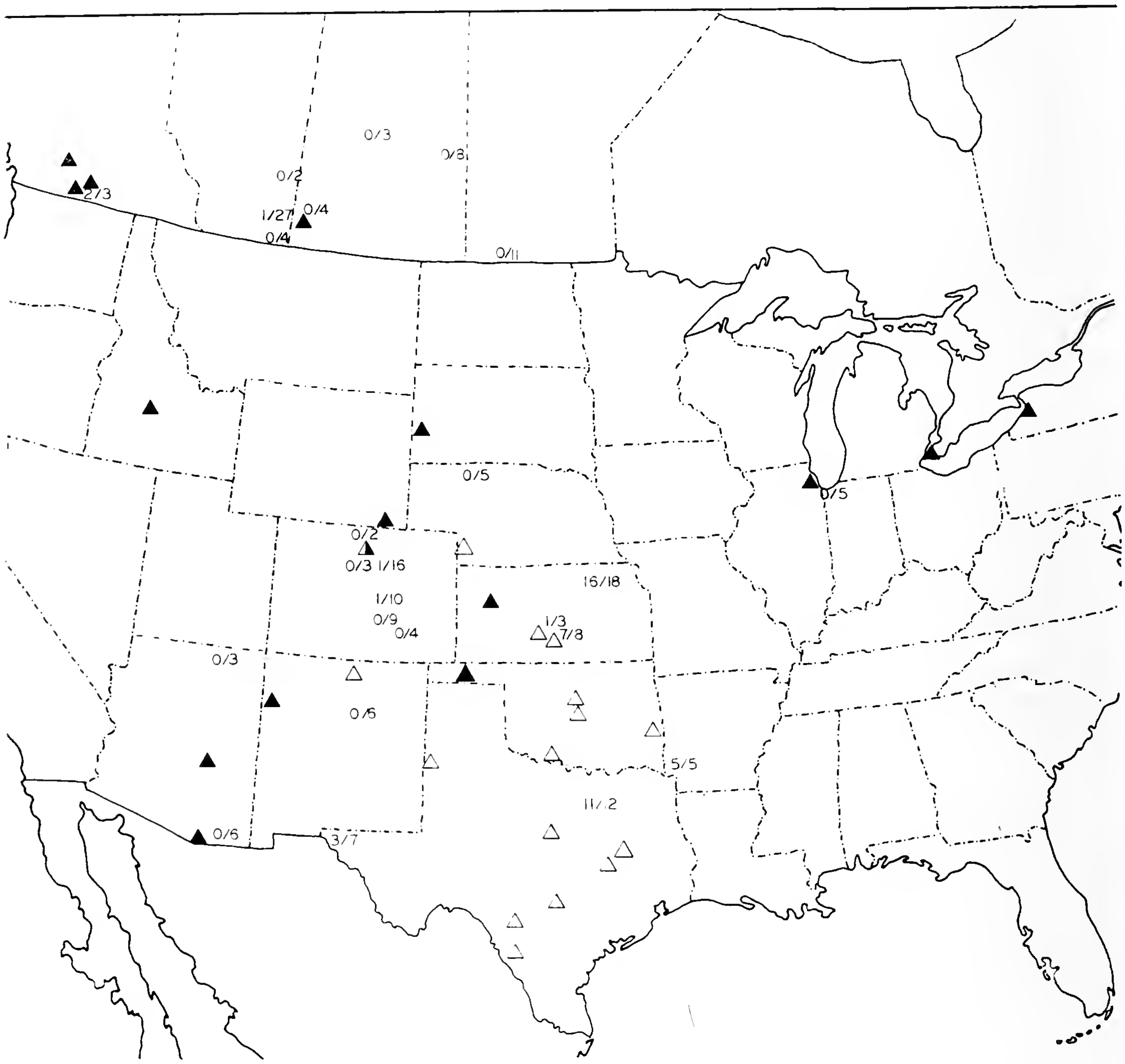


Fig. 3 Map showing distribution of *Euryderus grossus* (Say). Empty Triangles represent single specimens which lack setigous punctures in the even-numbered elytral intervals. Filled Triangles represent single specimens which have setigerous punctures in the even-numbered elytral intervals. Fractions stand for localities represented by more than one specimen: denominators are the total number of specimens, numerators are the number of specimens which lack punctures in the even numbered elytral intervals.

Three variates in the relative development of the frontal impressions are recognized. (See Table I.) All three variates occur in the Medicine Hat and Pottawattomie County samples. The punctiform variate is the most frequent in the Arkansas and Pottawattomie County samples (over 50 percent in both). In the rest of the samples, including the one from Dallas, Texas, over one-half of the specimens have either elongate-shallow or broader-shallower impressions, with the latter variate predominating slightly.

Variation in the postero-lateral impressions of the pronotum is divided into two classes: shallow and continuous with the lateral margins; or deeper and isolated from the lateral grooves. Both variates occur throughout the range of the species. In the Pottawattomie County sample, the "isolated" condition occurs in 18 of 19 specimens; in the Dallas and Medicine Hat samples, the two variates occur in about equal frequency; in the remaining samples, the "continuous" variate is more frequent, and in several of these samples, the "isolated" variate is not represented.

Punctation of the dorsal surface of the pronotum is divided into two classes "punctures finer and fewer", or "coarser and more numerous". Both are found throughout the range of the species, but at Medicine Hat and localities in the Mississippi Basin, the punctures of most specimens are in the "finer and fewer" class, while throughout the rest of the range, the "coarser, more numerous" class predominates.

I have two observations to make concerning the characters other than those of elytral punctation. The first is that their patterns of variation are discordant with respect to each other. That is, populations which are similar with respect to one of these characters are different with respect to another character. This fact lends support to the statements of Wilson and Brown (1953) regarding the nature of geographical variation, and indicates that subspecies need not be recognized in this species. The second observation is that these variates are defined subjectively, and it would be difficult to define them objectively. Therefore, it is likely that another worker might classify some specimens differently than I have, and so a pattern of variation different from the one I have indicated could be shown. Since this is so, it would seem that a more detailed analysis is unwarranted.

This study of geographical variation was based on a total of 228 specimens, collected in the localities listed below. These are in alphabetical order by state and province, and by county within each state. The letters in parentheses following each citation represent an abbreviation for the institution from which the specimen was borrowed. They are as follows:

CAS - California Academy of Sciences, San Francisco.

CNC - Canadian National Collection, Department of Agriculture, Ottawa.

CU - Cornell University, Ithaca, New York.

GEB - collection of the author.

UA - University of Alberta, Edmonton, Canada.

The greater part of this material was collected during June, July and August. Extreme dates are: April 1 (Sedgwick, Ks.) and December 22 (Oklahoma City, Okla.).

CANADA

ALBERTA. 2.6 mi. w. Empress (GEB); Medicine Hat (UA), (CNC), Lost River, D.R.E. Stn. (CNC); Seven Persons (CNC).

BRITISH COLUMBIA. Kamloops (CNC); Keremeos (CNC); Oliver (CNC); Osoyoos (CNC); Osoyoos Lake, (CNC).

MANITOBA. Aweme (CNC).

ONTARIO. Point Pelee (UA).

SASKATCHEWAN. Canora (CNC); Crane Lake (CNC); Great Sand Hills, 50° 8′, 109° 16′ (CNC), Pike Lake (CNC); Rutland (CNC).

UNITED STATES

ARIZONA. COCHISE CO: Chiricahua Mts. (CAS). GILA CO: Miami (CAS). NAVAJO CO: 19 mi. s.w. Keyanata, 6500′ (CAS). PIMA CO: Nogales (CAS). County not determined: Webb (CAS).

ARKANSAS. HEMPSTEAD CO: Hope (CU).

COLORADO. CLEAR CREEK CO: Clear Creek (CAS). DENVER CO: Denver (CAS). EL PASO CO: Colorado Springs (CU & CAS). LARIMER CO: Fort Collins (CAS); Loveland (CAS); Poudre CANYON, 5200′ (GEB). OTERO CO: Rocky Ford (CU). PUEBLO CO: Pueblo (CU). County not determined: Rock Creek.

IDAHO. "Idaho" (CAS).

ILLINOIS. COOK CO: Chicago (UA).

INDIANA. PORTER CO: Chesterton (CAS).

KANSAS. "GOVE CO., 2500′"(CU). HARVEY CO: Sedgwick (CAS). POTTAWATTOMIE CO: Blackjack Creek, (GEB); Little Gobi Desert (GEB). RENO CO: Hutchinson, (CAS); Medora (CU & CAS). STAFFORD CO: salt flats area (GEB).

NEBRASKA. CHASE CO: Imperial (CAS). CHERRY CO: Valentine (CAS).

NEW MEXICO. BERNALLILO CO: Albuquerque (CNC). MCKINLEY CO: Pinedale (GEB). SAN MIGUEL CO: Las Vegas (CAS). TAOS CO: Aztec, Animas Valley (CAS).

NEW YORK. ERIE CO: Buffalo (CU).

OKLAHOMA. "COTTON CO.", (CAS). LE FLORE CO: Wichita Natl. Forest, (CAS). LOGAN CO: Guthrie (CU). OKLAHOMA CO: Oklahoma City (CAS). "TEXAS CO." (CAS).

OREGON. "N.E. Oregon"—(Hatch, 1953: 165).

SOUTH DAKOTA. PENNINGTON CO: Hill City (CAS).

TEXAS. BAILEY CO: Muleshoe (CAS). COMAL CO: New Braunfels (CU). COMANCHE CO: Comanche (GEB). DALLAS CO: Dallas (GEB, CAS). DIMMIT CO: Carrizo Springs (CAS). EL PASO CO: El Paso (CU). "LEON CO." (CAS). ROBERTSON CO: Hearne (CAS). UVALDE CO: Uvalde (CAS).

WYOMING. LARAMIE CO: Cheyenne (CU).

WASHINGTON. M. H. Hatch (*in litt.*) gives the following records: Old Fort Okanagan, Vashon Island, and Walla Walla.

VI. Classification of the Genus *Eurytderus*.

The position of *Euryderus* in the harpaline system has been unstable. This is a reflection of the general instability of the arrangement of the genera of this large tribe, the members of which are sufficiently varied to suggest that they represent a number of distinct lines of evolution, but which are sufficiently uniform so that it is very difficult to decide what the lines are, and thus to classify the group. In certain sections of the Harpalini it is difficult even to draw generic limits. This is particularly true of some groups which are close to *Harpalus*, such as *Megapangus*, *Ophonus*, *Opadius* and *Glanodes*. Within the last 78 years, seven classifications of the Harpalini have been represented. Six of them are reviewed briefly here, especially with reference to *Euryderus*.

The principal feature used to classify the harpaline genera is the degree of development of the front and middle tarsi of the males, and the nature of the vestiture of the ventral surface of these articles. Jeannel (1941: 45-47) recognizes two types of vestiture: spongy and serial. Both types are found in the Harpalini, and further, some forms lack any specialized vestiture. The anterior tarsi are usually broadened considerably in forms which have well developed vestiture. If the vestiture is lacking, usually the tarsal articles are not expanded. (It would be interesting to know something about the genetic changes which led to suppression of the secondary sexual characters in this group.) If a classification of the Harpalini is based on the nature of the front tarsi of the males, then three groups of genera may be made: those with widened tarsal articles, and having spongy vestiture below; those with widened articles, and serial vestiture; and those with the articles narrow, and with or without vestiture. The earliest useful classification (Le Conte, 1853: 381) which was amplified by Horn (1881: 174-185) grouped the genera in just this fashion. The group with reduced vestiture or none at all was called the Dapti. Tschitscherine (1900) reviewed Horn's work, and presented a revised classification. Tschitscherine pointed out that the absence of vestiture from the anterior tarsi of males was not a a reliable criterion of relationship, because this character varied within a single genus (*Acinopus*—subgenus *Acmastes* without tarsal vestiture, typical subgenus with this vestiture), and also that otherwise very similar genera could be distinguished by the presence or absence of vestiture (*Harpalus*—with vestiture, *Harpalobrachys*—vestiture lacking). The Daptini was restricted to include those genera having unspecialized maxillae, bisetose glossae, and glabrous paraglossae. Thus, *Piosoma* and *Euryderus* (*Nothopus*, Tschitscherine) were removed from the Daptini and were placed near *Harpalus* in the Harpalini (*s. str.*)[1]

Casey (1914:49), who apparently overlooked or ignored Tschitscherine's important study, included *Euryderus* and *Piosoma* in the Daptini, on the basis of the structure of tarsus in the males.

Csiki (1932) distributed the Dapti of Horn among seven of his 21 subtribes, and *Euryderus* was placed in a subtribe of its own, the Eurydери. According to Van Emden (*in litt.*, 1956), the groups used by Csiki were suggested to him by Schauberger; unfortunately they were never defined.

Jeannel (1942: 584 *et seq.*) presented a classification of the Harpalini (accorded family rank by him), based on a variety of characters, including the form of the male genitalia and the number of setae on the penultimate article of the labial palpus. This author divided the Harpalidae into six subfamilies, one of which, the Harpalitae, contained the Harpali and Dapti of Horn, minus the genera in which the penultimate article of the labial palpus was bisetose. The palaearctic Harpalitae were arrayed in five tribes, and Jeannel stated specifically that *Euryderus* belonged to the Tribe Selenophorini. This group included those Harpalitae with narrow glossae, frons without a pair of longitudinal grooves, and median lobe symmetrical, the membranous dorsal area not restricted to the left side (1942: 621). In the key (1942: 615) Jeannel used also the presence of pubescence to

[1] Although the group-names as used by Tschitscherine end in -ini, he refers to them as subtribes of the Tribe Harpalini.

distinguish French selenophorines from harpalines. When he placed this genus in the Selenophorini, Jeannel may have considered the elytral hairs of *Euryderus* to represent pubescence. However, the form of the male genitalia indicate that this genus should have been placed among the Harpalini (*sensu* Jeannel).

Basilewsky (1946) presented a classification of the African Harpalinae (equivalent to the Harpalini of Horn, Tschitscherine, Leng, Csiki, and to the family Harpalidae of Jeannel) which was similar to Jeannel's. The constitution of the typical group was the same (i.e. Harpalitae of Jeannel and the equivalent Harpalini of Basilewsky). However, Basilewsky defined differently the selenophorine group, a result of which was that some genera listed by Jeannel as selenophorines were shifted to the harpaline group, and *vice versa*. The principal character used by Basilewsky to distinguish between the two groups was the length of the metatarsus of the hind leg; as long or longer than articles two plus three in selenophorines; shorter than articles two plus three in the harpalines. Basilewsky also mentioned that in most of the genera of the Harpalina the median lobe was inclined to the left; rarely was this condition found in the Selenophorina. In *Euryderus*, the hind metatarsus is shorter than the combined lengths of the next two articles, and, on the basis of this character, this genus must be considered to be a harpaline rather than a selenophorine.

Van Emden (1953: 513–519) discussed the classification of the Neotropical Harpalini (*sensu* Horn). He recognized a total of five subtribes, and within the Harpalina, he recognized at least two supergenera: Harpali and Selenophori, the equivalents of the Harpalina and Selenophorina of Basilewsky. His definition of the Selenophori excluded *Euryderus* from this group. In a letter to me dated November 5, 1956, van Emden stated that excluding the tarsal vestiture, "*Euryderus* seems to me to be quite a typical member of the Harpali, with its short hind tarsi, short first segment of these, absence of seriate punctures from the striae, and strongly setulose paraglossae." I agree with this conclusion. While none of these characters is conclusive proof in itself that *Euryderus* is a harpaline (in the strictest sense), the combination of them plus the form of the male genitalia makes it seem virtually certain that *Euryderus* must go in the same group as *Harpalus*.

Three other "daptine" genera appear not to be properly classified at present. These are *Piosoma* Le Conte, 1848; *Carthacanthus* Dejean, 1829; and *Geopinus* Le Conte, 1848. *Piosoma* resembles *Euryderus* in having long setae on the elytra which arise from large punctures in the elytral intervals; the paraglossae are fringed with setae; the hind metatarsus is short and the internal sac of the male genitalia bears two large spines;

and the membranous dorsal portion of the median lobe is restricted to the left side. The fourth article of the front tarsus of the male bears two rows of serially arranged specialized vestiture. This genus without doubt is also a harpaline in the strictest sense (as Tschitscherine stated) and is not a member of the Daptini (Casey, 1914:50) or of the Diorychi (=Selenophori) as Csiki (1932: 1194) suggested.

A second genus, *Cratacanthus*, was placed in the Harpalina (Tschitscherine, 1900: 340), in the Acinopi (Csiki, 1932: 1091), and also in this group by Jeannel (1942: 618). The Acinopi are harpalines with large heads, short hind metatarsi, and symmetrical male genitalia. *Cratacanthus* has these characters. However, in this genus, the apical opening in the median lobe is to the left, as in the Harpalina. Another interesting point is that the larva of this genus and of *Euryderus* are more similar to one another than either is to any other harpaline (van Emden, 1942: 41). Thus I suggest that *Cratacanthus* should also be included in the Harpali. The males of a third genus, *Geopinus*, have spongy pubescence on the underside of the front tarsi; the male genitalia are not inclined to the left, and the hind metatarsus is short. I suggest that *Geopinus* is, in fact, an anisodactyline, perhaps an aberrant one. None of its other structural characters precludes such an association. Like *Euryderus*, this genus was placed in a group of its own by Csiki (1932: 1026). Tschitscherine (1900: 340) associated *Geopinus* with *Daptus* in his Daptini.

Another "daptine" genus requiring brief mention is *Glanodes* Casey, 1914. Csiki (1932: 1185) listed this taxon as a subgenus of *Harpalus*. I have studied specimens representing *Glanodes*, and concur with this allocation.

The form of the legs and tibial spurs of the genera discussed above suggests that these appendages are adapted for digging. This statement also applies to the other "original" daptines. Perhaps the reduction of the fore and middle tarsi in the males and the loss or reduction of vestiture is correlated with a fossorial mode of life.

It is my opinion that the classification and the rank of taxonomic categories of the Harpalini presented by van Emden (1953) for the South American Harpalini are sound, and that they can be applied with little modification to the North American fauna. Of course, there are no "typical" Harpali in South America, whereas members of this group abound in North America.

VII. Summary

1. The correct name for this genus is *Euryderus* Le Conte, 1848, not *Nothopus* Le Conte, 1852.

2. An analysis of variation of characters claimed to be diagnostic of species indicates that *Euryderus* is represented in North America by a single species: *grossus* Say, 1834.

3. Synonyms of this species are: *zabroides* Le Conte, 1848; *valens* Casey, 1914; *privatus* Casey, 1914; *obtusus* Casey, 1914; *arizonicus* Casey, 1914.

4. Geographical variation of number of punctures in the even elytral intervals seems to form a central-peripheral pattern.

5. *Euryderus* is a member of the supergenus Harpali, subtribe Harpalina.

6. *Piosoma* Le Conte, 1848 and *Cratacanthus* Dejean, 1829 also belong in the Harpali.

7. *Geopinus* Le Conte, 1848 belongs in the subtribe Anisodactylina.

References

Basilewsky, P., 1946. Contribution a l'etude des Carabidae Harpalinae d'Afrique. *Bulletin et Annales de la Societe entomologique de Belgique*, LXXXII: 249-258.

Blatchley, W. S., 1910. *The Coleoptera of Indiana.* Bull. I, Indiana Department of Geology and Natural Resources, 1386 pp.

Brown W. L., 1958. Speciation: the center and the periphery. *Proceedings of the Tenth International Congress of Entomology*, 1: 89-99.

Casey, T. L., 1914. A revision of the Nearctic Harpalinae. *Memoirs on the Coleoptera*, Vol. 5, pp. 45-305. Lancaster.

Chu, Hung-fu, 1945. The larvae of the Harpalinae Unisetosae (Coleoptera, Carabidae). *Entomologica Americana*, XXV (new series), (1): 1-71, 92 figs.

Cockerell, T. D. A., 1906. Preoccupied generic names of Coleoptera. *Entomological News*, XVII: 240-244.

Csiki, E., 1932. COLEOPTERORUM CATALOGUS, Pars 121, Carabidae: Harpalinae VI, pp. 1023-1278 (Vol. III). W. Junk, Berlin.

Emden, F. I. Van, 1942. A key to the genera of larval Carabidae. *Transactions of the Royal Entomological Society of London*, 92: 1-99, 100 figs.

——————, 1953. The Harpalini genus *Anisotarsus* Dejean (Col., Carab.) Annals and Magazine of Natural History, Series 12, VI: 513-547, 20 figs., 4 maps.

Gemminger, M., and E. Von Harold, 1868. *Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus.* Vol. 1, xxxvi + 424 pp. + index. Monachii.

Hatch, M. H., 1953. *The Beetles of the Pacific Northwest. Part I: Introduction and Adephaga.* vii + 340 pp., 37 plates, 2 text-figures. University of Washington Press, Seattle.

Horn, G. H., 1881. On the genera of Carabidae, with special reference to the fauna of boreal America. *Transactions of the American Entomological Society*, 9: 91-196, plates 1-10.

Jaques, H. E., 1951. *How to know the beetles.* 372 pp., 865 figs. Wm. C. Brown Co., Dubuque, Iowa.

JEANNEL, R., 1941. Coleopteres carabiques, premiere partie. *Faune de France*, 39: 1-571, figs. 1-213. Paris.

__________, 1942. Coleopteres carabiques, 2me partie. *Faune de France*, 40: 573-1173, figs. 214-368. Paris.

LE CONTE, J. L., 1848. Monograph of the species of *Pasimachus* inhabiting the United States, with descriptions of two new genera belonging to the family Carabidae. *Annals of the Lyceum of Natural History of New York*, IV: 141-154.

__________, 1848. A descriptive catalogue of the geoadephagous Coleoptera inhabiting the United States east of the Rocky Mountains. *Annals of the Lyceum of Natural History of New York*, IV: 173-233; 334-474, 2 plates.

__________, 1852. Remarks on some coleopterous insects collected by S. W. Woodhouse, M.D., in Missouri Territory and New Mexico. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 6: 65-68.

__________, 1853. Notes on the classification of the Carabidae of the United States. *Transactions of the American Philosophical Society*, series 2, 10: 363-403.

__________, 1859. In Complete writings of Thomas Say, on the entomology of North America. 2 volumes. New York.

__________, and G. H. HORN, 1883. Classification of the Coleoptera of North America. *Smithsonian Miscellaneous Collections*, No. 507, xxxviii + 567 pp., illustrations. Washington.

LENG, C. W., 1920. *Catalogue of the Coleoptera of America, north of Mexico*, 470 pp. Mount Vernon, New York.

__________, and A. J. MUTCHLER, 1933. Second and third supplements to catalogue of the Coleoptera of America north of Mexico, 112 pp. Mount Vernon, New York.

MAYR, E., E. G. LINSLEY and R. L. USINGER, 1953. Methods and principles of systematic zoology. 328 pp., 45 figs. McGraw-Hill, New York.

SAY, T., 1834. Descriptions of new North American insects, and observations on some already described. *Transactions of the American Philosophical Society*, 4: 409-470.

TSCHITSCHERINE, T. S., 1900. Memoire sur la Tribu des Harpalini. *Horae societatis entomologicae Rossicae*, 34: 335-370.

WILSON, E. O., and W. L. BROWN, 1953. The subspecies concept. *Systematic Zoology*. 2(3): 97-111.

—BACK ISSUES—

The Coleopterists' Bulletin

		Per Volume	*Single Issue*
Vol. 3, 1949, 6 issues	***(Nos. 1 & 2 o.p.)***	$5.00	$1.00
Vol. 4, 1950, 6 issues		5.00	1.00
Vol. 5, 1951, 6 issues		5.00	1.00
Vol. 6, 1952, 4 issues		5.00	1.25
Vol. 7, 1953, 6 issues		5.00	1.00
Vol. 8, 1954, 6 issues		5.00	1.00
Vol. 9, 1955, 6 issues		5.00	1.00
Vol. 10, 1956, 6 issues		5.00	1.00
Vol. 11, 1957, 2 issues		5.00	3.00
Vol. 12, 1958, 1 issue		5.00	5.00
Vol. 13, 1959, 4 issues		5.00	1.25

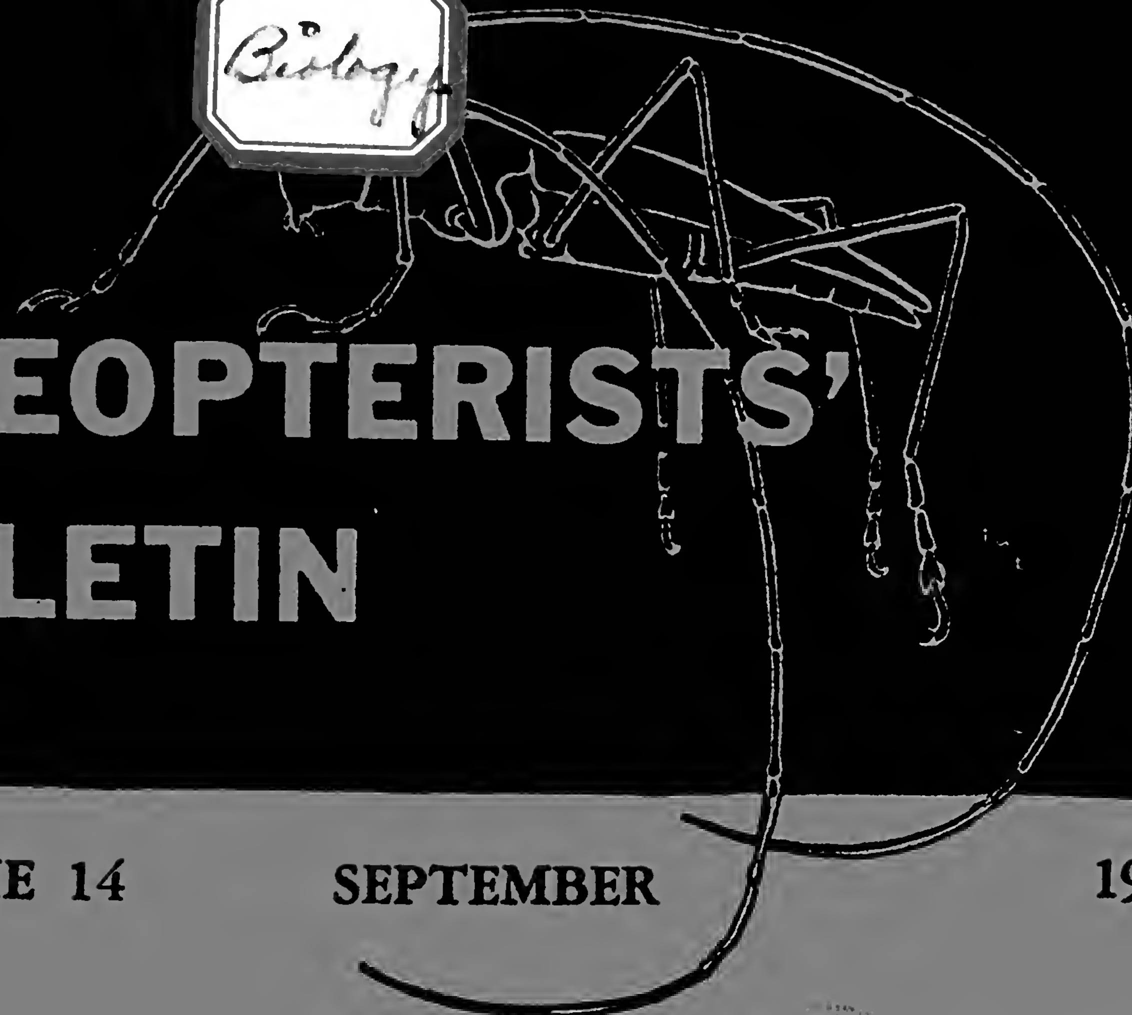
(above prices Postpaid)

ATTENTION READERS!

From time to time we receive requests from our subscribers who wish to complete their holdings of the *Bulletin*. We would appreciate it if any readers possessing copies of Vol. 3, No. 1, with which they are willing to part, would inform the *Bulletin*.

THE COLEOPTERISTS' BULLETIN
620 Michigan Avenue, N.E.
Washington 17, D. C.

THE COLEOPTERISTS' BULLETIN



VOLUME 14 SEPTEMBER 1960

TABLE OF CONTENTS

BARR, THOMAS C., Jr. A new genus of cave beetle (Carabidae: Trechini) from southwestern Virginia with a key to the genera of the Trechini of North America north of Mexico 65

MEEUSE, BASTIAAN J. D. and MELVILLE H. HATCH. Beetle pollination in Dracunculus and Sauromatum (Araceae) 70

SCHEDL, KARL E. Bark- and Timber beetles from the Neotropical region 74

SELANDER, RICHARD B. Restriction of the genus Lytta Fabricius (Meloidae) 80

KISSINGER, D. G. The Apion subgenus Perapion Wagner in North America (Curculionidae) 86

HICKS, STANTON D. Canadian specimens of Gnorimella maculosa (Knoch) (Scarabaeidae) with notes on variation 91

WERNER, F. G. Hilarocassis exclamations (L.), a tortoise beetle not previously reported from the United States (Chrysomelidae: Cassidinae) 94

BEAL, R. S., Jr. Description of a California species of Ctesias (Dermestidae) 95

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: 3 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid. Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten on 8½ x 11 sheets with at least 1 inch margins, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance after review by the Editorial Board. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five tear sheets of notes will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the Bulletin will be considered. Articles with illustrations are particularly desired, and *in all cases, descriptions of new species must be illustrated.* Descriptions of new species or genera MUST contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume 14 September, (No. 3) 1960

A NEW GENUS OF CAVE BEETLE (CARABIDAE: TRECHINI) FROM SOUTHWESTERN VIRGINIA WITH A KEY TO THE GENERA OF THE TRECHINI OF NORTH AMERICA NORTH OF MEXICO

By THOMAS C. BARR, JR.[1]

During the late summer of 1958 I was privileged to make a biological survey of seventy-five caves in the Appalachian valley of Virginia and West Virginia. This expedition, part of an extensive and continuing survey of the cave fauna of the United States, was supported by a grant from the Penrose Fund of the American Philosophical Society. Particular attention was paid to the troglobious carabids of the tribe Trechini, and nearly seven hundred specimens of these anophthalmous, wingless, rufotestaceous beetles were obtained. With the exception of one specimen, all are referable to the genus *Pseudanophthalmus* Jeannel. This specimen, a unique female teneral, is wholly different from each of the five previously described genera of trechines from caves of the eastern United States, and is described below.

Aphanotrechus NEW GENUS

Anterior tibiae pubescent on outer side, tarsi with lateral but no dorsal grooves; eyes totally absent; wings absent; size medium (5.7 mm in type species); form moderately elongate, subconvex. *Head* with two pairs of clypeal setae, one pair of mid-frontal setae, and four pairs of supraorbital setae; frontal grooves "incomplete" (aphaenopsian type), i.e., not extended onto sides and ventral surfaces of head; mandibles long and porrect, the retinacula tritubercluate; maxillary palps glabrous, the terminal segment one-fourth longer than the penultimate segment; labial palps glabrous, with the normal four setae on the penultimate segment, penultimate segment one-sixth longer than terminal segment; mentum very short and edentate, separated from submentum by a distinct suture; submentum (*pièce prébasilaire* of Jeannel) with transverse row of seven long setae at the base and two pairs of setae near the apex. *Pronotum* not pubescent, but with numerous long discal setae; anterior and posterior marginal setae very short.

[1] Department of Biology, Tennessee Polytechnic Institute, Cookeville.

Elytra with irregular rows of pubescence on intervals; discal punctures three, the anterior pair placed just posterior to the fourth marginal puncture; chaetotaxial index high (0.80 in type species); sixth and subapical marginal punctures with long setae but humeral series without setae except in the 3rd puncture; apical recurrent groove prominent, the recurrent portion connected medially to apex of 3rd longitudinal stria. Type Species: *A. virginicus* n. sp.

Aphanotrechus virginicus NEW SPECIES

Type: A single subteneral female, American Museum of Natural History, New York; Hugh Young Cave, 0.5 mile southeast of Maiden Spring, Tazewell Co., Virginia; coll. September 8, 1958, by T. C. Barr and Donald Egbert.

Total length 5.67 mm. Testaceous, shining. *Head* 1.52 x 0.97 mm (index 0.64), large and rounded; surface reticulo-alutaceous, shining; labrum with a broad, well defined median lobe; with long setae characteristic of the genus, plus rather long, sparse pubescence distributed over epicranium and genae. *Pronotum* 0.97 x 1.10 mm (index 1.14); cordate, slightly transverse; apex and base subequal, three-fourths the maximum width; anterior angles rounded, subdued; sides homogeneously arcuate, then subparallel immediately before the small, rectangular, elevated posterior angles; anterior and posterior marginal setae reduced, very short; disc subconvex, reticuloalutaceous, bearing about 16 very long, irregularly placed setae. *Elytra* elongate-elliptical, laterally vaguely emarginate, 3.18 x 1.65 mm (index 0.52); surface micro-granulate; disc subconvex, slightly concave in subhumeral areas, though not to the same degree as in *Nelsonites* Valentine; humeri prominent, angular, obliquely sloping, not serrate nor setose; longitudinal striation very shallow, the striae obsolescent beyond the 5th; intervals convex, with coarse, rather long pubescence in irregular rows; apical groove elongate, oblique, directed toward the apex of the 5th longitudinal stria but connected with the 3rd by a finely impressed transverse groove; anterior discal setae just posterior to 4th marginal puncture; medial pair at level of 5th and 6th marginals; posterior pair in apex of 2nd longitudinal stria; anterior discal punctures placed on the 3rd stria, medials on the 3rd interval; chaetotaxial index 0.80, the humeral marginal punctures widely spaced; a short seta in 3rd humeral puncture but no setae in 1st, 2nd, and 4th humerals. *Appendages:* antennae 3.45 mm (0.61 the total body length), pubescence normal for the tribe; mandibles large, both right and left retinacula with three sharp cusps; lacinia, galea, digitus, and maxillary palps all slender and elongate; maxillary palps glabrous, with one or two very short subapical setae on the penultimate and antepenultimate segments; labial palps elongate, the penultimate segment bearing two anterior, one ventral, and one subapical setae in the normal position, but all greatly hypertrophied; glossa rather broad at the apex, with 10 hypertrophied setae, two medials directed anteroventrally, the other 8 horizontal; paraglossae normal, long, hyaline, with an inner fringe of very fine setae; mentum very short, lightly sclerotized, with only the slightest suggestion of a medial tooth; mentum separated from submentum by a clearly visible suture (sharper than in *Ameroduvalius* Valentine but not nearly so distinct as in *Duvalius* Delarouzée); legs all long and slender; metatibia 1.89 mm (0.33 the body length).

The male of the species is unknown.

Discussion

Aphanotrechus is immediately distinguished from other known genera of the Trechini by the lack of a mentum tooth, a most unusual condition in this tribe, in which the tooth is normally sharp and frequently bicuspid. The chaetotaxy is definitely abnormal, especially with regard to the head. The reduction of the marginal setae of the pronotum and humerus and the long discal setae of the pronotum may or may not prove to be of generic significance if additional species of this genus are found and examined, but taken together these characters are highly diagnostic.

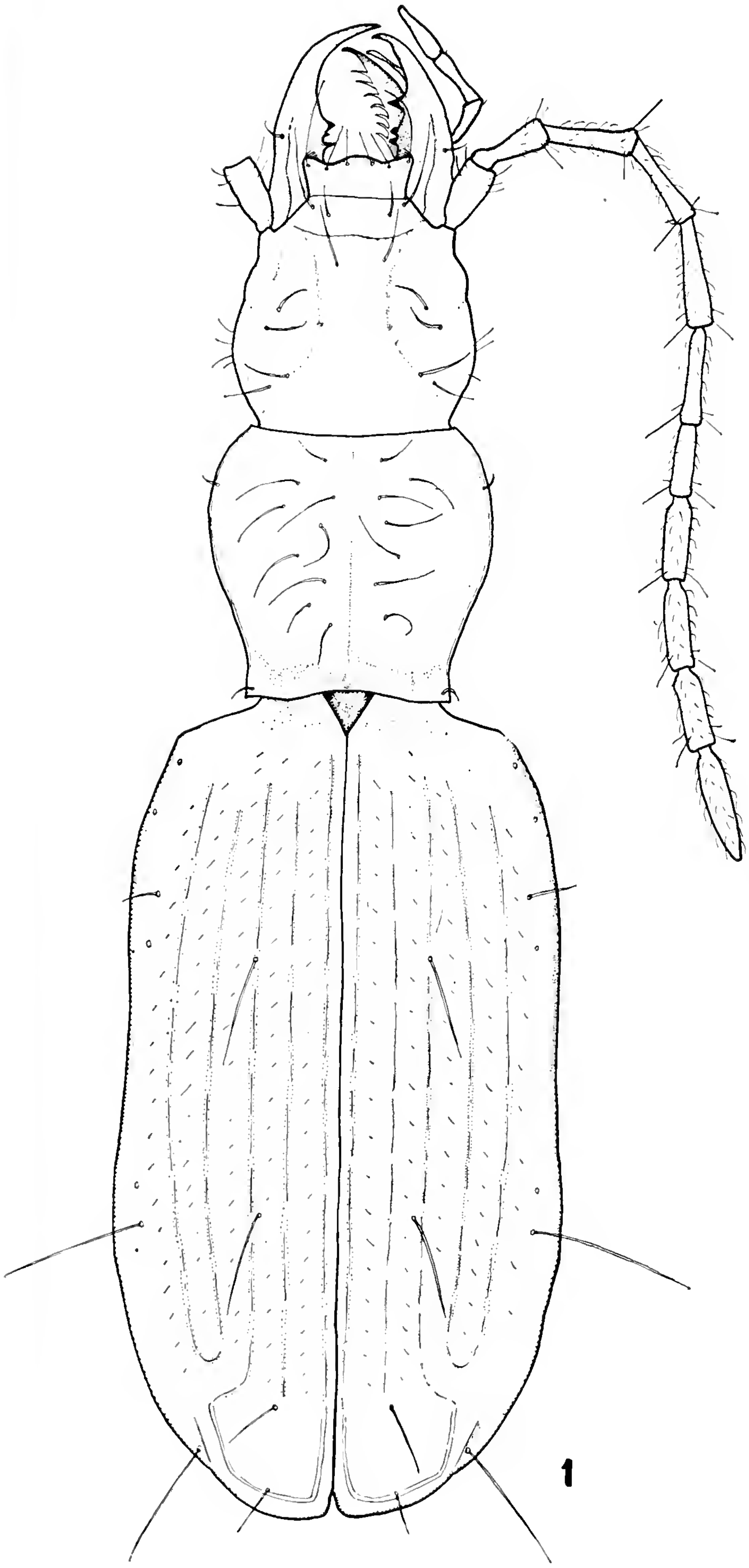
The affinities of *Aphanotrechus* are open to speculation. Possibly the future discovery of a male and the study of its aedeagus may clarify the situation. I believe that the minute median eminence on the anterior border of the mentum represents a vestige of a tooth, and prefer to regard the edentate condition as secondary rather than primitive. In any event, *Aphanotrechus* cannot be relegated to the "*Trechoblemus* series" in which Jeannel (1928) has placed *Pseudanophthalmus* and *Neaphaenops,* and to which *Nelsonites* and *Darlingtonea* certainly seem to belong (Valentine 1952). *Ameroduvalius* Val., which possesses a well defined mentum tooth, traces of a suture between the mentum and submentum, and an isotopic transfer apparatus can possibly be fitted into the "*Duvalius* series", as Valentine (1952) has suggested. Following Jeannel's practice of grouping related genera of trechines into these "phyletic series", it seems necessary to establish a monotypic "*Aphanotrechus* series" in which to set apart this aberrant beetle.

The type cave opens at the base of a huge sink in the rolling floor of an anticlinal valley immediately west of Clinch Mountain. The stream issuing from the mouth crosses the floor of the sink and disappears on the opposite side, almost certainly entering the drainage system of Maiden Spring, which is located a half mile distant. The cave consists of a single stream passage of moderate dimensions. It was explored for 200 yards, beyond which the ceiling becomes lower and the water deeper. The single beetle was collected from a small pile of broken rock on a shelf above the stream, beneath a slow, constant drip from a stalactite. A return visit to the cave in October, 1959, was wholly unproductive, probably because of recent heavy rains. Visits to four other caves in the vicinity—between Flat Knob and Clinch Mountain—in September, 1958, and October, 1950, produced five specimens of a small, undescribed species of *Pseudanophthalmus,* but no additional *Aphanotrechus.*

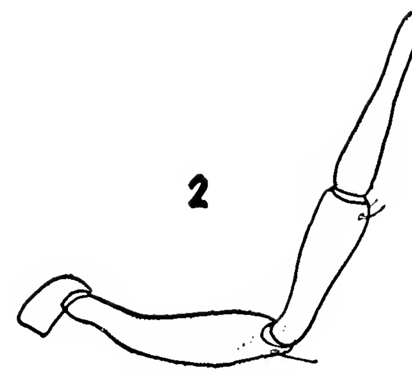
The discovery of *Aphanotrechus* increases to eight the number of known genera of Trechini from North America north of Mexico. Since only four of these are included in a published key (Jeannel 1931), the following key has been prepared. The Mexican genera *Paratrechus* Jeannel, *Mexaphaenops* Bolívar, and *Hygroduvalius* Bolívar have not yet been encountered in the United States, though their occurrence in caves or on mountain peaks in Texas or New Mexico would not be surprising.

KEY TO GENERA OF TRECHINI OF NORTH AMERICA NORTH OF MEXICO

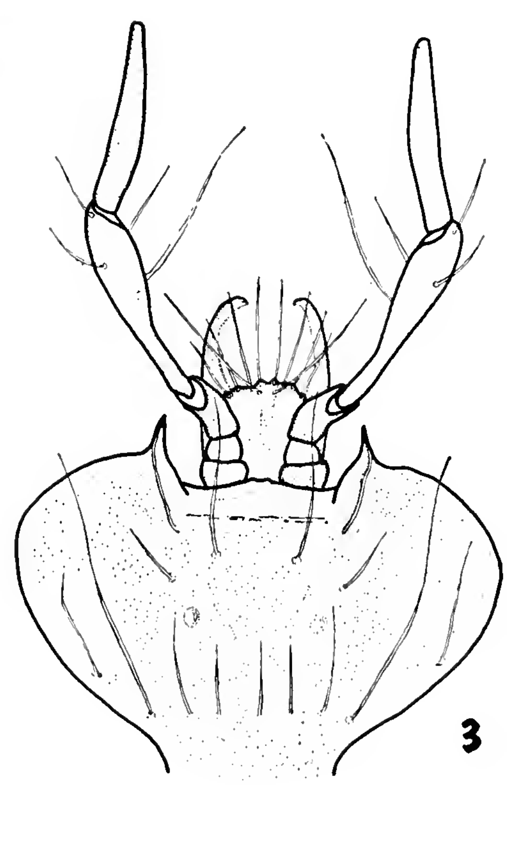
1. Eyes present; color dark brown to black.......... 2
   Eyes absent or vestigial; rufotestaceous cave species.......... 3
2. Males with first two protarsomeres enlarged; widespread in cool, moist habitats .... **Trechus** Clairville
   Males with only the first protarsomere enlarged; mountains and caves of Tennessee and North Carolina.......... **Microtrechus** Jeannel
3. Mentum tooth vestigial; head with 4 pairs of supraorbital setae; pronotum with several long discal setae; southwestern Virginia.......... **Aphanotrechus** n. gen.
   Mentum tooth well developed; head with one or two pairs of supraorbital setae; pronotum without long discal setae.......... 4
4. Mentum separated from submentum by a more or less well developed suture; copulatory pieces symmetrically arranged in internal sac (isotopic); apical recurrent groove running into 5th longitudinal stria of elytron; Cumberland Plateau of southeastern Kentucky.......... **Ameroduvalius** Valentine
   Mentum clearly fused to submentum; copulatory pieces asymmetrically arranged in internal sac (anisotopic); apical recurrent groove running into 3rd or 5th longitudinal stria of elytron.......... 5
5. Elytra with two pairs of discal setae (the 3rd pair may be vestigial).......... 6
   Elytra with three well defined pairs of discal setae (except in **Pseudanophthalmus audax** (Horn), which is unique in possessing only the posterior pair).......... 7
6. Head with two pairs of supraorbital setae; submentum with transverse row of 8 or 9 long setae (excluding the hypertrophied seta on the outer edge of each epilobe); apical groove of elytron prominent, well developed, running into 3rd longitudinal stria; Cumberland Plateau of southeastern Kentucky and adjacent portions of Tennessee.......... **Darlingtonea** Valentine
   Head with one pair of supraorbital setae; submentum with transverse row of 10 to 12 long setae; apical groove of elytron vestigial; western Pennyroyal Plateau of Kentucky from the Ohio River south to the Tennessee border.......... .... **Neaphaenops** Jeannel
7. Size large (6.2-8.0 mm); frontal grooves "incomplete", i.e. not extended onto sides and ventral surface of head; glossa with 10 to 12 long, hypertrophied setae; humeri sharply angular, subhumeral areas sloping, deplanate, concave; recurrent portion of apical groove of elytron running into 5th longitudinal stria; Cumberland Plateau in Kentucky and Tennessee.......... **Nelsonites** Valentine
   Size variable (3.0-7.0 mm); frontal grooves "complete", i.e. extended onto sides and ventral surface of head; glossa with 8 long setae; humeri more rounded; without subhumeral concave areas; recurrent portion of apical groove running into 3rd longitudinal stria (except to the 5th in two Indiana spp., **P. youngi** Krekeler and **P. shilohensis** Krekeler); unglaciated, Paleozoic limestone areas of Alabama, Georgia, Indiana, Kentucky, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.......... **Pseudanophthalmus** Jeannel



1



2



3

FIG. 1. *Aphanotrechus virginicus* n. gen. and sp., type female, Hugh Young Cave, Tazewell Co., Virginia. FIG. 2. *A. virginicus* n. gen. and sp., maxillary palp of type. FIG. 3. *A. virginicus* n. gen. and sp., labium of type.

LITERATURE CITED

JEANNEL, R. 1928. Monographie des Trechinae, morphologie comparée et distribution géographique d'un groupe de Coléoptères: 3e partie, les Trechini cavernicoles. L'Abeille (Paris), vol. 35, pp. 1-808.

JEANNEL, R. 1931. Révision des Trechinae de l'Amérique du Nord. Biospeologica LVI. Archives de Zoologie expérimentale et générale, vol. 71, pp. 403-499.

VALENTINE, J. MANSON. 1952. New genera of anophthalmid beetles from Cumberland caves. Geological Survey of Alabama, Museum Pap. No. 34, pp. 1-41.

BEETLE POLLINATION IN DRACUNCULUS AND SAUROMATUM (ARACEAE)

By BASTIAAN J. D. MEEUSE *and* MELVILLE H. HATCH[1]

The famous Lamarck, in 1777, was the first to draw attention to the development of considerable heat in the inflorescences of certain arum lilies (3). This phenomenon, which can lead to a difference in temperature with the environment of about 20° C, is accompanied by the production of a pronounced odor, different from species to species but usually carrion-like. A truly classical demonstration of its biological significance was given in 1926 by Knoll (1). For the two European species, *Arum maculatum* and *Arum italicum*, he could show that the odor serves the purpose of attracting large numbers of small insects—mostly Psychodid flies, but also some Staphylinid beetles—which are thereupon trapped in the floral chamber where they are held prisoner for about a day. Since the pistillate or female flowers at the base of the floral column are the first ones to reach maturity, and since some of the visitors may have come from other Arum inflorescences that were in the process of shedding their pollen, the likelihood of cross-pollination is great. The staminate or male flowers, grouped together in the region just above the female flowers, do not shower the captive insects with their pollen until a short time before the moment when certain wilting phenomena make escape from the trap possible. An insect-attracting function of the heat could not be demonstrated; its main (or perhaps even its exclusive) role may well be the volatilization of the odoriferous substances.

Predominant carrion beetle pollination has been described by Van der Pijl (5) for a number of Amorphophallus species, including the giant *Amorphophallus titanum*, in the East Indies; by Schmucker (4) for *Dra-*

[1] A contribution from the Departments of Botany and Zoology at the University of Washington. The beetle identifications are by M. H. H.; the collections and observations and the writing of the paper are by B. J. D. M.

cunculus creticus on the island of Crete; and finally by Kullenberg (2) for *Arum dioscoridis* in Lebanon. In many regions of the United States, an excellent opportunity to observe beetle pollination is provided by the circumstance that the so-called dragon lily, black calla, or black lily of the Nile, *Dracunculus vulgaris* Schott, is a popular garden plant. In spite of the fact that it stems from the northern Mediterranean region (Portugal to western Asia Minor), it is very successful in Seattle, where its inflorefcences will as a rule begin to unfold around the middle of June. Although these blooms are on the average about two feet tall, they occasionally grow to a height of three feet. The inside of the "spathe" is of a very deep purple color, while the sterile part of the central column (the so-called appendix) has the dark and glossy appearance of black cherries. It is this appendix which is responsible for the smell, produced in the morning hours of the opening day and strongly reminiscent of long dead-half dried fish. More specifically, there is a resemblance between the odor of Dracunculus and that of pedah, a fish product used on a large scale for human consumption in the East Indies and Siam (Van Veen 7). Although carrion and dung flies such as Calliphora, Lucilia and Sarcophaga are attracted in a matter of minutes and can be observed buzzing around the fresh inflorescences and sitting on the appendix, where they may even deposit their eggs, they do not as a rule assemble in the floral chamber. Carrion and dung *beëtles*, on the other hand, will accumulate here in large numbers. Thus, in one instance, 162 beetles were obtained from a single Dracunculus inflorescence by cutting it off in the middle of the afternoon of its first flowering day. If the inflorescences are allowed to remain in their natural position overnight, only a few beetles are found in them the next morning. However, the present authors have never consistently followed the change in beetle population with time for one single Dracunculus inflorescence. By the next morning the carrion smell has given way to a very faint aromatic and not completely unpleasant odor, somewhat reminiscent of that produced by certain Papilio caterpillars when they stick out their scent forks. The flowering sequence, ensuring cross pollination, is essentially the same as that described for *Arum maculatum* and *Arum italicum*; i.e., the inflorescence is proterogynous, the female flowers are receptive before the male flowers in the same inflorescence begin to shed their pollen.

With one exception (a collection made in the garden of a private home in Seattle) the following observations all pertain to a single collecting site on the campus of the University of Washington behind the new Botany Greenhouse. All but one of the inflorescences here were produced by two large clumps of *Dracunculus vulgaris*. The inflorescence that formed the exception was brought in from a private garden and left amid the foliage of one of these clumps. Over a period of 7 days (June 18 to 24) 298 beetles were collected, as follows. The number of specimens taken and the normal habitat of each species is indicated in parentheses.

HYDROPHILIDAE: *Cercyon pygmaeus* Ill. (1, dung).

SILPHIDAE: *Silpha lapponica* Hbst. (1, carrion)

STAPHYLINIDAE: *Platystethus americanus* Er. (4, dung), *Aleochara bimaculata* L. (1, dung), Aleochara gen. et sp. undet. (1), *Philonthus pachycephalus* Nord. (2, carrion), *Philonthus politus* L. (1, carrion).

HISTERIDAE: *Saprinus oregonensis* J. LeC. (207, carrion), *Saprinus lugens* Er. (57, carrion), *Margarinotus umbrosus* Csy. (1, carrion).

DERMESTIDAE: *Dermestes frischii* Kug. (3, carrion).

NITIDULIDAE: *Nitidula carnaria* Schall. (13, carrion), *Omosita colon* L. (4, carrion).

LATHRIDIIDAE: *Melanophthalma distinguenda* Com. (1, compost).

CRYPTOPHAGIDAE: *Anchicera ochracea* Zimm. (1, compost).

It is not without interest to compare this list with the one given by Schmucker (4) for *Dracunculus creticus*, a plant usually considered to be just a variety of *Dracunculus vulgaris*. With four exceptions the species reported are normally found on carrion and dung. The two Mycetoporus spp. occur in moist moss, among fallen leaves, under stones, etc. The species of Carpophilus occur under bark, at sap, and in warehouses. Malthodes is found on vegetation.

HYDROPHILIDAE: *Cercyon haemorrhoidalis* F.

STAPHYLINIDAE: *Oxytelus complanatus* Er. (22), *O. sculpturatus* Grav. (5), *O. inustus* Grav. (2). *Mycetoporus reichei* Pand. (7), *M. piceolus* Rey (1), *Aleochara* sp. (1), *Atheta* sp. (1), *Philonthus sordidus* Grav. (1), *P. longicornis* Steph. (1), *Xantholinus rufipennis* Er. (1).

HISTERIDAE: *Saprinus semistriatus* Scriba (1), *Saprinus* sp. (1).

CANTHARIDAE: *Malthodes* sp. (1).

DERMESTIDAE: *Dermestes frischii* Kugel. (9).

NITIDULIDAE: *Carpophilus immaculatus* Luc. (1).

It can be seen that some of the genera and one of the species observed on the island of Crete and in Seattle are the same. Moreover, a second species, *Cercyon haemorrhoidalis* F., is likewise recorded below from the inflorescence of *Sauromatum guttatum* in Seattle.

From the Lebanese arum lily, *Arum dioscoridis*, Kullenberg (2) has reported the following beetles, most of which are likewise normally found on dung or carrion.

HYDROPHILIDAE: *Cercyon haemorrhoidalis* F. var. *discoidalis* J. Sahlb.

STAPHYLINIDAE: *Oxytelus sculpturatus* Grav., *Philonthus intermedius* Boisd.

SCARABAEIDAE: *Onthophagus ovatus* L., *O.* ? *sellatus* Kl., *Aphodius signifer* Muls. & Rey, *Oxyomus silvestris* Scop.

These Coleoptera were accompanied by the dung flies (Diptera) *Scatophaga stercoraria* L. and *S. maculipes* Zett.

From the above it is clear that access to Arum lilies such as Dracunculus and *Arum dioscoridis* makes it possible for the beetle collector to obtain large numbers of certain carrion and dung beetles in a most elegant and painless way. It is one of the purposes of the present paper to draw attention to this fact and to enlist the cooperation of coleopterists in the study of Arum lilies. The scientific value of lists of beetles visiting these flowers obviously transcends their taxonomic significance. A comparative analysis of the "visitor spectrum" for species differing in odor will undoubtedly lead to more precise information on the exact ecological niche which each species of carrion or dung beetle occupies. Ideally, a complete chemical analysis of the odoriferous substances should be carried out for each species of Arum lily involved, and eventually this may lead to attempts to attract the beetles with well defined mixtures of the pure chemicals. This is an ambitious and optimistic program, in which, however, the human nose, fallible though it is, may give some guidance. Thus, there is at least a chance that the similarity in smell between the appendix of Dracunculus and the fish product, pedah, is not fortuitous but is due to the presence of the same chemical substances. A partial analysis of the pedah odor has been carried out (Van Veen 1941). On the basis of this, one or more of the following substances may be expected to be produced by the Dracunculus appendix: ammonia, trimethylamine, other methylamines, volatile fatty acids, methylnonylketone, butylaldehyde, some highly unsaturated aldehydes, and traces of sulfur compounds.

The present authors were fortunate in having available a number of inflorescences of *Sauromatum guttatum* Schott, a native of northwest India and Pakistan, producing a smell which, although carrion-like, is decidedly different in character from that of Dracunculus. Just as in Dracunculus, the odor in Sauromatum is developed in the morning hours. The inflorescences were exposed to insects in the same locality as the Dracunculus. Unfortunately, they appeared later than the Dracunculus blooms, so that in only one case simultaneous exposure of the two types could be practiced. Yet it is believed that the observed difference in the visitor-spectrum between Dracunculus and Sauromatum is significant. The latter accumulates flies along with beetles in the floral chamber. In the greenhouse, where one of us (B.J.D.M.) has made observations on hundreds of Sauromatums over a period of several years, flies are successful pollinators. However, they are the only insects present there. No information is available on the pollination in Sauromatum's native habitat. It is tempting to assume that beetles are responsible for it. The yellow, club-shaped and decidedly fleshy "hairs" which are found in the inflorescence instead of the bristles present in many other Arum lilies may well serve as nutritive tissue for the beetles. The following is a list of the beetles collected in Seattle on the freely exposed Sauromatums over the period June 24 to July 29.

HYDROPHILIDAE: *Cercyon haemorrhoidalis* F. (4, dung).
STAPHYLINIDAE: *Platystethus americanus* Er. (14, dung). *Aleochara bimaculata* Grav. (4, dung), Aleocharinae gen. et sp. undet. (1).
HISTERIDAE: *Saprinus oregonensis* J. LeC. (22, carrion).
NITIDULIDAE: *Glischrochilus 4-signatus* Say (2, sap and fermenting fruit).

Literature Cited

1. Knoll, F. 1926. Die Arum-Blütenstände und ihre Besucher. Abh. Zool.-Bot. Ges. Wien *12*, Heft 3.
2. Kullenberg, B. 1953. Observationer över Arum-pollinerare i Libanons Kustomrade. Svensk Bot. Tidskr. *37* (1): 24.
3. Lamarck, J. B. de Monet, Chevalier de Lamarck. 1777. Quoted from: James, W. O. and Beevers, H. 1950. The respiration of *Arum spadix*. A rapid respiration, resistant to cyanide. New Phytol. *49:* 353.
4. Schmucker, Th. 1930. Blütenbiologische und -morphologische Beobachtungen. Planta *9:* 718.
5. Van der Pijl, L. 1950. Met open ogen door stad en land. Jakarta-Bandung-Semarang-Surabaia, 1950.
6. Van Herk, A. W. H. 1937. Die chemischen Vorgänge im Sauromatum-kolben. Thesis Amsterdam, 1937; Rec. Trav. Bot. Néerl. *34:* 69.
7. Van Veen, A. G. 1941. On volatile aromatic substances from certain fish products. Natuurwet. Tijdschr. Ned. Indië *101:* 147.

BARK- AND TIMBER BEETLES FROM THE NEOTROPICAL REGION

By Karl E. Schedl [1]

173. Contribution to the morphology and taxonomy of the Scolytoidea

During recent years I have examined quite a number of Scolytidae and Platypodidae from the neotropical region, some larger ones from the Californian Academy of Sciences forwarded by the Curator Hugh

[1] Lienz, Osttirol, Austria

B. Leach and the Department of Entomology of the Cornell University sent by Dr. Henry Dietrich. It seems to be worth while to draw a line at the present stage of this work showing the species so far determined and describing some of the new species found. The new records of known species will certainly enlarge our knowledge about their geographical distribution especially with regard to the Platypodidae which I am just checking once more by using Chapuis types in the Museum in Bruxelles and the British Museum.

New Records

United States

Pityophthorus solus Blackm., New Mexico, Porvenir, Dr. A. Feayes.

Pityogenes fossifrons Lec., New Mexico, Porvenir, Dr. A. Feayes.

Mexico

Pagiocerus frontalis Fab., Cuernavaca, 20 miles N. El Limon, Tmlps., 10.XI.1946, E.C. Van Dyke.

Cnesinus strigicollis LeC., Cord., Ver., Dr. A. Feayes.

Cryphalomorphus knabi Hopk., Cordoba, Ver., Dr. A. Feayes.

Neodryocoetes guadeloupensis var. *costaricensis* Schedl, Cordoba, Ver., Dr. A. Feayes.

Ips cribricollis Eichh., 15 miles S. El Guardia D. F., 14.XI.1946, E. S. Ross.

Xyleborus ferrugineus Fab., Cordoba, Ver., Dr. A. Feayes; Cuernavaca, Dr. A. Feayes; 5 miles S. Iguala, Gro., 15.XI.1946, E. C. Van Dyke; Los Mochia, Sinaloa, 8.VII.1922, C. T. Dodd.

Xyleborus scopulorum Hopk., 15 miles S. El Guardia D. F., 14.XI.1946, E. S. Ross.

Xyleborus torquatus Eichh., Tamazunchale, S. L. P., 23.XI.1946, E. S. Ross.

Corthylus uniseptis Schedl, Cordoba, Ver., Dr. A. Feayes.

Pterocyclon turbinatum Schedl, Cordoba, Ver., Dr. A. Feayes.

Platypus dejeani Chap., Mazatlan (Cal. Ac. Sci.); Santa Isabella Isl., 21.VII.1932, M. Willows jr.; Vulcan Colima, Esperanzo, 1000 m, 10.III.1918, Joh. Laue; San Blas, Nayarit, 17.–21.IX, 53, B. Malkin.

Platypus poriferus Chap., Socorro Id., Grayson Cove, 11.V.1935, H. H. Keifer.

Nicaragua

Xyleborus ferrugineus Fab., Sioux Plantation, Rio Grande, 10.VII.1916 (Cal. Ac. Sci.); Hamburg, Worthdamm, 20.X.1955, importiert in Nicaragua Ceder, H. Wichmann.

Costa Rica

Phloeoborus scaber Er., Turriabla, For. Res. Inst. Dehra Dun.

Mimips mimicus Schedl, Turrialba, nachts am trockenen Holz, F. Nevermann.

Platypus dejeani Chap., Rio Reventazon, 16.V.1924, Cornell Univ.; Pacayas, C. Werckele.

Puerto Rico

Xyleborus mascarensis Eichh., El Yunque, Lucuillo Mts., 1500-2000 ft., 23.IV.1930, Cornell University.

Xyleborus ferrugineus Fab., El Yunque, Lucuillo Mts., 1500-2000 ft., 23.IV.1930, Cornell University.

Platypus dejeani Chap., Toa-Baja, 4.II.1915, G. Garb.

Cuba

Xyleborus mascarensis Eichh., Rio Taco-Taco, Sierra Rangel, P. d. Rio, 26.III.1939, J. C. Bradley.

Haiti

Stephanoderes prosper Schedl, Port-au-Prince, 27.II.1898, E. A. Klages.

Santa Lucia

Xyleborus ferrugineus Fab., Gastries, 10.-22.IX.1919, J. C. Bradley.

Platypus dejeani Chap., Gastries, 10.-22.IX.1919, J. C. Bradley.

Canal Zone, Panama

Hypothenemus eruditus Westw., Barro Colorado Id., XII.1930, F. G. Lutz.

Hypothenemus intersetosus Egg., Barro Colorado Id., XI.1930, F. G. Lutz.

Hypocryphalus magniferae Stebb., Corozal, 21.I.1929, C. G. Curran.

Coccotrypes aciculatus Schedl, Barro Colorado Id., XI.1930, F. G. Lutz.

Pityophthorus gentilis Schedl, Tres Rios Plantation, Gatun Lake, 1931, T. O. Zschokke Collector; Barro Colorado Id., Gatun Lake, April 1934, J. C. Bradley.

Pityophthorus epistomalis Schedl, Barro Colorado Isl., Gatun Lake, 26.-28.III.1924, T. O. Zschokke; Tres Rio Plantation, Gatun Lake, 1931, T. O. Zschokke.

Xyleborus macer Blandf., Barro Colorado Id., Gatun Lake, III.1924, J. C. Bradley.

Xyleborus mascarensis Eichh., Barro Colorado Id., Gatun Lake, XI.1930, F. G. Lutz; l. c., 1.II., 1.VIII., 1.XII.1929, C. H. Curran; l. c. 26-28.III, and April 1924, J. C. Bradley; Santa Rosa, 6.II.1931, A. L. Brody; Changuinola Dist. Roc. Toro, Cornell University.

Xyleborus torquatus Eichh., Tres Rios Plantation, Barro Colorado Id., Gatun Lake, 1931, T. O. Zschokke; Barro Colorado Id., Gatun Lake, XI.1930, F. G. Lutz; l. c. 1.II., 1.VIII., 1.XII.1929, C. H. Curran; l. c. 26.-28.III.1924, J. C. Bradley; Santa Rosa, Feb. 1931, A. L. Brody; Changuinola Dist., Roc. Toro, Cornell University.

Xyleborus perforans Woll., Barro Colorado Id., Gatun Lake, 26.-29.III.1924, J. C. Bradley.

Xyleborus ferrugineus Fab., Barro Colorado Id., Gatun Lake, XI.1930, F. G. Lutz; l. c. 26.XII.1928, 1.IV and 24.XII.1929, C. H. Curran; Tres Rios Plantation, Barro Colorado Id., Gatun Lake, 1931, T. O. Zschokke; Barro Colorado Id., III.1924, J. C. Bradley; Santa Rosa, Feb. 1931, A. L. Brody; Changuinola Dist., Roc. Toro, April 1924, J. C. Bradley.

Platypus hians Chap., Barro Colorado Id., Gatun Lake, April 1924, J. C. Bradley.

Platypus dejeani Chap., Barro Colorado Id., Gatun Lake, 26.-28.III.1924, J. C. Bradley; Changuinola Dist., Roc. Toro, Cornell University.

Colombia

In September 1955 Dr. W. Steinhausen collected a number of species in dying cacao trees in Puerto Tejada, Cauca, and referred to them in a short paper published in "Cacao en Colombia" V,1956: 47-60 giving in the same time some figures about their morphological aspects. One more species was determined later on. Xyleborus pseudotolimanus n.sp. in lit. shall not be described as it fits although larger as the average fairly well into a long series of Xyleborus tolimanus Egg. I have lately seen from the Matto Grosso in Brazil. The species Dr. Steinhausen's investigations have been based on are:

Xyleborus procer Eichh.

Xyleborus corniculatus Schedl

Xyleborus ferrugineus Fab. (*X. confusus* Eichh.)

Xyleborus parallelocollis Egg.

Xyleborus commixtus Blandf.
Platypus konincki Chap.
Platypus parallelus Chap.

In the collection of the Californian Academy of Science is a single species:
Platypus dejeani Chap., Arboleta Pt., IX.1914, B. Martin

and from Mr. George N. Wolcott I have received a Bostrichid:
Lyctus brunneus Steph. from Tumaco, 7.II.1956, ex Virola sp., Marino Sanchez Ayala.

PERU

Phloeoborus grossus Chap., Chanchamayo.

Phloeotribus pilula Er., Puno, Staudinger & Bang-Haas.

Pagiocerus frontalis Fab., Moguegua, leg. Wille.

Chramesus peruanus Schedl, Urubamba, Ollantaitembo, Dept. Cuzco, 31.I.1949, Dr. Kuschel.

Coccotrypes palmarum Egg., Puerto Bermudez, 12.-19.VII.1920, Cornell University.

Xyleborus curtus Egg., El Campamiento, Col. Perena, 21.VI.1920, Cornell University.

Xyleborus sentosus Eichh., El Campamiento, Col. Perena, 18.VI.1920, Cornell University.

Xyleborus mascarensis Eichh., El Campamiento, Col. Perena, 18. and 21.VI.1920; Upper R. Pchitea, 21.VII.1920; Union de la Isla (Iquitos), 8.VIII.1920; Puerto Bermudez, 12.-19.VII.1920, all Cornell University.

Xyleborus torquatus Eichh., El Campamiento, Col. Perena, 18.VI.1920; Puerto Bermudez, Rio Pichis, 12.-19.VII.1920; Rio Maranon, 7.VIII.1920; Putamayo River, 14.VIII.1920, all Cornell University.

Platypus sulcatus Chap., Hda San Juan, Col. Perena, VI.1920, Cornell University.

BOLIVIA

Phloeoborus punctato-rugosus Chap., Coroico (For. Res. Inst. Dehra Dun).

Dendrosinus ater Egg., Chulumani, Puente Villa, 14.II.1949, Dr. Kuschel.

Loganius flavicornis Chap., D° Cochabamba, Prov. Chapara, S. F. del Chipiri, 400 m, IV.1923, Martinetz.

Ceratolepis niger Egg., Asunta, V.1925, G. L. Harrington.

Stephanopodius boliviae Schedl, D° Santa Cruz, Prov. Ichita, Buenavista, X.1949, Martinetz.

Thamnopthorus elongatus Schedl, Cochabamba, Taguina, 27.XII.1948, Dr. Kuschel.

Xyleborus curtus Egg., D° Cochabamba, Prov. Chapare, km 158, El Palmar, 1949, Martinetz.

Xyleborus novateutonicus Schedl, D° Cochabamba, Prov. Chapara, km 158, El Palmar, 1949, Martinetz.

Xyleborus mascarensis Eichh., D° Cochabamba, Prov. Chapara, S. F. del Chipiri, 400 m.; D° Cochabamba, Prov. Chapare, km 150 (Jungas del Palmar), 1200 m, Martinetz; Rio Yacuma, Santa Rosa, 250 m, 14.VII.1950, W. Forster; Sarumpiuni, San Carlos, 1000 m, 15.IX.1950, W. Forster; Villa Montes, V.1926, Lind. D. Chaco.

Xyleborus torquatus Eichh., Villa Montes, V.1926, Lind. D. Chac.; Sarampiuni, San Carlos, 4.IX.1950, W. Forster; D° Cochabamba, Prov. Chapara, S. F. del Chipiri, 400 m, Martinetz.

Xyleborus ferrugineus Fab., Rio Yacuma, Santa Rosa, 250 m, 14.VII.1950, W. Forster; D° Santa Cruz, Prov. Ichita, Buenavista, X. 1949,Martinetz.

Corthylus punctatus Egg., D° Santa Cruz, Prov. Ichita, Buenavista, V.1949, Martinetz.
This species has been determined by using the description only and it perfectly agrees with it except that the impunctate sulcus, the second interstice of the elytral declivity has not been mentioned by Eggers.

Corthylus subsulcatus Schedl, D° Cochabamba, km 150, Jungas del Palmar, II.1953, Martinetz.

Platypus discicollis Chap., Rurrenbaque, VII.1935, G. L. Harrington.

Platypus perforans Schedl, Corvico, Huarinillas, 1.100 m, 12.II.1949, Dr. Kuschel.

Platypus parallelus Chap., Ingre Valley, X.1932, G. L. Harrington; Corvico Huarinillas,1.100 m, 12.II. 1949, Dr. Kuschel.

Platypus dejeani Chap., D° Cochabamba, Prov. Chapara, S. F. del Chipiri, 400 m, Martinetz; D° Cochabamba, Prov. Chapara, km 158, El Palmar, IV.1953, Martinetz; D° Santa Cruz, Prov. Ichita, Buenavista, X.1949, Martinetz.

Tesserocerus guerini Chap., Corvico, Huarinillas, 1.100 m, 12.II.1949, Dr. Kuschel.
The specimens from this high altitude in Bolivia are much larger (5.3 mm) than those from Brazil. The males are more coarsely sculptured, the base of the third elytral interstices are granulate on a much longer area and the elytral processes are much stouter. It seems to be worthwhile to regard them as var. montanus var. nov.

Venezuela

Camptocerus aeneipennis Fab., Suapure, Raura River, 7.VIII. and 6.-11.IX.1898, 25.IV.-1.VI.1900, E. A. Klages.

Stephanoderes prosper Schedl, Ciudad Bolivar, 21.-24.V.1898, E. A. Klages.

Stephanoderes obscurus Fab., Suapure, Caura River, 22.VI.1899, E. A. Klages.

Cryptocarenus seriatus Egg., Ciudad Bolivar, 12.X.1898, E. A. Klages.

Xyleborus asper Egg., Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.)

Xyleborus assiduus Schedl, Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.)

Xyleborus ferrugineus Fab., Mt. Duida, 4.XI.1928 (Cal Acad. Sci.); Ciudad Bolivar, 17.VI., 23.VI., 30.VI., 6.VII., 9.VII., 11.IX., 15.-30.IX., and 30.X.1898, E. A. Klages.

Xyleborus mascarensis Eichh., Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.); Ciudad Bolivar, 15.-30.IX.1898, E. A. Klages.

Xyleborus novateutonicus Schedl, Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.)

Xyleborus perebeae Nördl., Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.)

Xyleborus torquatus Eichh., Ciudad Bolivar, 11.-23.IV., 2.-8.V., 20.III., 31.V., 17., 23., 30.VI., 6. and 9.VII., 11.IX., 15-30.IX., 19.X.1898, E. A. Klages; Suapure, Caura River, 6.-17.I.1898, E. A. Klages.

Platypus dejeani Chap., Ciudad Bolivar, 20.I., 2.V., 27.VI., 17.VII, 24.VII., 25.VIII.1898, E. A. Klages; Suapure, Caura River, 6.-17.I., 6.-11.IX., 21.XII.1899, E. A. Klages; Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.); imported to Mannheim, Germany from Venezuela in wood of Zapotero (Gossypiospermum praecox)May 1957, H. Wichmann; Maracay, I.-II.1935, P. Vogel.

Platypus hians Chap., Mt. Duida, 4.XI.1928 (Cal Acad. Sci.).

Platypus lobatus Chap., Suapure, Caura River, 11.IX.1899, 18.III.1899, E. A. Klages.

Platypus parallelus Chap., Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.).

Platypus pretiosus Schedl, Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.).

Platypus pulchellus Chap., Imported to Mannheim, Germany from Venezuela in wood of Zapotero (Gossypiospermum praecox), May 1957, H. Wichmann.

Platypus ratzeburgi Chap., Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.).

Platypus subsulacatus Chap., Mt. Duida, 4.XI.1928 (Cal. Acad. Sci.).

Surinam

Hexacolus (*Erineophilus*) *guyanaensis* Schedl, Moengo, Boven, Cottica River, May 12, 17, 20, 21, and 24.1927 (Cornell University).

Neodryocoetes hymeneae Egg., Surinam, in Dolichus lab-lab (old collection).

Pityophthorus surinamensis Schedl, Moengo, Boven, Cottica River, 17., 20., 24.V.1927, Cornell University.

Xyleborus ferrugineus Fab., Paramaribo, 9.V.1927, Cornell University; Ongelijx, Para River, 1.V.1927, Cornell University; Moengo, Boven, Cottica River, 12., 13., 17., 21., 22.V.1927, Cornell University; Zanderij, I. Boven, Para Distr., 26.IV.1927, Cornell University; Kwakoegron, Saramoca R., 8.VI. 1927, Cornell University.

Xyleborus mascarensis Eichh., Moengo, Boven, Cottica R., 13.-22.V.1927, Cornell University; Zanderij, J. Boven, Para Dist., 19.IV.-26.IV.1927, Cornell University; Sint Barbara, Pln., Surinam R., 14.-15. IV.1927, Cornell University; Paramaribo, 9.V.1927, Cornell University.

Xyleborus intricatus Schedl, Moengo, Boven, Cottica R., 21.V.1927, Cornell University.

Xyleborus perforans Woll., Moengo, Boven, 13.-21.V.1927, Cornell University.

Xyleborus torquatus Eichh., Moengo, Boven, Cottica R., 12.-27.V.1927; Zanderij, J. Boven, Para Dist., 19.-26.IV.1927; Sint Barbara, Pln., Surinam R., 15.-23.IV.1927; Kwakoegron, Saramacca R., 8. and 11.VI.1927; Ongelijx, Para R., 30.IV.1927, all Cornell University; Surinam, ex *Cedrella odorata*, imported into Germany, Mannheim, leg. H. Wichmann.

Platypus carinulatus Chap., Moengo, Boven, Cottica R., 17.-27.V.1927; Zanderij, J. Boven, Para Dist., 25. and 29.IV.1927, Cornell University.

Platypus dejeani Chap., Moengo, Boven, Cottica R., 13.-27.V.1927; Zanderij, J. Boven, Para Dist., 24. and 26.IV.1927; Sint Barbara, Pln., Surinam R., 15.IV.1927, all Cornell University.

Platypus hians Chap., Moengo, Boven, Cottica R., 17. and 20.IV.1927, Cornell University.

Platypus dignatus Schedl, Ongelijx, Para R., 2.V.1927, Cornell University.

Cenocephalus pulchellus Schedl subsp. *minor* Schedl, Moengo, Boven, 12., 17., 20.IV.1927, Cornell University.

British Guiana

Xyleborus ferrugineus Fab., Mackenzie, Demerara R., 21. and 24.VI.1927; Rockstone, Essequebo R., 25.VI.1927; Tumatumari, Potaro R., 27.VI.1927, all Cornell University; Tumatumari, 11.VII.1911, Cal. Acad. Sci.

Xyleborus curtus Egg., Kamakusa, I.1923, C. B. Beal.

Xyleborus mascarensis Eichh., Kaieteur, 30.VII.1911 (Cal. Acad. Sci.); Rockstone, Essequebo R., 25. VI.1927, Cornell University.

Xyleborus perforans Woll., Mackenzie, Demerara R., 21.VI.1927, Cornell University.

Xyleborus torquatus Eichh., Georgetown, 13.IX.1948, C. B. Beal; Mackenzie, Demerara R., 21.VI.1927; Rockstone, Essequebo R., 25. and 30.VI.1927; Tumatumari, Potaro R., 29.VI.1927, all Cornell University.

Platypus alternans Chap., Kaieteur, 30.VII.1911; Tukeit, 27.VII.1911 (Cal. Acad. Sci.).

Platypus carinulatus Chap., Tumatumari, Potaro R., 27. and 29.VI.1927; Rockstone, Essequebo R., 25. and 26.VI.1927; Zanderij, I. Boven, Para Dist., 19.VI.1927, all Cornell University.

Platypus dignatus Schedl, Kamakusa, I.1923, C. B. Beal.

Platypus dejeani Chap., Mackenzie, Demerara R., 21. and 22.VI.1927; Rockstone, Essequebo R., 25.VI. 1927; Tumatumari, Potaro R., 27. and 29.VI.1927, all Cornell University; Kaieteur, 30.VII.1911; Kamakusa, I.1923 (Cal. Acad. Sci.); Nueva Limon, 10.IV.1944, K. E. Frick.

Platypus konincki Chap., Kamakusa, I.1923 (Cal. Acad. Sci.).

Platypus manus Schedl, Rockstone, Essequebo R., 25.VI.1927, Cornell University.

Teserocerus obtusus Chap., Kamakusa, I.1923 (Cal. Acad. Sci.).

Paraguay

Phloeoborus bodei Egg., Horqueta, -.XI.1932, Alberto Schulz.

Xyleborus torquatus Eichh., Alto Parana R., Argent.-Parag., 18.-23.VI.1920, Cornell University.

Argentina

Scolytus rugulosus Müll., Catamarca, Ciudad, III.1950, Martinetz.

Brazil

Phloeoborus punctato-rugosus Chap., Bahia, For. Res. Inst. Dehra Dun.

Hylesinus crenatus Fab., Brazil, E. P. Reed Collection.

Leperisinus varius Fab., Brazil, E. P. Reed Collection.

Stephanoderes plumeriae Nördl., Fernando de Noronha Island, V.1958, M. Alvarenga.

Hypocryphalus magniferae Stebb., State of Sao Paulo, Ribeirao Preto, 1958, ex Mango tree (*Mangifera indica*), José Pinto da Fonseca.

Xyleborus biconicus Egg., State of Sao Paulo, Ribeirao Preto, 1958, ex Mango tree (*Mangifera indica*), José Pinto da Fonseca.

Xyleborus ferrugineus Fab., Minas Gereas, Pirapora, 11.-13.XI.1919; Minas Gereas, Lassance, 9.-19.XI. 1919; Minas Gereas, Bello Horizonte, 1.-6.XI.1919; Matto Grosso, Itapura, 6., 8., 9.XII.1919, all R. G. Harris; State of Sao Paulo, Ribeirao Preto, 1958, ex Mango tree (*Mangifera indica*), José Pinto da Fonseca.

Xyleborus mascarensis Eichh., Minas Gereas, Pirapora 11.-13.XI.1919; Minas Gereas, Lassance, 9.-19.XI. 1919; Minas Gereas, Bello Horizonte, 1.-6.XI.1919; Matto Grosso, Corumba, 11.-22.XII.1919; Matto Grosso, Itapura, 6., 8., 9.XII.1919, all R. G. Harris.

Xyleborus torquatus Eichh., Porto Velho, 23.IX.1948, C. B. Beal; Fernando de Noronha Island, V.1958, M. Alvarenga.

Platypus dejeani Chap., Minas Gereas, Pirapora, 11.-13.XI.1919; Corumba, Urucum, 28.-29.XII.1919, R. G. Harris; Porto Velho, 23.IX.1948, C. B. Beal.

Platypus ratzeburgi Chap., Minas Gereas, Lassance, 9.-19.XI.1919; Minas Gereas, Pirapora, 11.-13.XI. 1919, R. G. Harris.

Teserocerus dewalkei Chap., Minas Gereas, Lassance, 9.-19.XI.1919, R. G. Harris.

RESTRICTION OF THE GENUS LYTTA FABRICIUS (MELOIDAE)

By RICHARD B. SELANDER [1]

In the course of a study of the classification of the genus *Lytta* it has become necessary to restrict the limits of the genus by removing from it four Neotropical species. In the present article new generic categories in the tribe Lyttini are proposed for the reception of these species.

All North American species currently assigned to *Lytta* may be retained in the genus with the exception of *sanguineoguttata* Haag-Rutenberg. In South America Kaszab's (1959, Acta Zool. Acad. Sci. Hungaricae, vol. 4, p. 111) recent transfer of seven species from *Lytta* to the genus *Acrolytta* Kaszab leaves a total of four species in the genus *Lytta*: *abbreviata* Klug, *inflaticeps* Beauregard, *philippi* Reed, and *neivai* Denier. The first three of these are definitely not congeneric with the type of *Lytta* (*vesicatoria* (Linnaeus)). The species *neivai*, on the basis of its description (Denier, 1940, Rev. Ent., vol. 11, pp. 799–800), is very doubtfully a true member of the genus *Lytta*, but I am unable to assign it to another genus at this time

I want to express my appreciation to Hugh B. Leech, California Academy of Sciences, and Christine M. F. von Hayek, British Museum (Natural History), for the loan of specimens of South American Lyttini from their respective institutions. Dr. von Hayek also assisted me by providing drawings of the type specimen of *Lytta fissiceps*.

Genus **PANICULOLYTTA,** NEW GENUS

Body unusually elongate. Antennae long, heavy, more or less filiform; segment I globose; male segments IV to VII incrassate and greatly lengthened. Pronotum elongate, campanuliform. Elytra not shortened; surface rugose. Wings fully developed. Mesepisterna meeting broadly on midline of body; marginal area wide. Legs unusually

[1] Department of Entomology, University of Illinois, Urbana

long, slender. Male trochanters each with a heavy tuft of stiff setae. Each tibia with two spurs. Hind tibial spurs flattened, excavate behind; outer spur thicker. First segment of male middle tarsi with a heavy tubercle at base extending ventrad at a right angle to segment. Tarsal claws cleft to base; blades subequal, smooth. Male pygidium with an apically dilated median process. Male genitalia with gonostyli slender, tapered, subglabrous (a few minute setae ventrally), lacking mesal hooks; aedeagus lacking ventral hooks.

Type: *Lytta sanguineoguttata* Haag-Rutenberg.

Remarks: The precise relationships of this genus are not apparent. However, the genus does seem to have more characters in common with the genus *Lytta* than with any of the other genera of Lyttini represented in the New World. It is most readily distinguished from other lyttines by its elongate form and the sexual modifications of the male.

A redescription of the type species follows.

Paniculolytta sanguineoguttata (Haag-Rutenberg)

Lytta sanguineoguttata Haag-Rutenberg, 1880, Berliner Ent. Zeitschr., p. 40.

Cantharis sanguineoguttata, Champion, 1892, Biol. Centrali-Americana, Coleoptera, vol. 4, pt. 2, p. 449, pl. 20, fig. 26.

Dark metallic green, blue, or violaceous. Pronotum with a large orange area on each side, or with these areas reduced to small spots or entirely absent. Head with a very small orange frontal spot at center. Wings light brown. Pubescence pale on at least under surface of body and legs. Length: 7—24 mm.

Length of elytra nearly or fully three and one-third times greatest width (near humeri). Head nearly one-third longer than wide, widest (except at eyes) just above eyes; vertex large; sides evenly rounded and convergent from eyes to top of vertex, which is deeply notched; surface smooth, shiny, densely micropunctate, finely, very sparsely punctate, subglabrous; few setae present short, stiff; a distinct oblique swelling on each side above antennal sockets, the area between depressed; lower margin of frontal area strongly declivous. Pronotum one-fifth to one-fourth longer than wide; disk flattened before middle, impressed medianly behind; basal margin reflexed; surface as on vertex except disk nearly impunctate. Scutellum narrow, blunt. Elytra finely, weakly rugose, shiny, very finely, moderately densely punctate, essentially glabrous. Middle tibiae bowed. Tarsal pads well developed, dense, undivided. Outer hind tibial spur at most twice as wide as inner spur.

Male: Antennae (fig. 1) extending five segments beyond base of pronotum; segment II very short; III normal, shorter than I; IV to VII four-fifths to twice as long as III; VIII to X progressively shorter and narrower, VIII being about two-thirds as long as VII. Setal tufts of fore and middle trochanters at middle ventrally, those of hind trochanters at basal angle ventrally (fig. 10); antero-ventral face of trochanters flattened, clothed with short, stiff setae. Fore and middle tarsal pads denser and more compact than in female. Fifth abdominal sternum truncate. Emargination of sixth sternum (fig. 8) deeply triangular; sternum deeply, broadly impressed behind middle, the sides forming a pair of broad, concave lobes; edge of lobes densely pubescent; impressed area glabrous. Pygidium (fig. 7) deeply, roundly emarginate on each side, leaving a median process which is dilated apically; surface of pygidium nearly glabrous. Genitalia as in figure 9; gonostyli widely separated basally, divergent and turned ventrad at apex; dorsal sclerite of aedeagus elongate, triangular in dorsal view, with each basal angle of triangle produced anteriad as a lamella; lateral flanges of gonopore densely spiculate internally.

Female: Antennae with segments IV to X each about as long as I, becoming progressively slightly wider. In two of the three females examined from four to eight of the setae of the middle and hind trochanters are clumped more or less closely in the position occupied by the setal tufts in the male. Fifth abdominal sternum entire. Sixth sternum entire, strongly cupped apically. Pygidium not modified.

Type Locality: Guatemala

Geographic Distribution: Mountains of southern Guatemala.

Seasonal Distribution: The only recorded collection date is September 22.

Records: GUATEMALA: Country label only, 3 (including lectotype); Calderas, 1; Chimaltenango, 2; Quezaltenango, September, 1; Tepan [Tecpán], 3.

Remarks: There are orange markings on the pronotum of three of the ten specimens I have examined. The trochanteral tufts of setae in the male were mistaken for spines by Champion, who also overlooked their presence on the middle legs.

I hereby designate a male in the Zoologische Staatssammlung at Munich (Haag-Rutenberg collection) labeled "Guatemal[a], Deyrolle" as lectotype of this species.

Genus **EPISPASTA**, NEW GENUS

Moderate-sized, entirely black beetles. Head and pronotum clothed with very short dark setae; abdominal setae longer; elytra glabrous. Head quadrate, lacking a pale frontal spot or bulge; surface coarsely, densely punctate. Antennae (fig. 2) rather short, three-fourths longer than fore tibia, slender, subfiliform, moderately compressed; distal segments slightly longer and wider than basal ones; male intermediate segments not incrassate. Eyes large, bulging. Pronotum subcampanuliform, quadrate; sides parallel for basal three-fifths, then rounded and convergent; disk convex, even, lacking calluses; surface as on head. Elytra not appreciably shortened, very finely, densely punctate, obsolescently rugose. Wings fully developed. Mesepisterna meeting broadly on midline of body; marginal area wide. Legs long, slender, not specially modified in male. Middle tibiae not bowed. Each tibia with two spurs. Outer hind tibial spur thickened, very obliquely truncate; inner spur slender, spiniform. Tarsal claws cleft to base; blades slender, subequal, smooth. Male sixth abdominal sternum shallowly, obtusely emarginate, not cupped, lacking membranous area. Female sixth sternum entire. Pygidium not produced. Male genitalia (fig. 6) with gonostyli robust, tapered apically to an acute apex; a linear membranous area on each gonostylus latero-dorsally for apical half from which arises a series of long setae; aedeagus heavy with a single ventral hook and an evenly arcuate dorsal one.

Type: *Lytta abbreviata* Klug.

Remarks: I have examined six specimens of *abbreviata,* including a male that was compared with the type by Haag-Rutenberg. In one of the males the abdomen extends two terga beyond the end of the elytra, but in the remainder of the specimens it is completely covered by them. The species has the general facies of a species of *Epicauta,* but it lacks the sericeous patch of the fore femur characteristic of that genus.

The genus *Epispasta* may be readily distinguished from other genera of South American Lyttini by its coarsely and densely punctate head and pronotum, finely punctate, nearly smooth elytra, and the complete lack of male sexual modifications of the antennae and legs.

Genus **MEGALYTTA,** NEW GENUS

Large beetles with head, sides of pronotum, and basal part of elytra orange, rest of body and legs black. Body surface densely pilose throughout; pubescence erect on upper surface, subrecumbent on under surface. Head triangular, deeply longitudinally impressed on front between eyes; vertex tumid; surface finely, densely punctate. Antennae (fig. 3) short, one-half longer than fore tibia, moderately compressed; segment I globose; II very short, half as long as III; III and IV more or less cylindrical; rest moniliform; III to X subequal in length. Pronotum subcircular in outline; disk impressed and declivous for apical half, convex for basal half with a broad median impression; calluses absent; surface as on head. Scutellum very elongate. Elytra not shortened, finely rugose-punctate; pubescence (except basally) shorter than on head and pronotum. Wings fully developed. Mesepisterna meeting broadly on midline of body; marginal area wide. Legs moderately long. Middle tibiae bowed. Each tibia with two spurs. Outer hind tibial spur thickened, obliquely truncate; inner spur slender, flattened, sticklike. Tarsal claws cleft to base; blades subequal, smooth. Under surface of body with pubescence shiny pale yellow on second to fourth abdominal sterna, black elsewhere, longer than on upper surface. Male sixth abdominal sternum (fig. 5) deeply, roundly emarginate. Female sixth sternum shallowly emarginate, with a median impression on hand margin. Male genitalia with gonostyli moderately heavy, each tapered to a point which is turned lateroventrad, each with a large, longitudinal lightly sclerotized area dorsally; aedeagus with a single ventral hook which is not recurved; dorsal hook small, sharply recurved.

Type: *Cantharis inflaticeps* Beauregard.

Remarks: This genus is distinguished from other New World Lyttini by the form of the head and antennae, the general pilosity of the body, and the color pattern. I have not examined a male of the type species, the description of male characters given above being based on drawings of the antennae and genitalia of the type specimen of *Lytta fissiceps* prepared for me by Christine M. F. von Hayek in the British Museum (Natural History). Unfortunately, the gonocoxal plate and the basal half of the aedeagus in this specimen have been destroyed by demestid larvae.

Megalytta inflaticeps has as synonyms *Lytta fissiceps* Haag-Rutenberg and *L. adonis* Pic. The name *inflaticeps* was proposed by Beauregard (1889, Bull. Soc. Ent. France, p. ccxii) as a replacement for *fissiceps* Haag-Rutenberg (1880), which became a junior homonym of *Eupompha fissiceps* LeConte (1858) by Beauregard's citation of both names under the generic name *Cantharis* (see also Beauregard, 1890, Les insectes vésicants, p. 494). Unfortunately, subsequent authors have persistently failed to recognize the validity of Beauregard's name.

Genus **DICTYOLYTTA,** NEW GENUS

Large black beetles with coarsely reticulate elytra and fully developed wings. A large, smooth, strongly swollen orange blister on front of head. Antennae short, one-third longer than fore tibia, compressed; segments filiform, closely set; IV to XI progressively narrower. Pronotum wider than long; sides rounded; disk with a strong, transverse depression on middle half. Elytra not shortened; surface coarsely strongly reticulate. Wings fully developed. Mesepisterna widely separated on midline of body; marginal area narrow. Legs long, very slender, strongly compressed. Fore tibiae with inner side very densely lined with pale, sericeous pubescence; middle and hind tibiae with a thinner, less dense line of black pubescence. Middle tibiae straight, not bowed. Each tibia with two spurs. Hind tibial spurs slender, subequal, flattened behind. Tarsal claws cleft to base; blades subequal, smooth. Male sixth abdominal sternum entire; apex cupped, membranous. Male genitalia with gonostyli moderately slender, straight, pointed, largely membranous except fused basal part, clothed with short, stiff setae subapically, aedeagus straight, slender, with two well-developed ventral hooks; dorsal hook small, slender.

Type: *Cantharis philippi* Reed.

Remarks: *Dictyolytta* is easily recognized as its type is the only winged South American species of Meloidae with reticulate elytra. A redescription of the type species follows.

Dictyolytta philippi (Reed)

Cantharis (?) *philippii* Reed, 1873, Ent. Month. Mag., vol. 9, p. 208.

Cantharis frontalis Fairmaire, 1873, Ann. Mus. Civ. Stor. Nat. Genova, vol. 4, p. 534.

Cantharis philippi, Fairmaire, 1876, Ann. Soc. Ent. France, ser. 5, vol. 6, p. 385.

Lytta philippi, Denier, 1935, Rev. Argentina Ent., vol. 1, p. 23; 1940, Rev. Ent., vol. 11, p. 802.

Black. Large frontal spot bright orange. Elytra with an ill-defined piceous area covering base and extending apicad to beyond middle along sutural third of each elytron. Length: 18—31 mm.

Head subtriangular, with prominent, well-rounded tempora; surface bumpy, wrinkled; vertex moderately coarsely, deeply, rather sparsely punctate; pubescence short, under

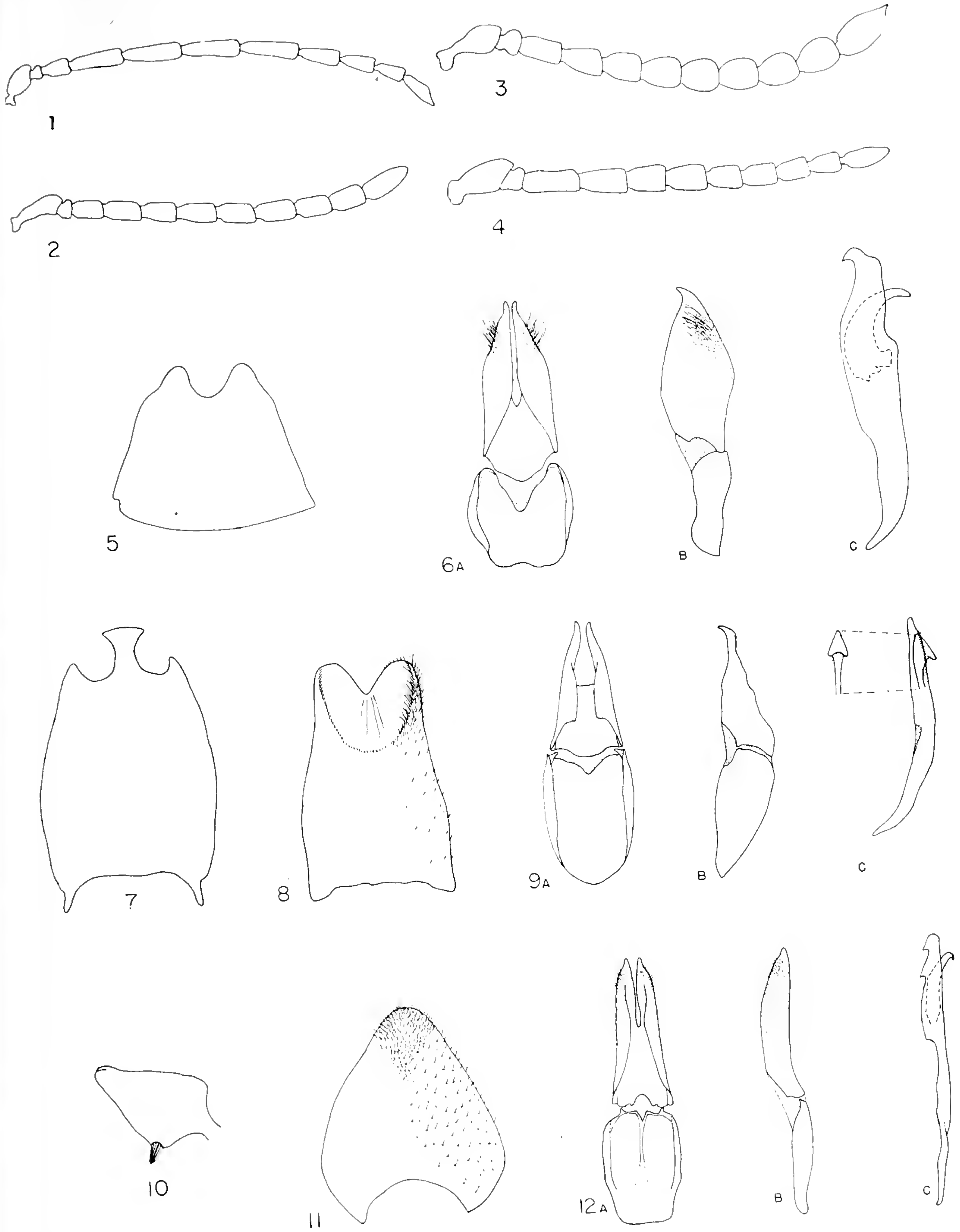


FIG. 1. *Paniculolytta sanguineoguttata*, male antenna. FIG. 2. *Epispasta abbreviata*, male antenna. FIG. 3. *Megalytta inflaticeps*, female antenna. FIG. 4. *Dictyolytta philippi*, male antenna. FIG. 5. *Megalytta inflaticeps*, male sixth abdominal sternum. FIG. 6. *Epispasta abbreviata*, male genitalia: a, gonoforceps, ventral view; b, same, lateral view; c, aedeagus, lateral view. FIG. 7. *Paniculolytta sanguineoguttata*, male pygidium. FIG. 8. Same, male sixth abdominal sternum. FIG. 9. Same, male genitalia; parts and views as in figure 6. FIG. 10. Same, male right hind trochanter. FIG. 11. *Dictyolytta philippi*, male sixth abdominal sternum. FIG. 12. Same, male genitalia; parts and views as in figures 6 and 9.

side of head densely punctate, hairy. Pronotum extremely rough, wrinkled, with deep impressions; surface smooth, very finely, very sparsely punctate on disk; setae as on vertex. Elytral surface smooth, impunctate, glabrous; reticulations strongly marked; cells irregular in form and size. Under surface of thorax densely pubescent, of abdomen more sparsely pubescent. Tarsal pads dense, very narrow.

Male: Antennae as in figure 4, reaching a little beyond middle of pronotum; segments except I very densely pubescent, dull. All tarsal pads pale. Sixth abdominal sternum as in figure 11. Genitalia as in figure 12.

Female: Antennae as in male but slightly shorter. Pad of first and second segments of middle tarsi and first segment of hind tarsi black. Sixth abdominal sternum truncate.

Type Locality: Of *philippi*, North Chilé. Of *frontalis*, Chilé.

Geographic Distribution: Atacama and Coquimbo provinces, northern Chilé.

Seasonal Distribution: November 4 to January.

Records: CHILÉ: *Atacama*: Chanaral, December, January, 4. *Coquimbo*: Condoriaco, November, 6.

Remarks: The above description is based on specimens in the collection of the California Academy of Sciences (E. P. Reed collection). The present location of the types of *philippi* and *frontalis* is unknown to me.

THE APION SUBGENUS PERAPION WAGNER IN NORTH AMERICA (CURCULIONIDAE)

By D. G. Kissinger [1]

The problem of determining the relationship of the species of *Apion* occurring in the New World to the various subgenera of *Apion* founded on European species is no small task. Recently I have found that the *Apion punctinasum* group of Kissinger (1959) can be assigned to the subgenus *Perapion* Wagner.

The general appearance of the two groups is very similar: body generally elongate; prothorax more or less subcylindrical with the apex not much smaller than the base; and the beak rather short, stout, and subcylindrical and hardly expanded at the insertion of the antennae. The fundamental character these two groups have in common is the fact that the middle coxae are not separated by the mesosternum. This condition is known to occur also in four groups of New World *Apion* (Kissinger, 1959), the Palearctic subgenus *Phrissotrichium* Schilsky, and the Ethiopian subgenus *Aplemonus* Schoenherr.

[1] Box 832 South Lancaster, Mass.

In addition to structural similarities the *punctinasum* group has host plants similar to those of the members of *Perapion.* Hustache (1931) lists 13 members of the subgenus from the Franco-Rhenane region, of these seven species are believed to develop in plants of the family Polygonaceae. Both *A. punctinasum* and *A. pulchrum* are associated with plants of this family. The only other *Apion* known to me that develop in Polygonaceae are members of the Palearctic subgenus *Erythrapion* Schilsky.

The three Nearctic members of the subgenus probably differ from the Palearctic and Ethiopian members (I have seen *affine,* Kby., *antiguum* Gyll., *brevirostre* Hbst., *chevrolati* Gyll., *curtirostre* Gem., *hydrolapathi* Marsh., *ilvense* Wagn., *limonii* Kby., *marchicum* Hbst., *sedi* Germ., *simum* Germ., and *violaceum* Kby.) in that the vestiture is denser in a narrow postscutellar spot on the elytra; the old World species have uniform pubescence on the elytra.

Hustache (1931) included two species in *Perapion, limonii* Kby. and *malvae* F., that were not included by Wagner (1910). Wagner placed *limonii* in *Aplemonus. A. limonii* has the middle coxae not separated by the mesosternum; it can not be *Aplemonus,* however, because the front tibia is not strongly curved and not armed with teeth within; it seems to be a *Perapion. A. malvae* F., on the other hand, has the middle coxae separated by the mesosternum, thus it cannot be placed in *Perapion*; Balfour-Browne (1944) placed it in *Pseudapion* Schilsky.

The subgenus *Perapion* is quite large; including the species treated in this paper Wagner (1910) listed 32 species from the Holarctic and Ethiopian regions.

[1]Oakwood College, Huntsville, Alabama.

KEY TO THE NORTH AMERICAN SPECIES OF THE SUBGENUS PERAPION WAGNER

1. Elytra with nearly uniform, conspicuous, moderately coarse pubescence; scales behind scutellum slightly denser and hardly coarser than those on remainder of elytra..**wickhami,** sp. n.
   Elytra with a conspicuous postscutellar spot of pubescence much coarser than the sparse, very fine, inconspicuous scales on remainder of elytra........................ 2
2. Beak distinctly shorter than prothorax in both sexes........................**pulchrum** Blatchley
   Beak equal to or longer than prothorax........................**punctinasum** Smith

Apion (Perapion) wickhami, NEW SPECIES

(Figure 1)

Described from a single specimen of unknown sex (probably a female) labeled Laramie, Wyoming, March 18, 1894, Wickham collection, in U. S. National Museum.

Length: 2.43 mm.; width: 1.00 mm. Elongate, moderately robust; black. Pubescence white, conspicuous, dense but not entirely concealing integument, uniform except for short sutural stripe immediately behind scutellum where it is slightly denser. Beak as long as prothorax, slightly curved, subcylindrical, a trifle prominent over antennal insertion when viewed from above; dull, punctured and pubescent to near tip, tip glabrous and shining. Antennae inserted at basal third at distance from eye slightly greater (as 3.0: 2.5) than width of frons; segments 1 and 2 each equal to next two, club 0.18 by 0.06 mm., segment 7 rather closely applied to club. Eyes slightly prominent, frons equal in width to dorsal tip of beak, punctured irregularly; in lateral view eye about as long as high, 0.18 by 0.18 mm., rounded in outline except in posterior ventral quadrant where it is obliquely flattened; in lateral view dorsal outline of head with frons appearing depressed and vertex of head appears higher and slightly prominent. Prothorax subcylindrical, as long as wide at base, middle a trifle narrower than base, width of apex to base as 7: 8; without basal lateral expansion, sides nearly parallel in basal two-thirds then slightly narrowed to apex which is not constricted; in profile dorsal surface slightly arcuate; on dorsal surface punctation fine and deep, about 0.02 mm. in diameter, interspaces much narrower than diameter of punctures, from one-third to one-half as wide, slightly wider near basal fovea; basal fovea a short deep elongate puncture beginning at distance from base equal to about twice length of scutellum. Elytra at humeri one-third wider than prothorax at base, three times as long as prothorax, length to width as 13.5: 8; intervals slightly convex, about twice as wide as striae, with three or four rather irregular rows of minute punctures bearing conspicuous, fine elongate scales from 0.04 to 0.06 mm. long, in same row tip of scale generally reaches to or slightly beyond base of next scale; striae deep, moderately broad, with one row of scales which has a tendency to be slightly coarser than scales on adjacent intervals; scutellum linear, about 0.06 mm. long by 0.04 mm. wide. Front femur robust, about 2.7 times as long as wide. Claws simple.

Apion (Perapion) pulchrum Blatchley

Apion pulchrum Blatchley, 1916, Rhynch. N. E. America, p. 74.

Specimens of this species have been seen with the following data: Illinois: Olive Branch, October 4, 1909, Gerhard Co. (CNHM). Indiana: Kosciusko Co., June 6, type locality. Louisiana: Mansura, July 11, A. A. Rosenfeld (USNM). Maryland: Snow Hill, August 16, 1942, W. H. Anderson, larvae in stems of *Polygonum punctatum* (USNM). North Carolina: Holly Shelter, April 25, 1953, H. and A. Howden (Howden). Ohio: Westerville, June 24, July 3 and 23, August 21, September 7, E. L. Sleeper, *Persicaria* [*Polygonum*] *hydropiper* L. [compared with type by Sleeper] (ELS).

Apion (Perapion) punctinasum Smith

Apion punctinasum Smith, 1884, Trans. American Ent. Soc., vol. 11, p. 46.

I designate the lectotype of this species as the specimen labeled "Wy [oming]," U S N M no. 1281; a lectoparatype in Museum of Comparative Zoology, no. 360, with same data.

Specimens of this species have been seen with the following data: UNITED STATES: California: exact locality unknown (TLCC); Grass Lake, Siskiyou Co., June 11, 1941, A. T. McClay; Lake Co. (TLCC). Illinois: Braidwood, May 10, 1949, N. W. Sanderson (INHS). Massachusetts: Nantucket, June 7, 1927, C. A. Frost (CAF and USNM). Montana: Onah, July 9, 1916, J. B. Wallis (UK). Nebraska: 3.3. miles east of Potter, Cheyenne Co., June 22, 1953, B. and B. Valentine (DGK). Nevada: Elko, Wickham collection. New Jersey: Elizabeth, Wickham collection (USNM). Oregon: Klamath Falls, June 1 to 7, July 18, Joe Schuh, one pair mating on *Rumex* sp. (Schuh); Upper Klamath Marsh, June 21, 1938, L. P. Rockwood (Schuh); Lake of the Woods, Klamath Co., June 15, 1941, A. T. McClay (UC at Davis). Wyoming: exact locality unknown, type locality (USNM). CANADA: Alberta: Edmonton, June 18, 1928, F. S. Carr (UC at Davis). British Columbia: Oliver, April 30, 1923, C. B. Garrett (CNC); Vernon, July 10, 1922, H. B. Leech (CNC). Manitoba: Aweme, N. Criddle, *Rumex persicarioides* (CNC); Riding Mountain Park, June 9, 1937, W. J. Brown (CNC). Ontario: Britannia, June 2, 1948, S. D. Hicks (CNC); Delhi, June 3, 1931, W. J. Brown (CNC); Mer Bleue, May 5, 1931, W. J. Brown (CNC); Prince Edward Co., June 9, July 13, August 21, J. F. Brimley (DGK). Saskatchewan: Attons Lake, Cut Knife, June 3, 1940, A. R. Brooks (CNC); Ogema, June 16, 1916, N. Criddle (CNC).

A. punctinasum shows some variation in the form of the beak of the male and in the sculpture of the elytral intervals. The beak of some males appears stouter in side view because the dorsal outline is arched, this is apparent because the beak attenuates somewhat apically instead of being nearly subcylindrical throughout. The intervals may be polished and smooth or they may have definite transverse wrinkles. No geographical pattern could be found for these variations as specimens from eastern and western localities exhibited the differences.

The two species, *pulchrum* and *punctinasum*, are very similar in many respects. Besides the difference in the length of the beak summarized in the key they differ somewhat in color and convexity of the elytral intervals. The elytra of *pulchrum* tend to have a definite brassy luster more yellow than the purplish luster of *punctinasum*, and the intervals of *pulchrum* tend to be more convex than those of *punctinasum* and have definite transverse wrinkles. Both *pulchrum* and *punctinasum* differ greatly from *wickhami* because of the uniform pubescence on the elytra of the latter.

ADDENDUM

An interesting specimen has been seen from the entomological collection of the "Defensa Agrícola," México, D. F. It is labeled only "Chiapis." Judging from available material it is *Apion* (*Erythrapion*) *miniatum*

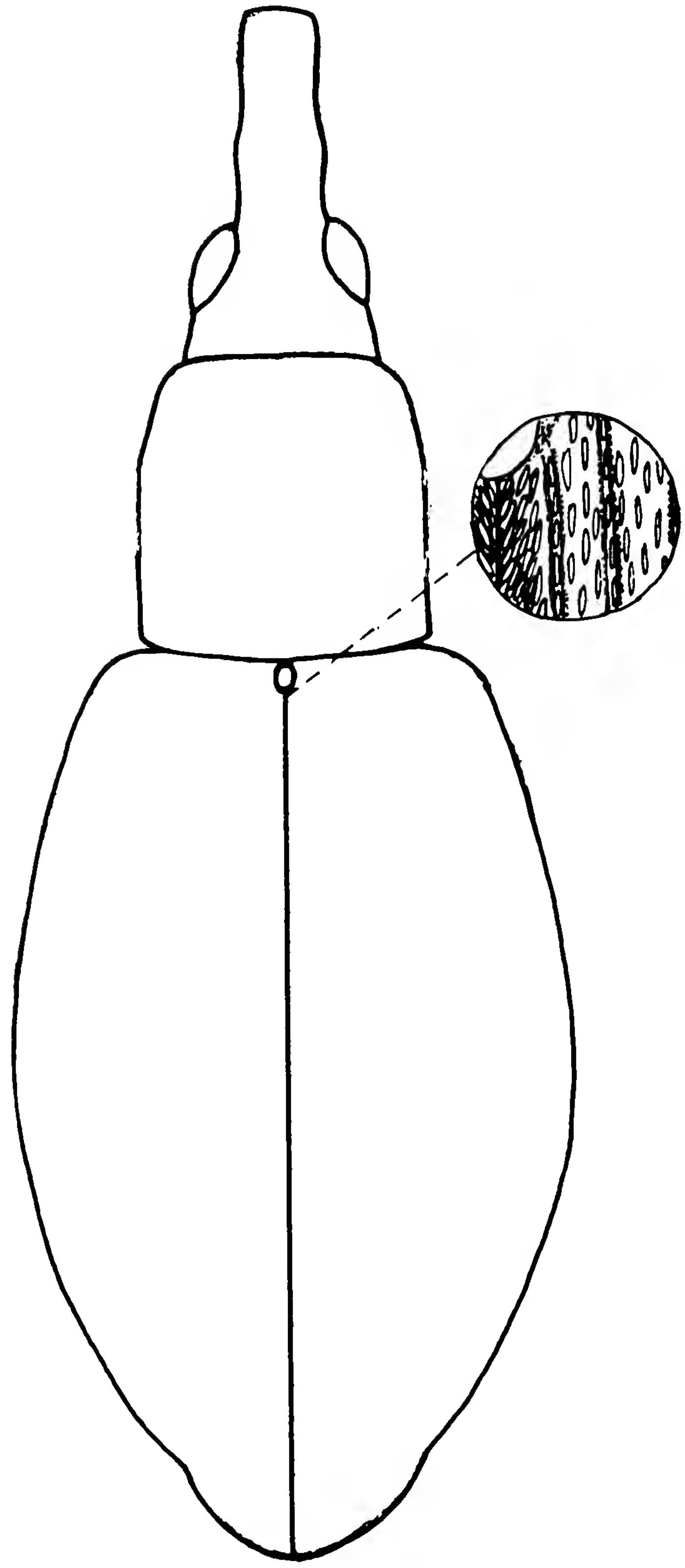


FIGURE 1. Entire dorsal view of *Apion* (*Perapion*) *wickhami* Kissinger; inset shows detail of scales on intervals 1-3 immediately behind scutellum.

Germar, a common European species. I believe the specimen is incorrectly labeled, perhaps accidentally transported, or by some other mishap incorrectly associated with Mexico. I'll stand corrected if and when further unquestionable material is found in Mexico.

The species differs greatly from the New World *Apion* known to me by its red color and very long, subcylindrical head; the eye is situated from the front margin of the prothorax at a distance greater than 1.5 times its diameter. Hustache (1931) gives the size range of this species as 3.3 to 4.5 mm. Members of this subgenus are associated with *Rumex.*

References

Balfour-Browne, J. 1944. A contribution to the knowledge of the Apioninae of Cyprus. Bull. Soc. Fouad Ent., 28: 147-154.

Blatchley, W. S. and C. W. Leng. 1916. Rhynchophora or weevils of North Eastern America. The Nature Publ. Co., Indianapolis, 682 pp., 155 fig.

Hustache, A. 1931. Famille LXXIX Curculionidae, Tribu: Apioninae. Tableaux analytiques des Coléoptères de la Faune Franco-Rhénane. Misc. Ent., 1931, 286 pp., 77 fig.

Kissinger, D. G. 1959. The species groups of *Apion* occurring in North and Central America. Coleopt. Bull., 13: 21-32.

Smith, J. B. 1884. Synopsis of the Apioninae of North America. Trans. American Ent. Soc., 11: 41-68.

Wagner, Hans 1910. Coleopterorum catalogus, pars 6, Curculionidae: Apioninae, 81 pp. [Vol. 28].

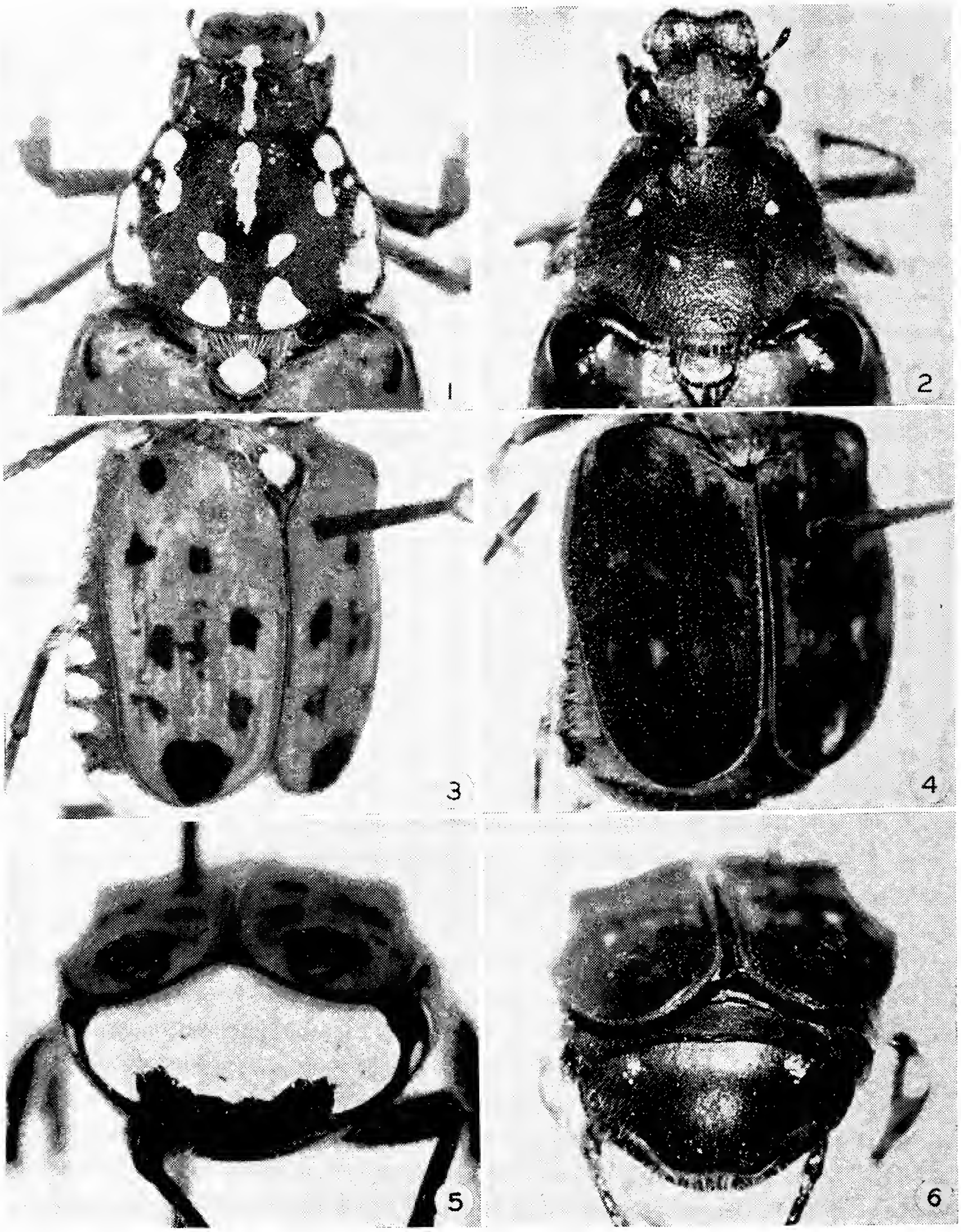
CANADIAN SPECIMENS OF GNORIMELLA MACULOSA (KNOCH) (SCARABAEIDAE) WITH NOTES ON VARIATION

By Stanton D. Hicks [1]

In The Canadian Field-Naturalist (1957) I published a note on the distribution and occurrence of the scarabaeid *Gnorimella maculosa* (Knoch), generally considered a rare beetle throughout its range in eastern North America. I suggested that this species could be collected rather frequently near Wakefield, Quebec, and on June 8, 1959, I confirmed this prediction. Three females and six males were taken flying around the flowers of *Cornus rugosa* (the same clump of dogwood as in 1956) which occurred on a steep, rocky hillside. Fifteen or more specimens were seen but only nine were taken since they were quite active, owing to the 90° temperature.

Variation in the Wakefield material seems worthy of comment. Published descriptions of the pattern of this beetle refer to a form having black spots on light brown elytra. This seems to be normal for specimens taken

[1]Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Ontario.



Variations in the colour pattern of the thorax, elytra, and pygidium of *Gnorimella maculosa*. Figs. 1, 3, and 5—typical female from Riverton, New Jersey. Figs. 2, 4, and 6—dark coloured male from Wakefield, Quebec.

in the eastern United States as shown in Figs. 1, 3, and 5. There is no mention in the literature of specimens with dark elytra nor mention of the range of colour variation in the species as a whole. One worker (Schaum, 1849, p. 291) noted the colour difference on the pygidium between the sexes. In the Canadian National Collection there are twenty specimens from the following localities: Wakefield, Quebec (6♂, 5♀), Montreal, Quebec (1♂), Ottawa, Ontario (1♂, 2♀), Walsingham, Ontario (1♀), and Riverton; New Jersey (1♂, 3♀). In these specimens the males have the pronotum (Fig. 2) averaging darker than in the females. The elytra are at least slightly more heavily maculate; most distinctive is the pygidial colour which is normally separated into three light yellow patches in the males (unlike the extreme example illustrated in Fig. 6). Females, on the other hand, have distinct patches of yellow on the pronotum (Fig. 1); the black spots of the elytra (Fig. 3) are generally small and irregular; and the pygidium (Fig. 5) is normally cream coloured or yellow, with the apex black.

While colour will ordinarily serve to separate the sexes, they can be easily distinguished by the difference of the middle tibiae. In the female they are straight while those of the male are more slender and suddenly arcuate.

Colour variation within each sex presents oddly different pictures. All of the male specimens from Canada, particularly those from Wakefield, have the black areas of the elytra noticeably enlarged, the darkest specimen having three, irregular, transverse black bands on the elytra (Fig. 4). Spotting is also reduced or lacking on the pronotum of the Canadian specimens. There is less variation in the females. The black spots of the elytra are larger in the Canadian specimens but the pattern remains similar to the more southern form.

These are the major differences and on the basis of the twenty specimens seen, the darker Canadian forms may indicate a north-south cline in colour, but a much larger number of specimens is needed before this can be definitely established.

Literature Cited

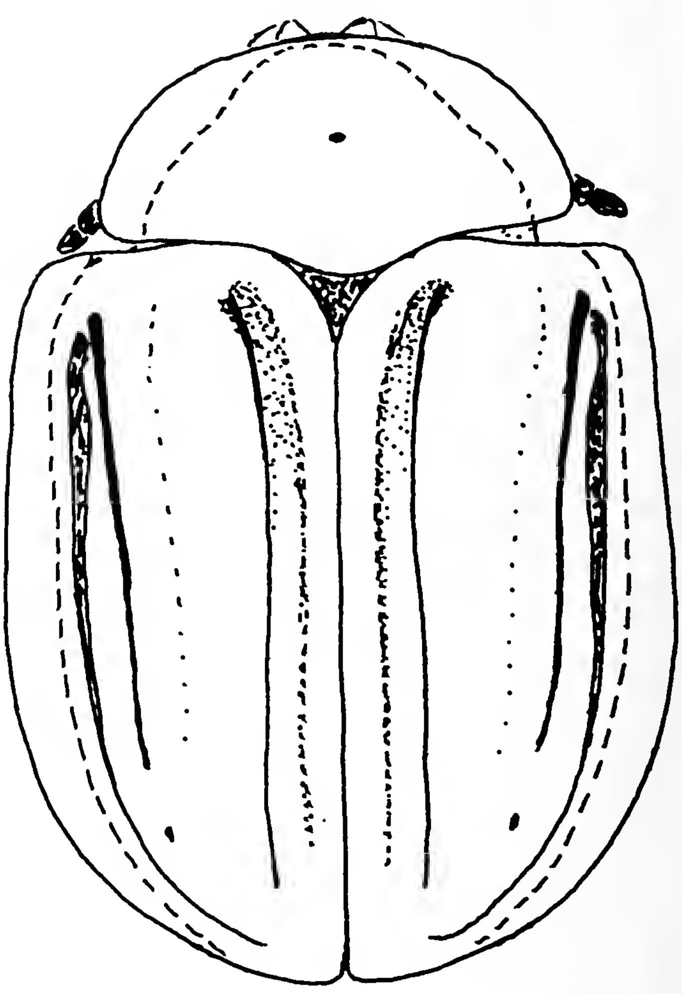
Hicks, S. D. 1957. Distribution and occurrence of *Gnorimella maculosa* (Knoch). Canadian Field-Naturalist, vol. 71, no. 4, pp. 199-200.

Schaum, H. R. 1849. Observations critiques sur la famille des Lamellicornes Melitophiles. Ann. Soc. Ent. France, ser. 2, vol. 7, pp. 241-295.

HILAROCASSIS EXCLAMATIONIS (L.), A TORTOISE BEETLE NOT PREVIOUSLY REPORTED FROM THE UNITED STATES (CHRYSOMELIDAE: CASSIDINAE)

This species has been included in the Nearctic fauna on the basis of specimens reported by Horn (1894) from El Chinche, Baja California, Mexico. This locality is probably on the western edge of the southern portion of the peninsula. Two Arizona specimens in the University of Arizona collection seem to be referable to the same species. These are labelled as having been taken in the Santa Catalina Mts., Sept. 19–20, 1930, by A. A. Nichol. There is no indication as to how far up in the mountains they were collected. *Exclamationis* has an extremely wide range, from Brazil and the West Indies and as far north as Mexico. Champion lists it for Mexico from San Blas, Acapulco, San Andres Tuxtla and Camaron.

The two Arizona specimens are 8.5 and 9.5 mm. long. The general color is yellowish, with the pronotum and underside except for the eyes and part of the antennae more rufous. Even the tarsal claws are pale. The eyes and last five antennal segments are black. The dorsal surface is subopaque, microreticulate and only slightly translucent; living specimens are probably not iridescent. Both pronotum and elytra are margined, the prothoracic margin being slightly upturned and that on the elytra following almost the same contour as the rest of the elytra. Both specimens have a small, median black spot on the pronotum and two black lines on each elytron. The elytral markings differ slightly in the two. The specimen figured has the black line that extends back from the humerus narrow, and abbreviated before it reaches a small black spot. The other specimen has this line wider and reaching the spot, but narrowed before it. The markings shown shaded in the figure are much more obscure in the other specimen. The underside is more shiny than the upperside. Antennae 11-segmented, with



all segments free. Tarsal claws strongly appendiculate. No specimens from other areas have been available for comparison but the Arizona specimens agree remarkably well with the description given by Boheman in his monograph of the cassidines.—F. G. WERNER, *Department of Entomology, University of Arizona, Tucson.*

DESCRIPTION OF A CALIFORNIA SPECIES OF CTESIAS (DERMESTIDAE)

By R. S. Beal, Jr. [1]

The dermestid beetle genus *Ctesias* Stephens includes at the present only two species, *C. serra* (Fabricius) in Europe and *C. variegata* Arrow in Africa. A species of *Ctesias* also occurs in California. Although but one specimen is known, its structural characteristics seem distinct enough to warrant its description as a new species. It is hoped that its description at this time will stimulate interest leading to additional collections and to a study of its biology.

Ctesias dusmae Beal, new species

Adult male.—Color of head black; pronotum dark brown; elytra brown; thorax brown; legs and abdomen yellowish brown. Pubescence of dorsal surfaces medium fine, short, subrecumbent, piceous; pubescence of ventral surfaces fine, short, recumbent, piceous. Punctation of dorsal surfaces shallow and simple with individual punctures no larger than facet of eye; punctures of frons separated by one to two diameters of one puncture becoming more sparse on vertex with surface between microscopically rugose; punctures of disc of pronotum and disc of elytra separated by two to four diameters of one puncture with surface between shining and smooth. Antenna with configuration as illustrated; antennal club moderately densely clothed with very short and fine, recumbent, black pubescence. Antennal fossa with posterior diagonal margin extending only half length of fossa leaving lateral half of fossa open behind; surface of floor of fossa densely, microscopically punctate. Epipleuron ending before hind margin of metepimeron, transversely flat for most of length but slightly concave on anterior third. Length (of pronotum and elytra): 4.4 mm.; width (across humeri): 1.9 mm.

Holotype male (deposited in the California Academy of Sciences): Yosemite Valley, California, July 7, 1921 (Van Dyke Collection).

This species is placed in the genus *Ctesias* by the form of the antennal club, which consists of three large triangular segments, and by the structure of the prothoracic hypomeron. The antennal fossa is deeply excavated and occupies all of the hypomeron except for two small medial triangular areas on each side of the fossa.

[1]Arizona State University, Tempe.

The most obvious difference between *C. serra* and *C. dusmae* is the proportionately greater length to width of the latter. A fundamental difference is found in the structure of the antennal fossa. In both sexes of *C. serra* the fossa is completely closed behind by a knifelike carina. In the male of *C. dusmae* the fossa is broadly open behind, the posterior carina extending only to a point opposite the basal two fifths of the lateral margin of the pronotum. An apparant difference between the two species is in the color of the elytra. The single known specimen of *C. dusmae* has medium brown elytra which contrast rather sharply with the black head. Whether specimens may ever be dark brown or black remains to be discovered. All specimens of *C. serra* which I have studied have black elytra, or, if the elytra are dark brown, they are at least as dark as the head. A difference between the species is also found in the proportionate widths to lengths of the segments of the antennal club.[2]

C. variegata is described[3] as having the elytra marked by transverse bands of coarse, white pubescence, a character not found in the other two species of the genus. The segments of the antennal club of *C. variegata* are proportionately much wider than those of either *C. serra* or *C. dusmae.*

C. dusmae may be a scavenger on the order of many other dermestid beetles. However, the habits of the other members of the genus suggest the possibility of a predatory role for this species. *C. serra* has been recorded as preying on the eggs and immature stages of the gypsy moth, *Lymantria dispar.*[4] C. variegata has been recorded from mantid egg cases.[5]

I am grateful to Vladímir Kalík of Pardubice, Czechoslovakia, and to Maciej Mroczkowski of the Institute of Zoology of the Polish Academy of Sciences for providing me with the specimens of *Ctesias serra* used in this study.

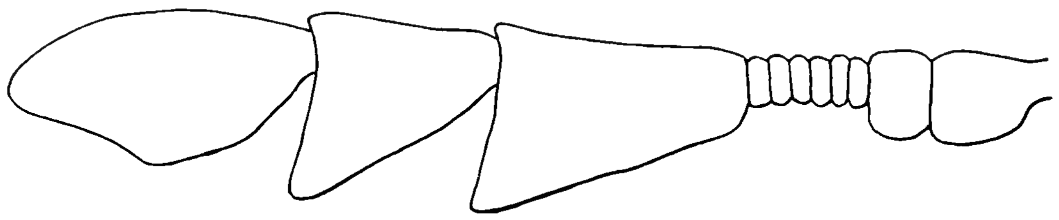


FIGURE 1. Male antenna of *Ctesias dusmae*, new species.

---

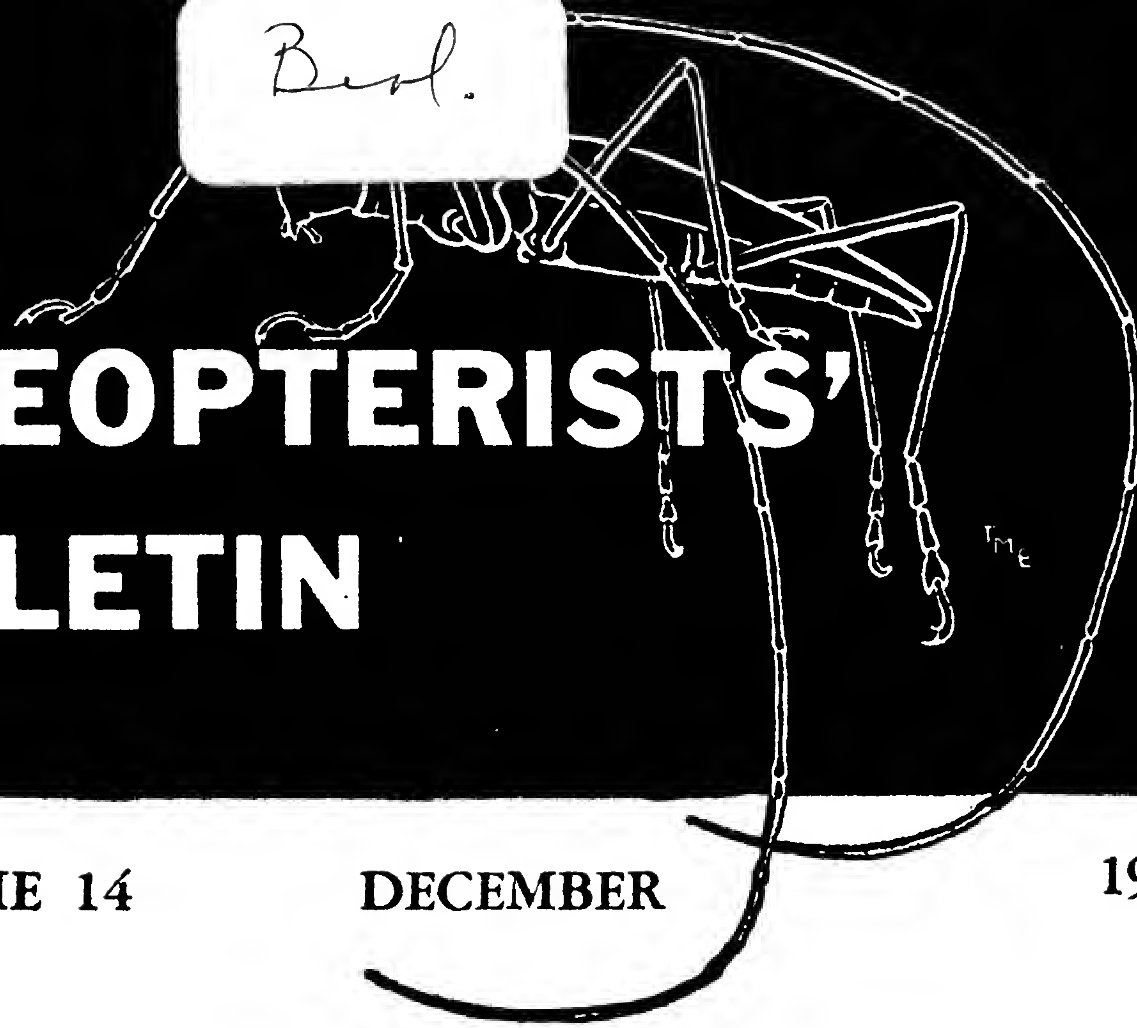
[2] The male antenna of *C. serra* is figured by Mroczkowski, 1954, Polski Zwiazek Entom., 19 (52):29.

[3] Kalík, 1955, Rev. Zool. Bot. Afr., 52:317-318.

[4] Hinton, 1945, Beetles associated with stored products, 1:241.

[5] Kalík, *op. cit.*

THE COLEOPTERISTS' BULLETIN



VOLUME 14 DECEMBER 1960

TABLE OF CONTENTS

McDONALD, Sister J. M. Morphology of the exoskeleton of Capnochroa fuliginosa (Melsheimer) (Alleculidae) 97

BURKE, H. R. A new genus and two new species of weevils from Texas with notes on others (Curculionidae) 121

THE CATHOLIC UNIVERSITY OF AMERICA PRESS
WASHINGTON 17, D. C.

A Quarterly Publication Devoted to the Study of Beetles

THE COLEOPTERISTS' BULLETIN

The Coleopterists' Bulletin is published by The Catholic University of America Press, Washington 17, D. C. and edited by Ross H. Arnett, Jr. It is issued four times a year beginning with March. All business matters should be addressed to The Coleopterists' Bulletin at the Press. Manuscripts and other editorial matter should be addressed to the editor, Department of Biology, Catholic University of America, Washington 17, D. C.

Subscriptions: The subscription price for each annual volume of four numbers is $5.00 payable in advance. All subscriptions begin with the first issue of the year and those subscribing later in the year will receive the back issues of the volume.

Back volumes: A stock of back volumes is maintained and may be purchased as follows: 3 to date, $5.00 ea.; single numbers, $1.00 each; all prices postpaid. Missing numbers: Issues lost in the mail will be supplied free of charge if notified within three months after mailing.

EDITORIAL BOARD

NOTICE TO AUTHORS

Manuscripts submitted for publication should be typewritten on 8½ x 11 sheets with at least 1 inch margins, double spaced, and on one side of the paper only. Notations after the author's name, such as address, project numbers, etc., should be treated as footnotes, and in general, acknowledgements should also be in footnotes. It is preferred that other footnotes be avoided. Illustrations should be sent unmounted, but numbered. The manuscript should be marked to indicate the location of text figures or the position of full page plates. A bibliography should be compiled at the end and references in the text referred to this bibliography. All geographical names in periodical abbreviations should be spelled out, and the full title of each article cited should be given.

Manuscripts will be acknowledged upon receipt. As soon as possible thereafter the author will be notified as to acceptance after review by the Editorial Board. If the manuscript is accepted, a tentative date of publication will be set. In general, all papers will be published in their order of receipt, but the editor reserves the right to use articles out of order in the interest of a balanced magazine.

The editor will make no text changes without advanced notice to the author. Galley proof will be sent for correction. These galleys are sent out well in advance and do NOT indicate the date or order of publication.

Twenty-five tear sheets of notes will be supplied free to the author if requested when returning galley proofs. Reprints printed free of extraneous matter will be supplied with or without covers at cost. Reprints MUST be ordered on the form provided when returning galley proofs. The approximate cost of reprints will be supplied with this form.

EDITORIAL POLICY

Any article, note, or news items likely to be of interest to readers of the Bulletin will be considered. Articles with illustrations are particularly desired, and *in all cases, descriptions of new species must be illustrated.* Descriptions of new species or genera MUST contain keys or be correlated with existing keys.

A QUARTERLY PUBLICATION DEVOTED TO THE STUDY OF BEETLES

The Coleopterists' Bulletin

Volume 14 December, (No. 4) 1960

MORPHOLOGY OF THE EXOSKELETON OF CAPNOCHROA FULIGINOSA (MELSHEIMER) (Alleculidae)

By Sister James Marie McDonald, S.B.S. 1, 2

Introduction

The order Coleoptera is among the best known of all groups of insects and, at the same time, it is equally true that the morphological details of many families within this order are poorly known. Tanner (1927) complained that "students have been content, in most cases, to place these insects (beetles) upon pins and treat them as priceless objects to be admired and not studied by means of microscopic dissection." Fortunately, this statement does not have such universal application today.

In the introduction to his very comprehensive morphological study of the family Staphylinidae Blackwelder (1936) said this: "morphology is one of the important foundations of classification because it supplies the easiest and most usable key to the relationships between individuals". No true system of natural classification can be attempted without this basic and comprehensive knowledge.

Additional studies of the entire external morphology of single species of Coleoptera have been completed within the last twenty-five years by Campau (1940). Bryson and Dillon (1941), Rings (1942), Butt (1944) and Bostick (1945) to mention part of a list which is all too short considering the large number of beetle families and the wealth of information still uncovered. It is certainly evident that the stage has not arrived where one can maintain that the usefulness of morphological characters has

---

[1] Department of Biology, The Catholic University of America, Washington 17, D. C. (Permanent address: 1663 Bristol Pike, Cornwells Heights, Pa.

[2] Acknowledgements.–It is a pleasure to acknowledge the very kind interest, direction, and encouragement of Dr. Ross H. Arnett, Jr. throughout this study, the generosity of Dr. Merritt P. Sarles and Mr. T. J. Spilman in reading the manuscript and offering helpful suggestions, and the splendid execution of the first illustration by Miss Eileen Van Tassel.

been exhausted and therefore the solution to the question of relationships between individuals must be sought elsewhere.

The purpose, then, of this particular study is to supply additional information on the morphology of the monobasic genus *Capnochroa* LeConte of the family Alleculidae with a view toward supplementing the present limited knowledge of this family and its classification as well as contributing to the morphological knowledge of Coleoptera in general.

Methods and materials

A series of ten specimens of *Capnochroa fuliginosa* (Melsheimer) obtained from the Arnett collection were used for this study. Most of the specimens were collected in New York State.

This is the sole species in the genus according to Borchmann (1910), and was described by Melsheimer in 1846.

Gross features of the anatomy were obtained from studying specimens mounted on pins. Two females and two males were dissected and studied according to the following method: the beetle was placed in an ordinary small porcelain crucible containing a 10% solution of KOH and was heated in this solution for about one minute. This was sufficient to soften the body and permit easy separation of the body regions. The procedure then followed was to remove the head first and place the remainder of the specimen in a vial of 95% alcohol until work on the head capsule and appendages was completed. Further heating in KOH was usually necessary in order to dissect the mouthparts and study the head capsule thoroughly. The same method was employed for the dissection and study of the prothorax and appendages, pterothorax and appendages, abdomen and genitalia. The various parts were dissected in 95% alcohol and stored in vials of the same. This made it possible to move the parts in any desired position while studying them. Drawings were made before and after dissection of all views necessary to show the structures clearly and the relation of the various parts to each other. All work was done using a binocular dissecting microscope with magnifications of 15X, 45X, and 120X. This range of magnification together with the above mentioned advantage of working with alcohol preserved specimens seemed most satisfactory for this particular study.

The terminology, abbreviations and, in general. the interpretations of Snodgrass (1935) were followed throughout the work with the exception of the section on genitalia. Here the work of Lindroth (1957) was used, for the most part, as the basis for interpreting and naming the structures found.

Description Of CAPNOCHROA FULIGINOSA (MELSHEIMER)

(Figure 1)

Capnochroa fuliginosa (Melsheimer) is a moderately large beetle. The females average 12 mm. in length and 5 mm. in width. The males, less robust, measure, on the average, 11 mm. or a little more in length and 4.5 mm. in width. The general appearance of this species is that of an elongate, elliptical, convex beetle with a prognathus head. The color is dark chestnut brown with black patches intermixed particularly on the pronotum and venter. The pubescence is very fine, short, and flavate. These flavate hairs are dense on the pronotum giving a dull appearance and rather sparse on the elytra resulting in a shiny appearance. The legs are long and slender and do not vary much in this respect in the two sexes. Each segment of the leg is densely clothed on the ventral surface with short flavate hairs in the male. The antennae are long, filiform to subserrate, and about half the length of the body.

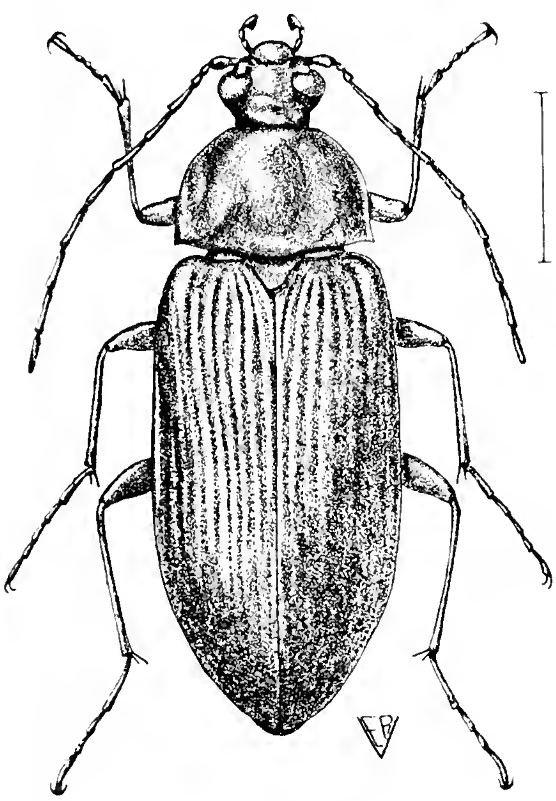


FIGURE 1.—*Capnochroa fuliginosa* (Melsheimer), female

Head

(Figures 2 and 3)

Dorsal aspect.—(Figure 2) One large sclerite, the epicranium, extends from the *occipital suture* to the clypeus. The sutures are obliterated which might divide this area into distinct frons, vertex, and genae. The horseshoe-shaped occipital arch forms the posterior aspect of the head dorsal to the *foramen magnum*. The dorsal portion of the arch is referred to as the *occiput* and the lateral parts, the *postgenae*. The narrow area between the dorsal mandibular articulation and the eye represents the *gena* (fig. 3). The dorsal and dorso-lateral aspect can be considered the *vertex*. The *epistomal suture* marks the distal extremity of the *frons*, but, there being no frontal suture, the posterior extent of the frons can only be estimated as the area proximad of the epistomal suture, between the eyes and distal to the area generally outlined above as the vertex.

The *clypeus* is a single sclerite joined to the front by the epistomal suture. A tough membranous strip, the *anteclypeus*, forms the anterior margin and overlaps the ridge on the labrum to form the clypeolabral junction.

The moderately large *eye* is situated in the median part of the lateral aspect of the head. There is a marked emargination in the dorsal third of the anterior margin. The raised *antennal ridge* projects into this emargination. The *oculata* is present as the part of the head capsule surrounding the ocular fossa and over which the lateral borders of the eye are placed. The oculata therefore forms a narrow internal shelf for the eye. The hemispherical facets are moderately small in size. Ocelli are absent.

Ventral aspect.—(Figure 3) The median area of the ventral surface of the head capsule is occupied by a triangular sclerite, the *gula,* which closes the foramen magnum with its base and has its lateral borders converging anteriorly to form the single *subgenal suture* which in turn connects anteriorly with the submentum. The lateral areas of the head capsule represent the *subgenal* parts of the epicranium. A ridge, the *crassa,* is found on the anterior ental surface of the head capsule extending from the mesal side of the ventral mandibular articulation to the submentum.

Tentorium.—(Figure 3) The *anterior tentorial arms* arise from the internal *subgenal ridge* just proximad of the dorsal mandibular articulation and between it and the antennal fossa. This site of origin is characteristic of the more generalized pterygote insects according to Snodgrass (1935). The anterior arms pass posteriorly and ventrally to join the *posterior arms;* the short *dorsal arms* are given off a little distad of the origin of the anterior arms. The posterior arms of the tentorium arise just proximad of the apex of the gula as indicated externally by a distinct, though shallow unevenness in the gular suture, the *posterior tentorial pit.* The posterior arms extend caudally to the edge of the foramen magnum and are united to the gular suture by membrane. The narrow H-shaped *tentorial bridge* is formed dorsal to the middle of the gula where the tentorial arms of opposite sides fuse.

Antennae.—(Figure 1) The eleven segmented *antennae* are inserted beneath the elevated antennal ridge of the epicranium just anterior to the emargination of the eye. They are nearly half the length of the body, somewhat compressed and filiform to sub-serrate. The three basal segments differ from the distal eight. The basal segment is the same length in both male and female, is elongate, cylindrical and as long as segments two plus three in the male, but not quite so in the female where the third segment is longer. The usual projection from the ventral aspect of the antennal fossa, the antennifer, supports the antenna. The second segment is half the length of the third in the female, less than half in the male, and of smaller diameter than the basal segment in both sexes. The third segment expands from its proximal end to the distal reaching at the apex the diameter of the basal segment. This third segment is longer on its outer edge than on the inner apparently allowing for more freedom of movement. The first and third segments are evenly covered with short setae; the second more sparsely so. The dense system of pores characteristic of the remaining segments is absent from the three basal segments. Segments four to ten are similar in appearance and size. These segments are quite serrate in appearance in the male but more filiform in the female. The eleventh segment is filiform in both sexes and comes to an acute tip which is clothed with a few longer setae than the remainder of the segment. A paler elliptical area extends back from the tip of segment eleven on the outer surface of the segment. This area is characterized by a density of minute setae, a few longer setae, and many small pores. This is probably a more highly specialized sensory area. Segments four to eleven have the entire surface covered with short setae interspersed with numerous large circular pits filled with a white substance.

Mouthparts

(Figures 4—10)

Labrum.—(Figures 4 & 5) The labrum is a broad, convex sclerite having a shallow sinuation in its anterior margin as well as a slight indentation at the center of this margin. The dorsal surface is clothed with both coarse and fine setae, more densely so toward and at the anterior margin. Near the proximal edge of the sclerite is a heavily sclerotized *ridge* (fig. 5) extending the width of the labrum marking the point of connection with the clypeus. The ventral surface is membranous and covered near the anterior margin with very fine hairs which become coarser at the margin. Proximally the membrane is continuous between the two laterally placed internal sclerites, *tormae*, and is continuous with the membrane of the inner surface of the clypeal region. The *epipharynx* projects posteriorly between the tormae as an irregular triangular lobe clothed densely with fine short hairs which are recumbent laterally but upright along the median line. A central depressed area on the ventral surface extends posteriorly about half the length of the labrum and is characterized by numerous circular pores of unequal size. An inverted T-shaped internal support lies dorsal to this depressed area in the center and extends posteriorly the same distance.

Mandibles.—(Figures 6 & 7) The mandibles lie posterior to the labrum and are prominent, heavily sclerotized and produced distally into curved, blunt, bilobed tips, the lobes of which are subequal in length and width. The expanded latero-basal area has a sparse covering of short bristles. The inner surface bears a large, sclerotized basal masticatory or *molar area* consisting of moderately narrow deeply cut vertical ridges. Arising from the antero-ventral edge of this molar surface is an expansive membranous lobe, the *prostheca,* which continues to just short of the apex of the dorsal lobe of the mandible. The prostheca is noticeably clothed on its antero-mesal edge with numerous short, fine hairs. The mandible articulates with the head capsule by means of a dorsal and a ventral condyle. A crescent shaped *acetabulum* is found on the dorso-lateral base of the mandible and a spherical *condyle* on the ventro-lateral base. Articulation is made at these two points with the large dorsal crescent shaped *condyle* (fig. 3) on the gena immediately in front of the eye and antennal fossa and with the ventral hemispherical *acetabulum* (fig. 3) on the crassa.

Maxillae.—(Figure 8) The maxillae are located posterior to the mandibles. Each maxilla is made up of several sclerites forming the body of the maxilla, the galea, the lacinia and the maxillary palpus. The basal sclerite, the *cardo,* articulates at its proximal end with the crassa, is closely associated with the submentum and mentum mesally, and articulates distally with the stipes. The *stipes* is secondarily divided bearing the large galea and the slender, elongate lacinia on the distal portion and the palpifer on the lateral side of the proximal portion. The *lacinia* is a narrow lobe covered with fine hairs and ending in a tuft of longer fine hairs. It is bounded laterally by a small sclerite on each side and is joined to the galea only in the basal membranous area. The *galea,* the larger and longer of the two lobes ends in a stout tuft of fine hairs. Two chitinized bands partially encircle this lobe. The *palpus* is four segmented and joined to the stipes by the *palpifer.* The first segment is small, longer on the mesal side than the lateral side allowing more extensive lateral movement of the second segment. The second segment is longer than and has a greater diameter than the first; the diameter increases from base to apex. The third segment has a basal and apical diameter subequal to the respective measurements of the second, but is less than half as long as the second. The last segment is broadly expanded into a triangle in which the inner side is half as long as the outer and a little more than half the length of the apex. The three distal segments are clothed with short, strong setae. The basal segment has only a few setae near the apex on the mesal side.

Labium.—(Figure 9) The labium is made up of three sclerites: the submentum, mentum and prementum. The submentum and mentum together form the *postlabium,* and the prementum which bears the palpi and ligula is the *prelabium.* The *submentum* is rather firmly fixed to the head capsule and is connected with the apex of the gula by a short suture which represents the posterior portion of the submentum as explained by Williams (1938). The *mentum* is larger than the submentum and has its lateral borders produced posteriorly into a short projection on each side which clasps the anterior margin of the submentum. The sides of the mentum are expanded entally to meet the ventralmost point of the sclerite supporting the hypopharynx. The *prementum* appears to be composed of at least three parts: a feebly sclerotized piece on the proximal ventral surface of the ligula between the bases of the palpi, and a lateral piece dorsal to each palpus. These lateral sclerites extend from the dorsal surface of the mentum to the proximal edge of the lateral extremities of the ligula. At the middle of each of these lateral sclerites, a narrow band passes down over the ventral surface of the *palpiger*. The labium terminates in a broad membranous, translucent T-shaped flap, the *ligula*, formed by the fusion of the glossae and paraglossae. The ligula is densely clothed on the dorsal and apical surfaces, and less densely on the ventral surface with fine recumbent hairs. Pores of various sizes are sparsely scattered on the ventral and dorsal surface apically as in the case of the ventral surface of the labrum. The palpiger bears the three segmented labial *palpus*. The first and second segments are quite similar in diameter and length. The terminal segment is not much longer than the first or second but is slightly expanded distally, compressed and arcuate. All three segments are sparsely covered with setae. The *hypopharynx* (fig. 10) is reduced to a small fleshy lobe very densely covered with short, fine, erect hairs. It projects dorsally from the center of a concavity on the dorsal surface of the labium. In this position it serves to force or hold food in the region of the molar grinding surfaces. The adoral surface of the hypopharynx is supported laterally and posteriorly by the sclerite known as the *hypopharyngeal suspensorium*.

Prothorax

(Figures 11 and 12)

Cervix.—The neck region or cervix is all membranous, no cervical sclerites present.

Pronotum.—(Figures 11 & 12) Dorsally the prothorax is very slightly convex, three-fourths wider than long, densely and finely punctate with the punctures narrowly separated and the interspaces finely alutaceous. The *basal angles* (fig. 1) are right, the *basal sinuations* (fig. 1) broad but shallow and the *basal fovea* (fig. 1) distinct though small. The sides of the pronotum are straight and parallel in about the basal half, then roundly converging to the apex which is about half as long as the base. The pronotum is inflexed laterally to form the hypomera (fig. 12) which is set off from the disk by the marginal ridge. Anteriorly the hypomera continues as far as the anterior foramen on the dorsal aspect and the *sterno-notal suture* on the ventral aspect. Caudad of the coxal cavities the hypomera is prolonged mesally as a slender lobe which becomes somewhat membranous at the tip. The approximation of these hypomeral extremities at the midline of the body closes the coxal cavities behind. Both the anterior and posterior edges of the lobes are very sparingly set with setae. The caudal pronotal inflection is in the form of a triangular area on each side of the posterior foramen at the dorso-posterior corners. The punctuation and pubesecnce of the hypomera is like that of the disk of the pronotum except near the coxal cavities where both become sparse.

Prosternum.—(Figures 11 & 12) The sternite of the prothorax extends from the ventral border of the anterior foramen laterally to the sternonotal sutures and posteriorly to form the anterior borders of the *coxal cavities.* The median posterior prolongation of the prosternum forms the intercoxal process or the *spinasternum.* Entally this process is fused with the membrane lining the coxal cavities and it is from the floor of these cavities that the *sternal apophyses* or furcal arms arise. The prosternum is less heavily sclerotized and less densely punctate than the hypomera. A trochantin is not present on the prothorax.

Prothoracic legs. —(Figures 13 & 14) The *coxa* of the foreleg is distinct, spherical, reticulately strigulate and covered with very short, fine hairs set in small punctures. The lateral surface of the coxa extends internally to articulate with the distal end of an apophysis arising from the anterolateral corner of the pronotal disk. The articulation thus formed is quite flexible. The coxa has a groove which extends from the anterior trochanteral articulation mesally to the prosternal intercoxal piece permitting extensive movement of the trochanter in a dorso-ventral plane.

Trochanter.—(Figure 13) The trochanter is a short segment joined immovably to the femur and articulating with the coxa by means of a ball and socket arrangement held in place internally by muscle attachments and externally by a prominent condyle on the posterior surface of the coxa. The trochanter is covered with short, fine setae and about three longer setae on the ventral surface.

Femur.—(Figure 13) This is the stoutest segment of the prothoracic leg and equal in length to the tibia. It is nearly even in thickness throughout, only tapering somewhat at each end. Proximally it is fixed to the trochanter and also has a prominent rounded elevation at the proximodorsal edge which articulates with the corresponding depression in the coxa above the coxal condyle. A dorso-ventral groove at the distal end of the femur receives the head of the tibia and also extends proximally on the under surface of the femur a short distance making it possible for the tibia to be flexed back against the femur. The entire surface of the femur is more or less reticulately strigulate and finely, evenly punctate with each puncture bearing a short seta.

Tibia.—(Figure 13) As stated above the tibia is as long as the femur. A distinct emargination is located on the ventral surface of the tibia just distad of the femoral articulation. The joint between the femur and tibia is dicondylic, the head of the tibia fitting between a condyle on each side of the femoral groove. This type of joint permits movement in one plane only. The tibia is slightly expanded at its distal end and also slightly longer on its anterior surface. The distal end of the tibia bears two large spurs, the *calcaria;* is encircled by smaller spurs which are probably stout setae and is attached by membrane to the basal segment of the tarsus. The calcaria are inserted in the membrane of the tip, one on the antero-ventral aspect of the tip; the other on the postero-ventral aspect. The small spurs which circle the tip are a little longer in the area between the calcaria. The entire surface of the tibia is minutely strigulate and clothed with moderately fine setae, evenly and closely set. A number of stout setae like those of the tip are scattered over the surface of the tibia.

Tarsus.—(Figure 13) The tarsus of the prothoracic leg is composed of five segments. The segments are slightly expanded at the distal end and longer on the dorsal than the ventral edge. The basal segment is only slightly shorter than the second, third, and fourth combined and similarly slightly shorter than the fifth segment. The proximal end of the basal segment is rounded and fitted into the membrane of the tip of the tibia. Just distad of this end and on the dorsal surface is an abrupt and deep indentation allowing maximum movement of the tarsus in a dorsal direction. The second, third and fourth segments are similar in size and shape. The third and fourth are somewhat shorter than the second and the fourth is less expanded distally than either the second or third. The fifth segment maintains the cylindrical shape of its proximal end to very near its distal end where it expands slightly to give attachment to the large claws on its dorsal aspect and the fleshy lobe, the empodium, on the ventral surface. The *claws* are laterally compressed, long, curved and tapered distally to sharp tips. From the inner face of each claw arise six or seven sharp teeth which increase in size from the first to the last. Ventrad of the claws lies the *unguitractor plate* (fig. 14) with the fleshy *empodium* at its distal end and the *tendon* of the retractor muscle of the claws attached to its proximal end. All of the tarsal segments are rather densely covered with setae, denser on the ventral surface and longer at the distal expanded ventral region. The rounded proximal end of the basal segment is glabrous. The fifth segment is more or less uniformly covered with setae throughout.

Pterothorax

(Figures 15-17)

Mesothorax.—(Figures 15-17) The mesothorax is connected to the prothorax by a membrane in which the *mesothoracic spiracles* are ventrolaterally situated. The *mesotergum* is considerably smaller than either the prothoracic or metathoracic terga. The dorsal aspect of the tergum is without distinguishable sutures. In general then, the posterior lobe which projects back over the metathorax is interpreted as the *scutellum;* the expanded part anterior to the scutellum, covered by the pronotum and bearing laterally the anterior notal wing process is the *prescutal area,* and the transverse sclerite ending laterally in the posterior notal wing process while joined to the scutellum ventrally by a lightly sclerotized v-shaped ridge is the *scutum.* A submarginal ridge, the *antecosta,* is also found at the anterior margin of the mesotergum. The scutellum, the only part seen when the elytra are in repose, is more heavily sclerotized than the other areas. The entire dorsal aspect except the anterior margin bears numerous moderately coarse setae.

The ventral aspect of the mesothorax is occupied by the *mesosternite,* a single sclerite which is separated from the membrane joining the prothorax and mesothorax by the narrow inflected *prepectus.* The prepectus is the anterior marginal sclerite of the mesothoracic pleura and sternum. It is divided into three sections by the *sterno-pleural sutures.* The mesosternum extends laterally to the suture just mentioned and forms the anterior margin of the coxal cavity. Posteriorly it forms the intercoxal process, the *spinasternum.* Internally this process is continued onto the floor of the coxal cavities. From this point a two-branched *apophysis* arises on each side. The shorter mesal arm of the apophysis ends in the sterno-pleural suture and the longer arm extends to the membrane between the pleuron and notum of the mesothorax.

The pleuron of the mesothorax is composed of the episternum and the epimeron separated by the *pleural suture.* The *episternum* is separated from the sternum by the sterno-pleural suture. Internally a strong *pleural ridge* corresponding to the external pleural suture extends from the coxal articulation dorsally to the pleural wing process and forms a brace between the wing and coxa. The episternum is finely and densely punctate along the prepectal margin becoming more coarsely and much less densely punctate posteriorly, and is finely strigulated throughout. Short, fine setae are borne by the punctures.

The *epimeron* of the mesothorax is the sclerite posterior to the pleural suture. It articulates with the trochantin at the antero-lateral extremity of the coxal cavity. Thus the *mesocoxal cavities* are open laterally. Posteriorly it overlaps the episternum of the metathorax and its narrow medial edge lies under the antero-lateral extremity of the metasternum. The lightly sclerotized dorsal margin is continued anteriorly into the *wing process* of the episternum. The surface is evenly, sparsely punctate and finely strigulated. Internally a membranous fold extends from the posterior margin of the epimeron to its anterior margin but is not fused with the latter as it is with the dorsal, ventral and posterior margins of the sclerite. The *metathoracic spiracle* is situated in thinner membrane which is the mesal continuation of the fold just described.

The *basalare* is a small triangular sclerite located in the membrane anterior to the episternum close to the edge of the prepectus.

The *trochantin* of the mesothorax is a small feebly sclerotized rectangular sclerite which articulates with the epimeron by means of a blunt condyle and is closely associated with and moveable upon the coxa. It is finely strigulated and otherwise devoid of sculpturing or vestiture.

Mesothoracic legs.—(Figure 16) The mesothoracic legs are longer than the prothoracic legs and the segments less stout. The *mesothoracic coxa* is larger and more ovate than that of the prothorax. It bears a depression from the proximal to distal end along its postero-ventral aspect which receives the dorsal surface of the femur when the latter is flexed upward. The trochanter and its articulations are as described for the prothoracic legs. The femur is longer and less stout than that of the forelegs and nearly the basal half of the concave posterior surface is devoid of setae. Otherwise, the prothoracic and mesothoracic femora are quite alike. The mesothoracic tibia is longer than and more slender than that of the prothorax, but otherwise very similar to it. The two calcaria are similar in size and location to those of the prothoracic legs. The tarsal segments are quite like those of the forelegs being only somewhat longer and having a number of coarse setae interspersed among the normal finer setae on the ventral aspect.

Elytra.—(Figures 1, 18, 19) The elytra are four and one-half times longer than the prothorax, one-half more than the width of the prothorax and gradually dehiscent from about the middle. Each elytron is narrowly and gradually rounded at the tip. Basally the humerus forms on oblique angle with the base of the prothorax. The disk has distinctly impressed *striae* (fig. 1) with rounded punctures. The *intervals* (fig. 1) are moderately convex, finely and confusedly punctate with about five punctures in the width of one interval. The pubescence is fine and short over the whole elytron. The disk of the elytron has an acute and conspicuous lateral margin which is properly called the *dorsal ridge* of the epipleural fold. The inflexed portion beneath this ridge is the *epipleural fold* which tapers from the humeral region to the apex of the elytron. The epipleura or narrow piece sometimes present along the edge of the elytron is absent in this species. The usage here of the terms dorsal ridge, epipleural fold and epipleura is in accordance with the original definitions as clarified by Arnett (1947). The elytron is connected to the mesothorax between the mesonotum and the mesepisternum by means of a membrane in which several irregularly shaped sclerites are situated. These are the *axillary sclerites* four of which appear present, as well as one distinguishable *median plate* between the second and third sclerites.

Metathorax.—(Figures 15–17) The metathorax is the largest thoracic segment and is closely united to the mesothorax anteriorly and the abdomen posteriorly. The *metatergum* is made up of five distinct areas, four fundamental to the tergum; one, a secondarily developed sclerite. The first tergal area is the *prescutum,* a lightly sclerotized area separated from the scutal areas by membrane and from the *antecosta* (fig. 20) of the metatergum by the *antercostal suture.* The prescutum is covered medially by the posterior lobe of the mesonotum. Two small irregular areas of sclerotization lie within the membrane laterad of the prescutum and function in connection with the axillary sclerites.

The *scutum* is divided into two areas by the *convergent sutures* or notaulices and these two scutal areas are separated mesally from the scutellum by the *scutoscutellar ridges* but are confluent with the scutellum laterally combining with it to form the *posterior notal wing process.* The entire surface of the scutum is finely strigulated and a restricted area of setae extends from near the posterior extremity of the scutoscutellar ridge in an oblique direction to the lateral margin of the scutum.

The central part of the metatergum extending from the anterior margin to the postnotal suture and expanding laterally to the postnotal wing processes is the *scutellum.* The median portion of the scutellum is elevated by a sort of out-folding of the tergum but no external groove or internal ridge is apparent to merit the designation of reversed notal suture. The surface of the scutellum is like that of the scutum but devoid of setae.

The *postnotum* is a secondarily developed sclerite caudad of the metatergum and separated from the latter by the postnotal suture. Posteriorly it is joined by a short membrane to the first abdominal tergite. Laterally it is reflected around the first abdominal spiracle and closely approximates the epimeron of the metathorax. The *postnotal plates* are enclosed by internal membranous ridges marked externally by narrow sclerotized borders.

The *metasternum* is the large sclerite that extends from the mesothoracic coxal cavities to the metathoracic coxal cavities. It bears three external lines or secondary sutures which indicate infoldings or ridges. The first of these is in the midline from the posterior margin of the sclerite to just short of the anterior margin. The other two grooves are located one on each side of the midline and extend from its base obliquely cephalad but do not quite reach the sterno-pleural suture. The portion of the sternite posterior to this line is referred to as the *antecoxal piece,* the piece which overlaps partially the anterior aspect of the coxa and provides the degree of flexibility needed at this point. The oblique groove just described is incomplete; the antecoxal piece is continuous at its lateral extremity with the remainder of the sternite. Anteriorly the metasternum has a short median process, somewhat membranous on its ental surface, which comes in close proximity to the spinasternum of the mesosternum. The anterior corners of the metasternite articulate with the postero-ventral aspect of the mesepimeron. Laterally the sternite is separated from the metathoracic pleuron by the sterno-pleural suture. The posterior median margin is characterized by a triangular emargination on each side of which is a small rounded protuberance, the *coxal condyle.* A membrane attached along the posterior margin lines the antecoxal pieces forming the shallow ventral surface of the coxal cavity. The antecoxal pieces are very finely strigulated and bear a few setae in more or less linear arrangement along the width of the piece. The entire sternite anterior to the antecoxal portion is likewise reticulately strigulated and finely, densely punctured in the median area becoming more coarsely and less densely punctured laterally. There is a small area just anterior to the antecoxal pieces which is devoid of punctures.

The metathoracic pleuron is divided longitudinally by the *pleural suture* into the ventral episternum and the dorsal epimeron. The *episternum* is subrectangular. Its anterior edge lies under and articulates with the posterior edge of the mesepimeron. Posteriorly it partially overlaps the small *trochantin.* The surface of the episternum is quite thickly covered with U-shaped elevations and in the center of each elevation is a short seta. This type of vestiture and sculpture is lacking along the sterno-pleural suture, the pleural suture and the cephalic extremity of the sclerite. The surface is finely strigulated throughout.

The *epimeron* varies considerably in shape and degree of sclerotization from anterior to posterior. It extends distally beyond and around the posterior extremity of the episternum to form the coxal and trochantinal articulations. Except for this caudal extension the epimeron is concealed beneath the elytron. As the epimeron continues cephalically it becomes sub-membranous and finally combines with the metepisternal process to form the *pleural wing process.* Its dorsal aspect is joined to the metanotum by membrane. In the caudal sclerotized third, punctures and setae are sparsely distributed and also along the pleural suture in the caudal half of the sclerite. Minute strigulations cover the entire surface of the epimeron.

A ridge projects entally from the ventral metathoracic midline. Fused to its posterior extremity in the region of the coxal condyles is the *metendosternite* which extends cephalad as far as the anterior end of the median fold where it branches into the two *furcal arms.*

Metathoracic legs.—(Figure 16) The metathoracic legs are only slightly longer than the mesothoracic legs and closely resemble them except for the coxa and the four-segmented tarsi. The *coxa* is large and transverse. It articulates laterally with the metepimeron, antero-mesally with the coxal condyle of the sternum, and postero-mesally with the trochanter. An irregular punctate groove extends from the epimeral to the trochanteral articulation. The internal aspect of this groove appears to be a crescent shaped muscle disk. A second hemispherical muscle disk originates very close to the point of articulation with the coxal condyles of the sternum. The anterior aspect of the coxa is without punctures although finely strigose above and below the irregular groove. The median apex is punctured and bears a density of short setae. The fine strigulation continues on the posterior aspect and a few punctures extend upward onto the posterior median surface from the ventral punctate area. The tarsus of the metathoracic leg is composed of four segments; the basal segment is not quite as long as the remaining three segments together. The tarsus also differs from that of the mesothoracic legs in having more of the strong setae on the ventral aspect.

Flying wings.—(Figures 21 & 22) The metathoracic wings or flying wings are as long as the body, well developed and with only moderately reduced venation. The *costa* (C) is present as a short vein which ends about midway along the anterior margin of the wing. It is sclerotized basally and attached by membrane to the anterior aspect of the metanotum. Entally the costal margin articulates with the wing process of the metathoracic pleuron. Immediately posterior to the costa are the *subcosta* (Sc) and *radius* (R). These two veins are separate in the basal portion of the wing, become fused near the middle and continue distally along the anterior margin to the point of the concave wing fold near the apex. Basally the *first axillary sclerite* articulates with the Sc and the *second axillary sclerite* with the R. A short bar connects the R with the *cubitus* (Cu) just distad of the wing base. This connection is referred to as the *anterior arculus* and according to Forbes (1922) is a short sector of the *media* (M). The dorsal surface of the R in the region of the arculus is characterized by several small pores, a feature which serves to identify the R in most beetles according to Blackwelder (1936). A *radial cross vein* (r) connects the anterior edge of the *radial sector* (Rs) to the fused R and Sc. The *radio-medial cross vein* (r-m) is present and distinct between the base of the Rs and the M. As is characteristic of the Polyphaga the base of the Rs is lost and the portion remaining proximad of the r-m is interpreted as the *radial recurrent vein* (Rr).

Posterior to the R is the M which has been lost in the basal half of the wing and united with the Cu near the apex. The convex principal fold of the wing runs very closely along the whole extent of the anterior edge of this vein to the posterior margin of the wing.

The Cu is a very distinct and complete vein in this species extending from the base of the wing to the apex. As mentioned above it fuses with the M near the apex of the wing. Close to its base but distad of the anterior arculus lies the short *cubito-anal cross vein* (cu-a). A convex fold runs along the ventral edge of the Cu for a short distance midway between the base and apex of the wing. This is the cubital fold.

The proximal portion of the *first anal* (1A) is lost except for a short projection from the Cu near its base. The vein connected to the Cu by the cu-a cross vein is taken to be the remainder of the 1A. It continues distally to the posterior margin of the wing giving off the *anal arculus* midway along its course.

The remainder of the anals make up a rather distinct anastomosing network of veins. The first branch of the second anal is absent. The *second branch* of the second anal (2nd. A_2) is present, fused basally with the *third anal* (3A), and connected by the anal arculus to 1A. The *third branch* of the second anal (2nd. A_3) forms the apical border of the *wedge cell* (W) and then becomes confluent with the *first branch* of the third anal (3rd. A_1). A cross vein (2nd.-3rd. a) projects obliquely posterior from the 2nd. A_2 to join 3A and form the proximal border of the wedge cell. The *second branch* of the third anal (3rd. A_2) arises near the base of 3A and extends almost to the posterior margin of the wing. The convex anal fold runs diagonally from the wing base between 3rd. A_2 and the fourth anal to the wing margin. The *fourth anal* (4A) originates in close proximity to the *third axillary sclerite* and also appears to be nearly joined to the base of the 3A by a sclerotized area. It may actually be a branch of 3A but since the trachea does not traverse the connecting area, it is more likely the true 4A.

The wing folds discussed above indicate that the pattern is typical of the Heteromera and is therefore included in Series 2 of Polyphaga by Forbes (1926).

Various regions of the wing are irregularly marked with dark brown (the cross-hatched areas on Figure 21), and the entire costal area and radial sector area are even darker brown than the remainder of the wing. Dorsally and ventrally the wing surface is densely covered with minute conical projections. These are particularly numerous and sharp in the apical and costal regions but become less numerous toward the center of the base and a little less pointed toward the base and posterior margin of the wing.

The wing articulates with the metanotum by means of the three axillary sclerites and the anterior and posterior notal wing processes. The first axillary sclerite articulates along its mesal edge with the anterior notal wing process. The posterior tip of the second axillary sclerite and the median protuberance of the third axillary sclerite articulate with the tip of the posterior notal wing process of the metanotum. The articulations of the axillary sclerites with the various wing veins and areas has been discussed above.

Abdomen

(Figures 23 and 24)

Tergite one is united anteriorly with the metathoracic postnotum and extends laterally to the large oval *spiracles.* There is no sternite for the first abdominal segment.

Tergite two is as wide and about twice as long in the center as the first and overlaps the third tergite broadly in the median area. The small, circular spiracle of the second segment is situated in the lateral membrane of the dorsum near the anterior border of the second tergite. *Sternite two* is reduced, fused with the third and membranous except for a small feebly sclerotized area on each side of the center. The membrane anterior to the fused second and third sternites is attached to the ental surface of the metathoracic coxae.

Tergite three is like the others and the size and location of the spiracle of this segment is like that of segment two as are those of segments four, five and six. *Sternite three,* fused with sternite two, is the longest and widest sternite in this species and has a deep V-shaped excavation anteriorly for the reception of the large transverse metathoracic coxae. The excavated area is feebly sclerotized and its anterior margin in general is not distinguished from the second sternite except by the gradual transition from light sclerotization to membrane. Just caudad of this point of fusion is a posteriorly directed fold or ridge which has the same shape as the ventral margin of the coxal excavation. This ridge marks the cephalic extent of the coxae. The center of sternite two plus three is not excavated but projects cephalad as the intercoxal piece.

Tergites four and *five* are very similar in length. The fifth is narrower as is each succeeding segment caudad of the third. *Sternite four* is as long as sternite five. *Sternite five* has its postero-latero corners slightly produced caudally and its posterior margin is characterized by a narrow coriaceous edge.

Tergite six is narrower but longer than the one preceding it. It overlaps the seventh tergite but not by the ordinary membranous fold. A narrow glabrous strip extends from the caudal edge of the sixth tergite to overlap the anterior fold of the seventh. *Sternite six* has its posterior corners more produced than those of the fifth and a more extensive coriaceous posterior edge.

Tergite seven is the last one completely visible in a dorsal view. It is broadly and roundly tapered posteriorly, heavily sclerotized and its cephalic margin forms a shallow anterior fold. The lateral aspect of this tergite is deflected for about three-fourths of its length and just distad of the anterior margin this deflected portion is reflected dorsally again for a short distance. The *spiracle* of the seventh segment is smaller than any of the others and situated in the membrane between the tergite and sternite of this segment. *Sternite seven* is overlapped by the produced corners of the preceding segment. Its apex is more broadly rounded than that of the seventh tergite and in the female its median posterior margin is produced into a broad, shallow lobe with a very slight sinuation in the center. The median apical surface of this sternite is also broadly but shallowly impressed. Sternite seven of the male is described in the section on genitalia.

Tergite eight of the female is normally almost or completely withdrawn beneath the seventh. It is greatly reduced and composed of two feebly sclerotized plates which are in close proximity to each other distally but diverge proximally. They are joined to each other along the median edges by a membrane which continues anteriorly to the ventral surface of the seventh tergite. *Sternite eight* is reduced in size in the female. It is a single sclerite with a membranous base from which an *apodeme* arises and projects cephalically as far as the anterior half of the fourth segment. The apex of this sternite is truncate and very slightly sinuate. Sternite eight of the male is described in the section on genitalia. The eighth set of spiracles is present though small and difficult to see.

There are no paratergites between the tergum and sternum. The lateral margin of each sternite is reflected dorsally to form a narrow concave ledge which is connected to the membrane of the dorsum.

The sculpture and vestiture of the sternum is quite uniformly alike for segments three through six, finely alutaceous, dark brown, moderately punctate with short stiff setae, and a narrow glabrous posterior margin on each of these sternites. Each sternite seems to be faintly longitudinally rugose. The margin of the apical lobe of sternite seven bears setae. Sternite eight is less distinctly alutaceous and has fewer punctures than the preceding segments. It bears a few scattered short setae over its surface and several longer ones of varying lengths along the apical margin.

The tergum is characteristically feebly sclerotized, very finely alutaceous and, except for the seventh tergite, devoid of punctures and setae. The anterior half of tergite seven is much like the preceding terga but the posterior half has the same type of sculpture and vestiture as is typical of sternites three through six. The setae become much longer and coarser at the posterior margin. The tergal plates of the eighth segment possess a few coarse punctures near the apices and a mixture of very long, medium and short setae in the same region.

Male genitalia

(Figures 25-27)

All the abdominal segments distad of the seventh in the male can be considered as modified to form the genitalia which are somewhat more specialized than those of the female of this species. However, the ninth segment is properly called the genital segment. The Tenebrionid type of genitalia is found in this species as in those species of Alleculidae discussed by Sharp and Muir (1912).

Tergite seven resembles that of the female but is sub-truncate apically. The posterior margin of *sternite seven* (fig. 24) has a distinct shallow but wide emargination. The spiracles of segment seven are as in the female.

Tergite eight of the male and female are similar although the tergal plates are somewhat larger in the male. This tergite is closely attached along its lateral edges to the dorsal surface of sternite eight. A membranous lip extends from the distal margin of tergite eight. The *rectum* passes over the dorsal surface of the basal piece of the tegmen with the *anal opening* directly ventral to this strip of membrane. *Sternite eight* is large, very prominent and bilobed distally to form two long, excavated, laterally flattened lobes. These lobes extend laterally along each side of the median lobe of the aedeagus. The apex of each lobe is set with short, stout setae. Long, fine setae border the distal median edge of the sternite. The eighth sternite is less heavily sclerotized proximad of the lobes and becomes membranous basally. The small spiracles of the eighth segment are present in the membrane between the tergite and the sternite close to the base of the ninth sternite.

Tergite nine is present in the male as an extremely reduced sclerite there being but a tiny plate on each side of the dorsal surface of the rectum just proximad of the anus. The *sternite nine* is highly modified and composed of two arm-like processes united basally where they articulate with the base of the tegmen. The arms pass distally from this point, first, ventral to the basal piece of the tegmen, then lateral to it and finally the expanded apices pass dorsal to the base of the parameres in the region of the first connecting membrane. There are a few setae at the apex of each arm of the sternite. The two arms are joined to each other by membrane extending across the ventral surface of the basal piece.

The *tegmen* is made up of the basal piece plus the parameres. In this species the *basal piece* is long, slightly arcuate, sclerotized dorsally and membranous ventrally. The basal piece is attached proximally to the ninth abdominal segment and anus by the *second connecting membrane* and distally to the median lobe by the *first connecting membrane*. The first connecting membrane does not allow much movement between the basal piece and the median lobe. Two *apophyses* of the median lobe extend the length of the basal piece internally. The *parameres* have fused dorsally to form a conical plate. The edges turned under form a slit-like opening through which protrudes the *membranous median lobe* or penis.

The *ejaculatory duct* enters the ventral surface of the tegmen just distad of the base of the ninth sternite and extends along the length of the basal piece to the basal orifice of the median lobe. The median lobe bears the *ostium* on the dorsal apical surface through which the ejaculatory duct opens.

The aedeagus (tegmen plus penis) as here described corresponds to the Vaginate type discussed by Lindroth and Palmen (1956).

Female genitalia

(Figures 28 and 29)

The genitalia of the female are composed of the modified ninth and tenth abdominal segments. The eighth segment is reduced as described above.

The membranous *median oviduct* extends distad of the eighth segment and ends in the vagina. The median oviduct when retracted forms a telescoped tube with the distal portion drawn back into the proximal connecting membrane.

The *rectum* is situated dorsal to the median oviduct and has a large funnel-shaped *anal opening*. The median dorsal surface of the anus is a feebly sclerotized area which becomes a narrow strong rod for a short distance cephalad. The lateral plates located ventral to the anus represent the halves of the ninth tergite and are referred to as the *valvifers* by Tanner (1927).

The bulbous terminal portion of the median oviduct is the *vagina* which has an apical orifice, the *vulva*. The *hemisternites* or halves of the ninth sternite partially surround the vagina and extend a short distance beyond its apex. A *stylus* extends laterally from near the apex of each hemisternite.

Discussion

There are a number of problems involving the correct interpretation of the morphological structures of Coleoptera.

One of the more controversial points concerns the pterothoracic sternites. Ferris (1940) speaks of the non-existence of such structures in beetles. There was no difficulty in using the so-called orthodox interpretation of the sternal elements in the species here studied, but there is a problem, at least in the minds of some, of applying this same interpretation throughout the order.

In consulting the work of Tanner (1927) and Lindroth and Palmen (1956) on the female genitalia the difficulty of inconsistency and disagreement in interpretation of structures was met again. Furthermore, anyone who has investigated beetle morphology at all is aware of the fact that a better understanding of the whole female reproductive system is much needed. Such knowledge may well supply useful taxonomic characters.

Snodgrass (1909) wrote that the trochantin is absent on the metathorax of Coleoptera. Campau (1940) found an exception to this statement in the family Cupesidae which he considered to be probably the only exception. In this study of *Capnochroa fuliginosa* (Melsh.) a trochantin was found on the metathorax and mesothorax but not on the prothorax.

No attempt will be made here to remove or resolve these basic Coleopteran problems but it can be concluded that the very existence of them and the lack of equivalence in the views held by different workers is proof enough that a complete, careful and comprehensive morphological study of the whole order, Coleoptera, is very much needed if the systematic work on beetles is to achieve any semblance of a valid scheme of natural classification.

Literature Cited

Arnett, R. H. 1947. Coleoptera notes II: Silphidae. Canadian Ent. 79:110–113.

Blackwelder, R. E. 1936. Morphology of the coleopterous family Staphylinidae. Smithsonian Misc. Col. 94(13):1–102. 29 figs.

Borchmann, F. 1910. Coleopterorum Catalogus. vol. 17, pars 3: Alleculidae. W. Junk, Berlin. 80 p.

BOSTICK, BEVERLY O. 1945. The morphology of the carabid beetle *Calosoma scrutator* (Fabricius). Ann. Ent. Soc. America. 38:14–32.

BRYSON, H. R. and G. F. DILLON. 1941. Observations on the morphology of the corn seed beetle *Agonoderus pallipes* Fabricius (Coleoptera:Carabidae). Ann. Ent. Soc. America. 34:43–50.

BUTT, F. H. 1944. External morphology of *Amphimallon majalis* (Razoumowski) (Coleoptera:Scarabaeidae). Cornell Exp. Sta. Memoir 266.

CAMPAU, E. J. 1940. The morphology of *Chauliognathus pennsylvanicus* (de Geer) (Coleoptera:Cantharidae). Microentomology 5:57–85. 17 figs.

FERRIS, G. F. 1940. The myth of the thoracic sternites of insects. Microentomology. 5:87–90.

FORBES, W. T. M. 1922. The wing-venation of Coleoptera. Ann. Ent. Soc. America. 15:328–352. 71 figs.

__________. 1926. The wing-folding patterns of the Coleoptera. Journ. New York Ent. Soc. 34:42–139. 145 figs.

LINDROTH, C. H. and E. PALMEN. 1956. Coleoptera. *In* Tuxen, S. L. Taxonomist's glossary of genitalia in insects. p. 69–76.

LINDROTH, C. H. 1957. The principal terms used for male and female genitalia in Coleoptera. Opusc. Ent. 22:241–256.

RINGS, R. W. 1942. The external anatomy of *Sandalus niger* Knoch (Coleoptera:Rhipiceridae). Ann. Ent. Soc. America. 35:411–425.

SHARP, D. and F. MUIR. 1912. The comparative anatomy of the male genital tube in Coleoptera. Trans. Ent. Soc. London. 1912:477–642. 239 figs.

SNODGRASS, R. E. 1909. The thorax of insects and the articulation of the wings. Proc. United States Nat. Mus. 36:511–595.

__________. 1935. Principles of insect morphology. McGraw-Hill, New York. 667 p.

TANNER, V. M. 1927. A preliminary study of the the genitalia of female Coleoptera. Trans. American Ent. Soc. 53:5–50. 222 fig.

WILLIAMS, INEZ W. 1938. The comparative morphology of the mouth-parts of the order Coleoptera treated from the standpoint of phylogeny. Journ. New York Ent. Soc. 46:245–289. 101 figs.

LIST OF ABBREVIATIONS

A, dorso-lateral acetabulum
a, acetabulum
Ac, antecosta
Aclp, anteclypeus
acs, antecostal suture
Acx, antecoxal piece
An, anus
ANP, anterior notal wing process
AntR, antennal ridge
apo., apodeme of sternite 8
apo.p., apophyses of median lobe
AT, anterior tentorial arms
1Ax, *2Ax*, etc., axillary sclerite
AxC, axillary cord
Ba, basalare
b.pc, basal piece
C, ventro-lateral condyle
c, condyle
Cc, calcaria
Cd, cardo

Clp, clypeus
CLR, clypeolabral ridge
cm1, *cm2*, connecting membranes
Cr, crassa
Cx, coxa
CxC, coxal cavities
Cxc, coxal condyle
Dr, dorsal ridge
DT, dorsal tentorial arms
du.ej., ejaculatory duct
E, eye
Emp, empodium
Endst, metendosternite
Ephy, epipharynx
EPlf, epipleural fold
Epm, epimeron
Eps, episternum
es, epistomal suture
Fm, femur
For, foramen magnum
Fr, frons
Fu, furcal arms
Ga, galea
Ge, gena
Gu, gula
Hphy, hypopharynx
Hpm, hypomera
HS, hypopharyngeal suspensorium
Lc, lacinia
Lig, ligula
m, *m1*, median plates
ma, molar area
Mt, mentum
no, convergent sutures
o, ostium
Oc, occiput
oc, oculata
ocs, occipital suture
ovc, median oviduct
P, prostheca
p, median lobe
Pge, postgenae
Plf, palpifer
Plg, palpiger
Plp, palpus
PlR, pleural ridge
PlS_2, PlS_3, pleural sutures
pm, parameres
Pmt, postlabium
PN, postnotum
PN_3, postnotal plates
PNP, posterior notal wing process
Prlb, prelabium
Prmt, prementum
Prp, prepectus
Prsc, prescutum
PT, posterior tentorial arms
pt, posterior tentorial pits
Rect, rectum
S1, *S2*, *S3*, *etc.*, sternites
S9, hemisternites
SA, sternal apophyses
Scl, scutellum
Sct, scutum
Sge, subgenal area
SgR, subgenal ridge
sgs, subgenal suture
Smt, submentum
sns, sterno-notal suture
Sp, spiracles
Spls, sterno-pleural suture
Ss, spinasternum
St, stipes
st, stylus
T1, *T2*, *T3*, *etc.*, tergites
T9, valvifers
Tar, tarsus
TB, tentorial bridge
Tb, tibia
tm, tegmen
Tn, trochantin
Tor, tormae
Tr, torchanter
Un, claws
Utr, unguitractor plate
vag, vagina
vs, scutoscutellar ridges
vu, vluva
Vx, vertex
W, wedge cell
WP, pleural wing process
x, tendon of retractor muscle

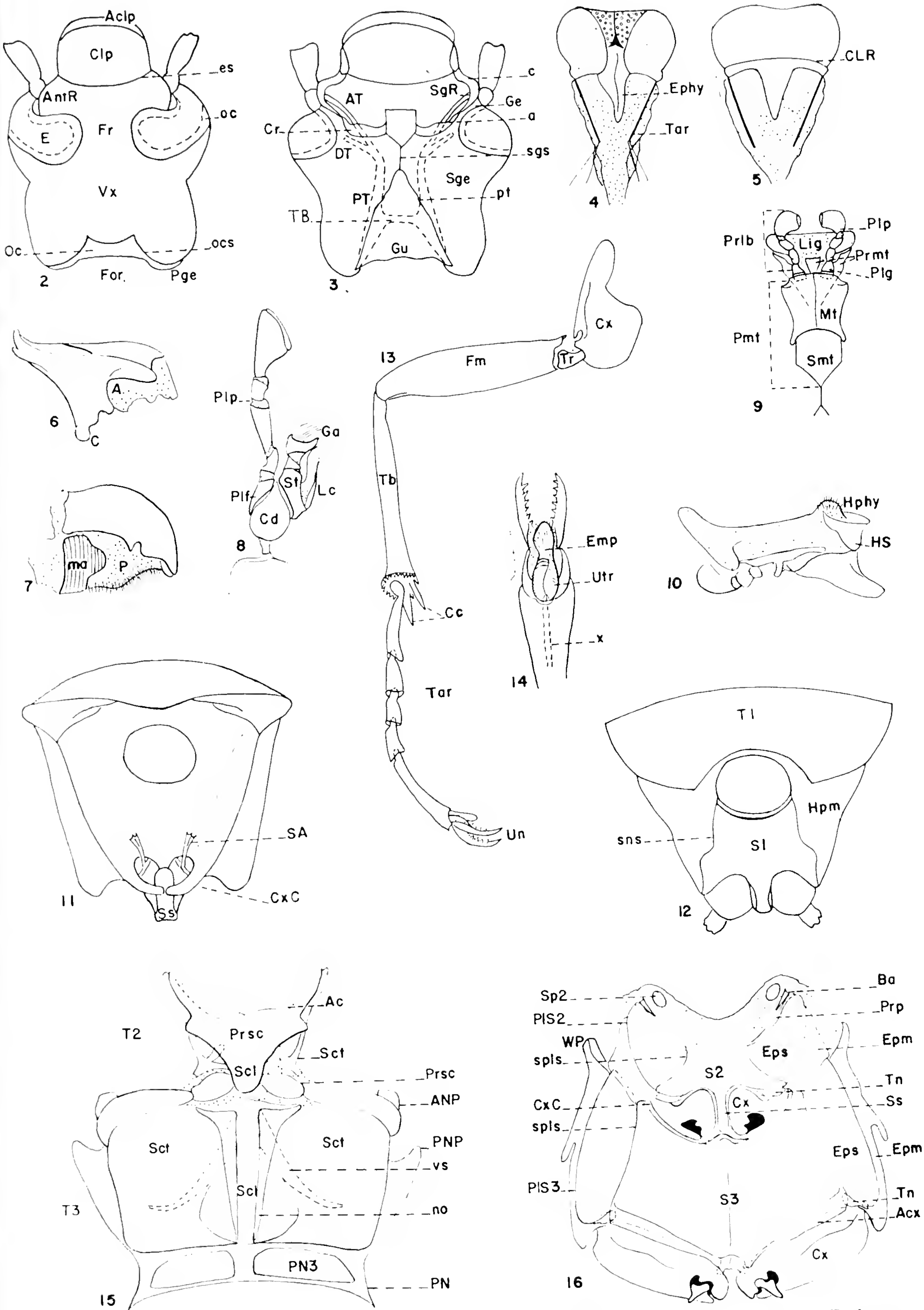


FIG. 2.—Head capsule, dorsal; FIG. 3.—Head capsule, ventral; FIG. 4.—Labrum, ventral; FIG. 5.—Labrum, dorsal; FIG. 6.—Left mandible, lateral; FIG. 7.—Left mandible, dorso-medial; FIG. 8.—Right maxilla, ventral; FIG. 9—Labium, ventral; FIG. 10.—Labium, dorso-lateral; FIG. 11.—Prothorax, posterior; FIG. 12.—Prothorax, anterior; FIG. 13.—Prothoracic leg; FIG. 14.—Detail of fifth tarsal segment; FIG. 15.—Pterothorax, dorsal; FIG. 16.—Pterothorax, ventral.

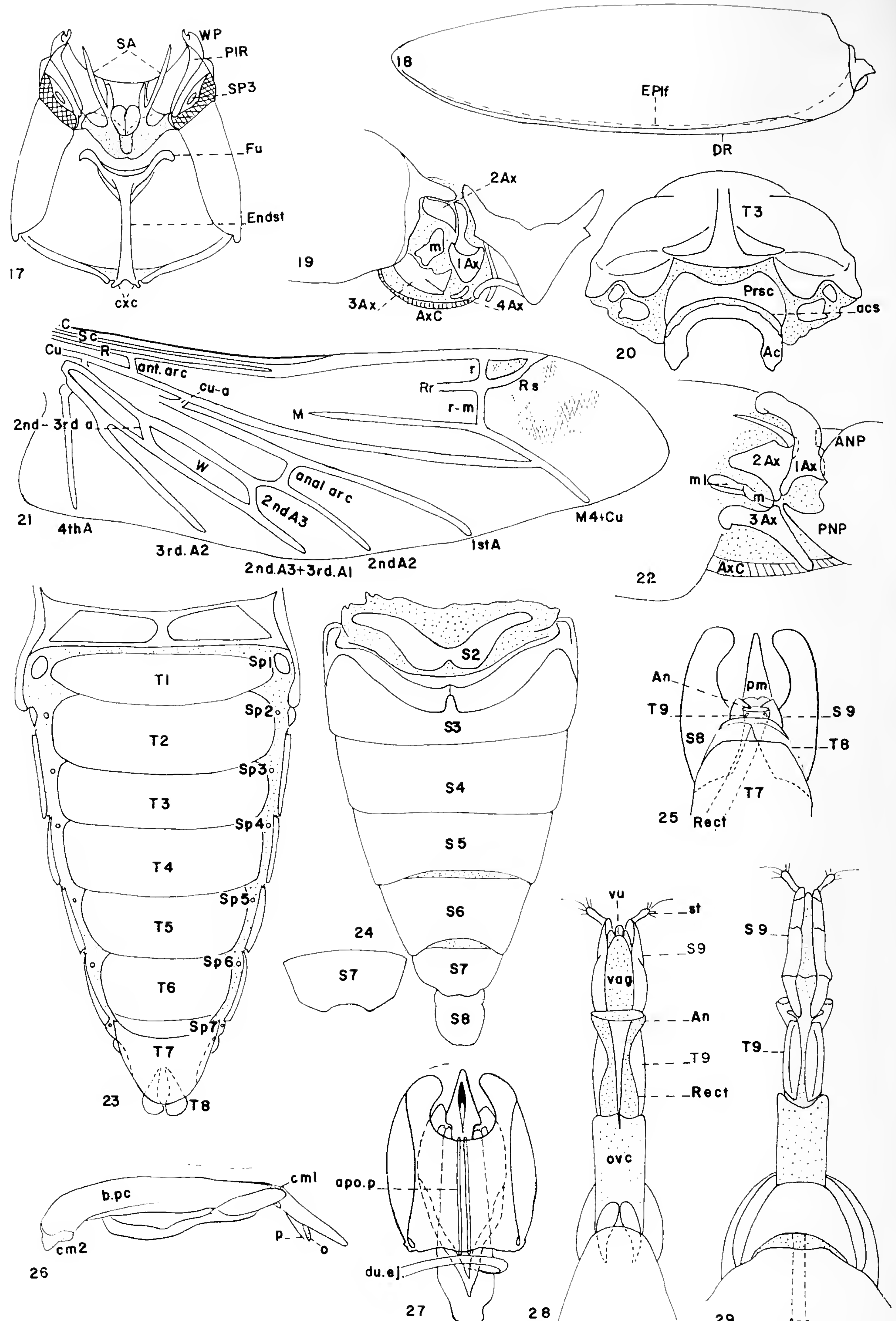


Fig. 17.—Pterothoracic endoskeleton; fig. 18.—Elytron, right; fig. 19.—Articulation of elytron; fig. 20.—Metathorax, anterior; fig. 21.—Flying wing; fig. 22.—Articulation of flying wing; fig. 23.—Abdomen, dorsal; fig. 24.—Abdomen, ventral; inset: S7 of male; fig. 25.—Male genitalia, dorsal; fig. 26.—Tegmen, lateral; fig. 27.—Male genitalia, ventral; fig. 28.—Female genitalia, dorsal; fig. 29.—Female genitalia, ventral.

A NEW GENUS AND TWO NEW SPECIES OF WEEVILS FROM TEXAS WITH NOTES ON OTHERS (CURCULIONIDAE)

By HORACE R. BURKE[1, 2]

The following new weevils are described here so that the names will be available for use in a proposed paper on the Curculionidae of Texas. Taxonomic and distributional notes on three other species are also presented.

Mesagroicus parmerensis NEW SPECIES

(FIGURES 1-7)

Elongate oval; derm piceous, antennae and legs reddish-brown; densely clothed with rounded to irregular-shaped, closely appressed scales, the margins of which are contiguous to narrowly overlapping; scales predominately brown above, gray on ventral side of body, on legs, and in a broad lateral vitta along each side of prothorax and elytra; body and appendages bearing long, tan, suberect, bristlelike to more slender and parallel-sided setae.

HOLOTYPE MALE: Length, 4.9 mm. (from anterior margins of eyes to apices of elytra); width, 2.0 mm. (across elytra); pronotum width, 1.4 mm.; pronotum length, 1.1 mm.

Rostrum quadrate, flattened dorsally, basal two-thirds clothed above with irregular-shaped scales and prominent, suberect setae, apical portion shining and remotely punctured; median sulcus narrow, deep, beginning on front between eyes and extending forward to a point opposite antennal insertions; nasal plate triangular, emarginate in front, indistinctly defined behind; scrobe broad, but deep and well-defined, moderately angulate, directed immediately beneath lower margin of eye. Antenna stout; scape strongly clavate, densely squamose, setose, apex reaching upper posterior margin of eye; funicular segments prominently setose, segment 1 stouter and as long as 2+3, 2 slightly longer than 3, 3-7 approximately equal in length, 7 wider; club elongate oval, pubescent, as long as preceding five funicular segments combined. Eyes subcircular, moderately convex. Forehead slightly convex in side view, clothed with scales and setae like those on rostrum. Prothorax a little wider than long, sides evenly rounded, widest at middle; base of prothorax with collarlike constriction extending across dorsum and down sides; scales on pronotal disk brown, irregular in shape, their margins contiguous, those scales along each lateral margin of pronotum and on propleura gray in color forming a broad vitta which extends back into side of elytra; setae more abundant along lateral margins of prothorax, bristlelike with acute tips, but on dorsal surface intermixed with some which are more slender, parallel-sided and narrowly truncated at tips; sculpture of prothorax, beneath the dense scales, consists of very much flattened, inconspicuous tubercules, a

[1] Technical Contribution No. 3405, Department of Entomology, Texas Agricultural Experiment Station, College Station.

[2] I am indebted to Miss Rose Ella Warner, Entomology Research Division, U.S.D.A., for arranging the loan of specimens for comparison, and to J. W. Jones and W. L. Owens, Jr., for providing information on the economic damage caused by one of the weevils described here.

few of which are visible through the scaly covering. Scutellum triangular, squamose. Elytra approximately 2.8 times longer than prothorax; basal margin, in region of scutellum, sloping gently forward to level of mesonotum, more nearly perpendicular at sides; humeri rounded, merging gradually into the parallel elytral sides; elytral scales rounded, narrowly overlapping, striate, especially on base of elytra and on declivity, scales mostly brown on disc but faintly mottled with lighter scales, gray in broad vitta along each side; intervals wide, flat, each bearing a row of long, slender, suberect setae; striae indistinct, punctures small, each bearing a slender to squamiform white seta. Ventral side of body densely clothed with rounded, grayish, slightly iridescent scales, recumbent setae, and a few scattered plumose scales on coxae, mesosternum and along lateral edges of abdominal sterna. Abdominal sterna 1 and 2 broadly impressed at middle, 1 more distinctly so, first suture arcuate, sternum 2 longer at middle than 3+4, 5 same length as 3+4. Femora strongly, abruptly clavate, densely covered with rounded, opalescent scales. Tibiae slender, straight, inner margins slightly sinuate, scales irregular in shape and not overlapping, setae more abundant along inside margin near apex; all tibiae feebly mucronate. Tarsi slender, setose with a thin coating of small scales, segment 3 deeply emarginate, much broader than 2, segment 4 as long as 2+3. Claws divergent.

ALLOTYPE FEMALE: Length, 5.2 mm.; width, 2.5 mm.; pronotum width, 1.6 mm.; pronotum length, 1.2 mm.

Resembles male holotype, except body is more robust, prothorax more strongly rounded, impression in middle of first abdominal sternum not so well defined, and only the fore and middle tibiae mucronate.

TYPE MATERIAL: Holotype male and allotype female, Parmer Co., Texas VI-2-1958 (feeding on seedling cotton) in Collection of Department of Entomology, A. & M. College of Texas. Eleven paratypes, same data as holotype and allotype, to be deposited as follows: 3 in U. S. National Museum, 8 in A. & M. College of Texas.

The length of 7 paratype males ranges from 4.2 to 4.9 mm. Four female paratypes range from 4.4 to 5.5 mm. in length. The variation in the paratype series is slight, except that some have the brown scales on the disc of the elytra conspicuously mottled with lighter scales. Some of the paratypes have distinct, dark median and sublateral vittae on the pronotum.

Mesagroicus parmerensis n. sp. is apparently not closely related to any known species of the genus, and will not trace to either of the three groups proposed by Buchanan (1929). The characters possessed by members of this new species appear sufficiently distinct to warrant the establishment of a fourth group. The following adaptation of Buchanan's key to the groups of *Mesagroicus* will serve to separate *Mesagroicus parmerensis* n. sp. from others now known to occur in North America.

1. Basal margin of elytra (the deflexed portion extending downward to the mesonotum) perpendicular, or nearly so, from side to side. Elytral scales dense and broadly overlapping 2

   Surface of elytra, in vicinity of scutellum, sloping gently forward and downward to level of mesonotum, the basal margin perpendicular only at the sides. Elytral scales rounded or irregular-shaped, less numerous and at most only narrowly overlapping 3

2. Form rather stout, the elytra slightly inflated behind. Elytra setae truncate at tip, shorter, stouter, in a nearly regular single row along each interval, and in side view, distinctly curved and inclined. Pronotal tubercules moderately to strongly developed, though sometimes obscured by a surface crust............................ **Group I**

Form more slender, subparallel. Elytral setae acute at tip (bristlelike), longer, more numerous and less regular, and more nearly erect. Pronotum not tuberculate.. **Group II**

3. Legs with numerous hairs, but without appressed scales, punctation visible. Elytra with plumose scales on flanks.. **Group III**

Legs setose, and also with a dense coating of rounded to irregular-shaped, closely appressed scales, punctation not visible. Elytra without plumose scales on flanks ....(Mesagroicus parmerensis n. sp.) **Group IV**

The specimens included in the type series were found feeding on seedling cotton in Parmer Co., Texas, VI–2–1958. Infestations heavy enough to cause concern among the farmers in that area were reported throughout May and June, 1958. According to these reports the damage caused by the weevils was confined to the edges of fields bordering rangeland. The injury to the seedling cotton resulted from the feeding of the weevils on the stems of the young plants immediately after the plants had emerged from the soil. Apparently this weevil is only an occasional pest of cotton, since infestations occurred in limited areas during the early growing season of 1958 and were not noticed at all the following year.

The little information available on the food habits of members of this genus of weevils indicates that other species of *Mesagroicus* have occasionally damaged cultivated plants. *Mesagroicus herricki* (Pierce) (=*Lepidocricus herricki* Pierce, 1910, p. 362) was described from specimens found feeding on cotton in Mississippi. Buchanan (1929) cites label data indicating that *Mesagroicus minor* Buchanan has been found "injuring potato" in Kansas, and *Mesagroicus hispidus* Buchanan "feeding on sugar beet" in California.

Paranametis NEW GENUS

Traces to *Anametis* Horn in Pierce's (1913) key to genera of the tribe Tropiphorini. However, the present new genus differs from *Anametis*, type *granulata* (Say), not only in general habitus, but also by the following combination of characters: body smaller and much more robust than in that species, transverse impression before eyes not so well defined, eyes located more laterally on the head, scape of antennae densely squamose, suberect setae of body stouter, and apex of abdominal sternum 8 strongly compressed and bladelike (e.g., as in *Dyslobus granicollis* Lec. and *D. decoratus* Lec.).

Robust, densely clothed with closely appressed, contiguous to separated, irregular-shaped scales and short, clavate, suberect to recumbent setae. Head with shallow, transverse impression at base of rostrum before eyes. Rostrum longer than head, widened at apex; median carina distinct; nasal plate crescent-shaped, sharply limited behind by a ridge which is rounded to obtusely pointed posteriorly. Scrobes lateral, deep, moderately angulate and directed toward extreme lower margin of eye. Scape squamose, strongly clavate, apex reaching middle posterior margin of eye. Antenna 7-segmented, first two segments longer, remaining segments obconical, each slightly longer than wide, segment 7 distinctly separated from club. Ocular lobes prominent. Prothorax wider than long, covered with conspicuous, scale-covered tubercules, prothoracic sides moderately and evenly rounded, median longitudinal groove feebly evident for most of length of pronotum. Elytra oval, widest before middle, humeri obsolete. Scutellum small, triangular. Metathoracic wings absent. Elytral intervals each bearing confused rows of setae. Elytral striae 9 and 10 confluent for a distance at middle. First abdominal suture feebly arcuate. Abdominal sternum 2 slightly longer at middle than 3+4. Posterior portion of abdominal sternum 8 strongly compressed to form a bladelike structure. Femora strongly clavate. Fore and middle tibiae dentate within, all tibiae mucronate. Corbels of hind tibiae enclosed. Tarsal segments pubescent beneath, segment 3 bilobed and much broader than 2. Claws free.

TYPE SPECIES: *Paranametis distincta* n. sp., here designated.

Paranametis distincta NEW SPECIES

(FIGURES 8–12)

HOLOTYPE FEMALE: Length, 4.9 mm. (from anterior margins of eyes to apices of elytra); width, 2.8 mm. (across elytra); pronotum width, 1.8 mm.; pronotum length, 1.1 mm.

Derm dull black, antennae and legs dark reddish-brown. Gray scaly vestiture inconspicuously mottled with pale brown and lighter scales on pronotum and elytra. Rostrum thickened and widened apically, covered above with dense, irregular-shaped scales, clavate, suberect setae, and a brown, waxy exudation; median carina distinct, originating at bottom of transverse impression at base of rostrum and extending anteriorly to where it terminates in a short, deep groove immediately behind a point opposite antennal insertion; nasal plate crescent-shaped, emarginate in front, limited behind by a sharp ridge; scrobes lateral, moderately angulate, well-defined throughout and directed toward extreme lower margin of eye. Antenna rather long; scape slightly arcuate, strongly clavate, setose and densely squamose, apex reaching middle posterior margin of eye; first two funicular segments elongate, 1 slightly longer than 2, segment 3 very slightly longer than 4, 5 and 6 approximately equal in width and length, 7 longer and wider; club oval, darker, as long as four preceding funicular segments combined, densely pubescent and with a few erect setae. Eyes feebly convex, oval, obtuse beneath, with a deep orbital groove along upper anterior margin; posterior margin of eye contiguous with ocular lobe. Prothorax distinctly wider than long, sides moderately rounded, median longitudinal groove faintly evident, ocular lobes prominent; sides and dorsum of prothorax densely covered with prominent, scale-covered tubercules, each of which bears a flattened, clavate, recumbent to suberect seta on its summit; scales in median and sublateral vittae lighter in color than remaining scales on prothorax. Elytra oval, widest before middle, 3 times longer than prothorax and about 1.5 times wider, base feebly emarginate, humeri obsolete; scutellum small, scarcely visible. Elytral scales striated, irregular-shaped, those along base of elytra dense and with contiguous margins, scales elsewhere narrowly separated so that derm is visible between them; intervals feebly convex, bearing confused rows of clavate setae, these setae becoming finer on intervals 8 and 9; strial punctures, round, shallow, each bearing a minute seta. Ventral side of body covered with scales like those on dorsal surface. Sutures of metasternal side pieces indistinct. Abdominal sternum 2 a little longer than 3+4, 5 almost as long as three preceding sterna combined and with a depression on each side of middle near apex. Femora strongly clavate, scales narrowly overlapping and more rounded than those on ventral side of body. Fore and middle tibiae dentate within, scales more irregular in shape than those on femora; all tibiae mucronate, hind pair feebly so. Tarsal segment 3 broad, deeply bilobed, segment 4 longer than 2+3. Claws free.

Type material: Holotype female and 3 paratype females (male unknown), Gillespie Co., Texas, V-3-1959 (S. D. & H. R. Burke) to be deposited in Collection of Department of Entomology, A. & M. College of Texas. The 3 paratypes agree well with the holotype. The type series was collected while sweeping mixed, low vegetation at the edge of a sparsely wooded area.

Mecynopyga texana Pierce

Mecynopyga texana Pierce, 1908, Proc. U. S. Nat. Mus., 34: 179.

Pierce erected *Mecynopyga* to contain this interesting little weevil which he described from a single specimen collected at San Diego, Texas. Regarding the relationship of *Mecynopyga* to other weevil genera, he stated, "The genus belongs near Pseudanthonomus in the Dietz tables". Examination of the type (in U.S.N.M.) revealed that the prolonged sides of the second abdominal sternum extend posteriorly to the fourth segment, completely covering the lateral edges of the third. Accordingly, this weevil should be placed in the tribe Tychiini and not in Anthonomini as originally proposed by Pierce. *Mecynopyga* is apparently most closely related to *Tychius* from which it may easily be distinguished by the prominent pygidium protruding past the apices of the elytra (figure 13). The type is a female. Other than the usual characters of sexual dimorphism in weevils, the male differs from the female by the deeper transverse impression of the fifth abdominal sternum.

Besides the type, another specimen collected at Cotulla, Texas, was seen in the Collection of the U. S. National Museum. I collected a total of six specimens during May 1959, in Kleberg, Zapata, and Live Oak counties. All of these collection localities are within 100 miles of the type locality of San Diego, Texas. These specimens were taken while beating shrubbery along fence rows and roadsides.

Anthonomus molochinus Dietz

Anthonomus molochinus Dietz, 1891, Trans. Am. Ent. Soc., 18: 231.

Numerous specimens of this weevil were swept from mixed vegetation in a small, isolated area bordering a pond in Anderson Co., Texas, VIII–31–1958. The species has previously been reported only from Montana, New Hampshire, Iowa and Ottawa, Canada.

Bagous pusillus LeConte

Bagous pusillus Leconte, 1876, Proc. American Phil. Soc., 15: 187.

A single example of this small weevil was collected at a light in Garwood, Texas, V–15–1959 (C. F. Bailey). Tanner (1943) lists the distribution of the species as Flordia, Illinois and Massachusetts.

Literature Cited

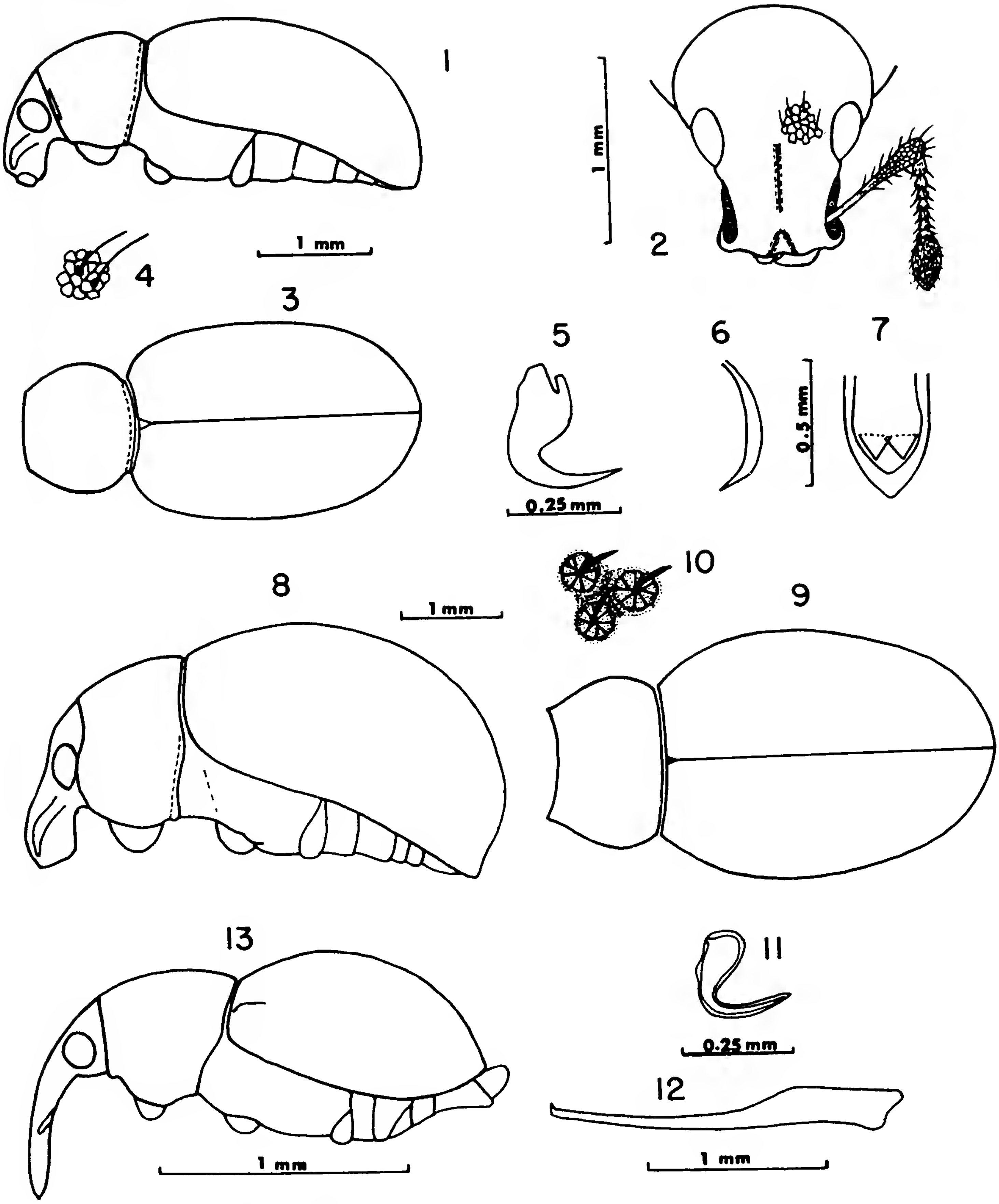
Buchanan, L. L. 1929. North American species of the weevils of the otiorhynchid genus Mesagroicus. Proc. U. S. Nat. Mus., 76: 1-14.

LeConte, J. L., and G. H. Horn 1876. The Rhynchophora of America north of Mexico. Proc. American Phil. Soc., 15:455 pp.

Pierce, W. D. 1910. Some new species of weevils of economic importance. Jour. Econ. Ent. 3:356-66.

————, 1913. Miscellaneous contributions to the knowledge of the weevils of the families Attelabidae and Brachyrhinidae. Proc. U. S. Nat. Mus., 45:365-426.

Tanner, V. M. 1943. A study of the subtribe Hydronomi with a description of new species (Curculionidae) Study No. VI. Great Basin Nat., 4:1-38.



FIGURES 1-7.—*Mesagroicus parmerensis* n. sp.: 1, Side view; 2, Front view of head and rostrum; 3, Dorsal outline of elytra and prothorax; 4, Portion of pronotum showing scale arrangement; 5, Spermatheca; 6, Side view of median lobe of male genitalia; 7, Dorsal view of apex of median lobe.

FIGURES 8-12.—*Paranametis distincta* n. sp.: 8, Side view; 9, Dorsal outline of elytra and prothorax; 10, Portion of pronotum (greatly enlarged) showing tubercules and scale arrangement; 11, Spermatheca; 12, Side view of 8th abdominal sternum of female.

FIGURE 13.—*Mecynopyga texana* Pierce, side view.